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AGRICULTURAL POLICY COURSE

NO. 206

Fredericksburg, Virginia
June 1-6, 1986

Participants' Manual

Presented to:

United States Agency for International Development
Washington, D.C.

Developed by:

Checchi and Company
Washington, D.C.

AGRICULTURAL POLICY COURSE
No. 206

Fredericksburg, Virginia
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o Improving Agricultural Policy Dialogue

o Improving Capacity for Agricultural Policy Planning and Analysis in Developing Countries

Participants' Manual

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FOREWORD

Checchi and Company is pleased to present the **Agricultural Policy Course** # 206 to Mission and Washington-based staff of the United States Agency for International Development. This course will be held near Fredericksburg, Virginia, roughly 50 miles south of Washington, D.C., from June 1-6, 1986. The course is made possible by AID's Training Division and by Checchi and Company's ongoing commitment to provide AID with expert policy and technical advice in a wide range of areas through rapid response Indefinite Quantity Contracts and longer-term development assistance projects.

The Agricultural Policy Course brings together approximately 20 expert lecturers, panel members, trainers and guest speakers to present material and interact with participants throughout the entire week. The Core Staff members are:

- Lehman Fletcher, Senior Agricultural Policy Advisor
- Malcolm Odell, Rural Development and Training Methods Specialist
- Ernest Carter, Agricultural Economist and Course Supervisor

Mr. Fletcher received his Ph.D. in Agricultural Economics from the University of California-Berkeley and has 20 years of experience in teaching, research and international consulting for agricultural programs worldwide, with particular emphasis in food policy issues. Mr. Odell received his Ph.D. in Development and Rural Sociology from Cornell University and has 25 years of experience with technology transfer programs in Africa and Asia, with particular emphasis in evaluation, management and training for agricultural and rural development. Mr. Carter, a member of Checchi and Company's home office professional staff, received his Masters degree in Agricultural Economics from the University of Wisconsin-Madison and has six years of experience in research and international consulting in the United States and Asia, with particular emphasis in agricultural development strategies and natural resource management schemes.

Course structure and content is the sole responsibility of the Core Staff, and course materials should not be copied without the prior consent of Checchi and Company, Washington, D.C. We gratefully acknowledge the helpful technical guidance provided us by Mr. Andra Herriott (M/PM/TD) and Mr. Phillip Church (S&T/AGR) of AID/Washington.

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COURSE SUMMARY

Designed especially for AID agricultural, economic and rural development officers, the Agricultural Policy Seminar provides an opportunity for individuals to increase their understanding of economic and other policies which affect agricultural sector performance in developing countries. This Seminar is designed to improve participant understanding of key concepts and analytical approaches that can assist them to formulate more effective strategy statements, to design improved projects and programs geared toward increasing host government capacity for agricultural planning and analysis, and to interact successfully with local officials on the subject of agricultural policy reform.

The Seminar was designed around two central themes. First, an increased understanding of the policy factors that influence good agricultural sector performance and a greater sensitivity toward political and institutional realities can enhance the dialogue between AID and the host government on the subject of policy reform. Second, an understanding of how to 'move' toward policies that lead to better agricultural sector performance, combined with the ability to select appropriate data collection systems and analytical approaches can enable AID officers to more effectively design and target assistance which builds host government capacity for agricultural planning and policy analysis.

The Agricultural Policy Seminar covers a wide range of policy issues that are of common interest to most developing countries. The major course topics may be summarized as follows:

- Macroeconomic, price and market interventions that affect costs and returns to producers, consumers and the government;
- Public support and investment decisions for research and extension, and other services and infrastructure;
- Parastatal divestiture and increased opportunities for private sector activity;
- Quantitative methods, agricultural pricing models and microcomputer applications;

- Data requirements and a comparative review of data systems; and
- Institutions and the issues of implementing agricultural policy reform and building capacity for agricultural policy planning and analysis.

The Agricultural Policy Seminar provides an excellent opportunity for participants to exchange ideas and share experiences with their peers and with experts in the field, and although a large amount of material will be covered, participants will undoubtedly wish to pursue issues which are not directly covered by the course. The following points indicate what the course will and will not accomplish:

<u>This course will</u>:

- assist participants to identify appropriate policy issues and instruments for achieving sectoral and national growth and equity goals;
- assist participants to become more effective dialogue and policy reform agents;
- improve participants' ability to formulate sectoral strategy statements and plan new assistance projects;
- enable participants to more effectively interact with technical assistance teams and define appropriate policy studies;
- provide an opportunity for formulate action plans for specific group and individual projects.

<u>This course will not</u>:

- review specific technical issues related to any number of development-related topics, such as soil conservation, reforestation techniques, rain-fed cropping systems, and improved educational and health systems;
- make economists of non-economists nor macro-economists of agricultural economists;
- improve participant negotiation and group dynamics skills;
- train participants to become professional policy analysts and experts;

These points and others related to the nature and content of the course will be reviewed with participants on Sunday during the intro-introduction/orientation session.

INTRODUCTION

INTRODUCTION

INSTRUCTIONS TO PARTICIPANTS

A. Course Format and Schedules

Throughout the week a range of instructional techniques will be used including short lectures and discussion periods, small group assignments, role playing, case studies and participant reports. Each day is divided up into several sessions of approximately one to two hours in length, separated by 15 to 30 minute breaks. Sessions typically begin at 8:30 AM and end at 6:00 PM, with lunches scheduled from 12:00 PM to 1:30 PM and dinners beginning at 6:00 PM. Occasionally, time has been set aside for an evening session; however, most evenings have been left open to allow participants to plan their own activities. Please refer to the Detailed Course Schedule for complete information. The Core Staff will inform participants on a daily basis of upcoming lecturers and guest speakers and any changes in the schedule of events.

B. Attendance, Readings and Preparation

Participants are expected to remain overnight at the Johnny Appleseed Inn (Best Western) during the entire week. Check in time is 2:00-3:15 PM on Sunday, and check out time is from 7:30-8:30 AM and 12:30-1:30 PM on Friday. Personal baggage should be packed between 7:30-8:30 AM on Friday and can be left in the room until departure.

Participants should plan to attend all sessions without exception. It is suggested that evenings be used for informal working group sessions, reading time to prepare for the following days' sessions and social interaction. A list of daily required and optional readings can be found in this manual directely following the tabbed page for that day, and readings are placed immediately following the session outline pages for each day. It is suggested that participants include their notes for each session as pages immediately following the session outline pages, so that each person has a personalized 'book' of the course by the end of the week. Supplementary readings are not provided in the course manual; however, a

bibliography of suggested readings will be provided at the end of the course along with a form which participants may use to order copies from AID's Training Division in Washington.

C. Hotel and Meal Costs

The per diem of $59.00 for Fredericksburg will adequately cover participant daily expenses. Participants should expect to pay for the following items:

- Room Costs: $32.70/day for single occupancy; an additional $16.45/day for double occupancy.
- Daily Beverages: $3.00/day
- Scheduled Meals:

  Sunday Dinner ---- $9.80
  Monday Lunch ----- $6.58
  Wednesday Lunch -- $6.58
  Thursday Lunch --- $6.58
  Friday Lunch ----- $6.58

- Other Unscheduled Meals

The hotel accepts travelers checks, and all major credit cards. Payment should be made to the Head Office Friday morning.

D. Working Groups

Agricultural policy analysis can be an empty exercise if there is no implementation of results. To assist participants and staff in focusing course activities on the real world of projects and programs in LDCs, participants will work individually and in small teams to prepare action plans for implementation after the course is completed. Teams will be formed -- based on shared interests -- on Sunday evening and will meet toward the end of each day to integrate seminar concepts into the planning process. On Friday morning, teams and individuals will present summaries of these plans in a simulated "Report to the Mission Director" for peer and staff review. Groups will also have the opportunity to suggest topics of special interest to be covered, where possible, by course staff.

The following is a formate for the Working Groups:

Goal: Integration of Seminar Learnings and Job-Specific Activities

Objective: Prepare Action Plan for Agricultural Policy Activities On-the-Job

Team Formation: Based on shared interests to be determined (e.g., PL-480, Pricing Policy, CDSS, Privatization, etc.)

Activities:

(1) Develop action plans for on-the-job application
(2) Integrate course content and job-specific activities
(3) Present plans for peer/staff review
(4) Provide leading questions for staff/presenters

Suggested Meetings:

Day	Approximate Times	Potential Topics/Tasks
Sunday	7:30 - 8:30 PM	Goals/Objectives Roles/Responsibilities
Monday	5:00 - 6:00 PM	Macro Policy/Pricing Issues
Tuesday	12:15 - 12:45 PM 5:30 - 6:00 PM	Non-Price Issues Quantitative Modeling
Wednesday	7:30 PM -	Farmers' Perceptions
Thursday	11:00 - 12:45 PM 4:00 - 5:30 PM 7:15 - 9:30 PM	Data and Information Institution Building Analytical Techniques Preparation of Reports
Friday	8:30 - 10:30 AM	"Report to the Mission Director"

More detailed guidance will be provided during the course as appropriate.

"Reports to the Mission Director" (Friday 8:30-10:30 AM) will consist of group presentations on major concepts and issues to be addressed and general working plans. Peers will briefly critique the group presentations.

E. Course Evaluations

The purpose of course evaluations is twofold: (1) to receive daily feedback from participants on how the course is proceeding so that the core staff can make adjustments during the week to better tailor the course to perceived needs; and (2) to receive comments from participants on how the course should be further modified to meet AID staff needs in the future. Short evaluations will be required on a daily basis, and a final evaluation will be completed before lunch on Friday.

F. Hotel Facilities and Recreation

Ernest Carter and his assistant will be available throughout the week to answer all questions related to hotel accommodations, facilities and local recreation. The hotel has a swimming pool and basketball and volleyball courts, and there are opportunities for jogging and walking nearby. There are several fast food sitdown restaurants within a block of the hotel. Fredericksburg offers some pleasant spots for informal evening get-togethers.

SUMMARY COURSE SCHEDULE, JUNE 1 - 6, 1986

-------ORIENTATION------	-------PROBLEM CONCEPTUALIZATION AND ANALYSIS-------		ROLE PLAY/ -SENSITIZING-	ORGANIZATION/ -----IMPLEMENTATION-----	----AG POLICY ON THE JOB----
	AG SECTOR AND NATIONAL ECONOMIC DEVELOPMENT	NON-PRICE AG POLICIES * PUBLIC SECTOR * PRIVATE SECTOR MICROCOMPUTER PRICE MODELLING	EXACTION SIMULATION	DATA AND INFORMATION SYSTEMS AID PROJECT AND IMPLEMENTATION EXPERIENCE BUILDING INSTITUTIONAL CAPACITY	JOB APPLICATION REPORTS
Pre-Course Day **SUNDAY**	**Day 1** **MONDAY**	**Day 2** **TUESDAY**	**Day 3** **WEDNESDAY**	**Day 4** **THURSDAY**	**Day 5** **FRIDAY**
	Ag Policy Analysis Framework Macro Policies	Public/Private Sector Roles	Exaction	Data and Information Systems	"Report to Mission Director" Simulation Course Evaluation
LUNCH	Speaker: Policy Dialogue (econ issues)			Speaker: Policy Dialogue (political issues)	
Introduction/ Orientation	Price and Market Intervention Concept Analysis	Quantitative Methods/ Micro-Computer Modelling	Exaction	Building Institutional Capacity * AID Project Expereience * Sudan Case Study * Local Organizations Measuring Impacts of Government Marketing Interventions	
DINNER Opening Speaker					
EVENINGS	Working Groups ----------				
Reading Time ----------					

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DETAILED COURSE SCHEDULE, JUNE 1 - 6, 1986

June 1
SUNDAY (Pre-Course Day)

1:00-3:15 TRAVEL TO FREDERICKSBURG AND CHECK INTO HOTEL --- --- --- --- ---

PERIOD	DESCRIPTION	STAFF
SESSION 1 3:30-6:00	OBJECTIVES: Course orientation and introduction. CONTENT: o Staff and participant introductions. o Introduce course: * objectives, content and manuals * schedules o Participants' needs assessment and expectations * "visioning" excercise	Core Staff AID Officers
DINNER --- 6:00-7:30	Speaker: Opening Address with Discussion	Schuh
SESSION 2 7:30-8:30	OBJECTIVES: Working Group formation * goal and objective setting * roles and responsibilities * planning for professional presentations Friday ("Report to Mission Director")	Odell Fletcher
EVENING 8:30-	o Review course materials. o Reading time.	

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DETAILED COURSE SCHEDULE, JUNE 1 - 6, 1986

June 2
MONDAY (Day 1)

OBJECTIVES: Understand the nature of good agricultural sector performance in relation to and as it is affected by overall national economic policies. Learn to identify the range of agricultural policies. Understand how macro policies affect ag sector performance, both growth and equity. Analyze costs and benefits useful in evaluating ag policies and making decisions about policy reform.

PERIOD	DESCRIPTION	STAFF
SESSION 1 8:30-10:00	OBJECTIVES: Understand the nature of good agricultural sector performance in relation to and as it is affected by overall national economic policies. Learn to identify the range of agricultural policies.	
	CONTENT: o Conceptual framework linking national-level policies to overall ag sector performance. Types of ag policies and their impacts on production, prices, employment, income distribution and other performance variables. o Public policies influencing resource allocation and performance in the ag sector.	Fletcher
	BREAK	
SESSION 2 10:30-12:00	OBJECTIVES: Understand how macro, trade and exchange rate policies affect incentives for ag production. Analyze costs and benefits useful in evaluating ag policies and making decisions about policy reform.	
	CONTENT: o Identify key macro policies, and outline how they determine incentive structures facing ag producers. o Evaluate impacts of macro policies using border prices and social opportunity costs.	Fletcher
LUNCH --- 12:00-1:30	Speaker: Agricultural Policy Reform	Mellor
SESSION 3 2:00-4:30	OBJECTIVES: To define measures of costs and benefits of ag pricing and market intervention policies, and evaluate their use in formulating appropriate policies.	
	CONTENT: o Demand, supply and elasticity concepts. o Types of inefficiencies. o Costs and benefits of market and price interventions.	Tweeten
	BREAK	
SESSION 4 5:00-6:00	Working Groups	Tweeten Core Staff
	--- --- **DINNER** --- ---	
EVENING	o Working Groups. o Reading time.	

DETAILED COURSE SCHEDULE, JUNE 1 - 6, 1986

June 3
TUESDAY (Day 2)

OBJECTIVES: To identify non-price agricultural policies and show how they determine the capacity of ag producers to respond to price incentives. To demonstrate quantitative techniques and models for evaluating price and non-price policies.

PERIOD	DESCRIPTION	STAFF
SESSION 1 8:30-10:00	OBJECTIVES: Understand the problems and how to assist government research and extension systems. CONTENT: o Using the Philippine example investment decisions and institutional chande will be explored.	Pray
	BREAK	
SESSION 2 10:30-12:00	OBJECTIVES: To identify the role of the private sector and appropriate government actions to stimulate private sector participation in food processing, product marketing, and input supply activities. Develop action programs for AID missions. CONTENT: o Review the track record of "privatization". o Overcoming constraints to parastatal divestiture. o Strengthening the private sector. o Jamaica Commodity Trading Corporation Case Study.	Meissner
SESSION 3 12:15-12:45	Working Groups	Pray Meissner Core Staff
	--- --- LUNCH --- ---	
SESSION 4 1:30-2:30	OBJECTIVES: Understand alternative methods of agricultural policy analysis, and be able to decide which methods to employ for a given situation. CONTENT: o Identify numerical measures that are useful for policy diagnosis. o Identify when more formal modeling approaches are appropriate.	Norton
	BREAK	
SESSION 5 2:45-4:15	OBJECTIVES: Distinguish between results obtained from single market and multi-market policy analysis, and determine data needs. CONTENT: o Microcomputer demonstration of the Sudan Pricing Model.	D'Silva
SESSION 6 4:30-5:15	OBJECTIVES: Gain better insight to the uses and abuses of economic models. CONTENT: o Panel discussion on the uses and abuses of economic models.	Norton, D'Silva Fletcher
SESSION 7 5:30-6:00	Working Groups	Norton, D'Silva Core Staff
	--- --- DINNER --- ---	
SESSION 8 8:00-9:30	o 'Exaction' Briefing o No reading assignments	Cruz, Whelan Rassas

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DETAILED COURSE SCHEDULE, JUNE 1 - 6, 1986

June 4
WEDNESDAY (Day 3)

OBJECTIVES: Sensitizing participants to a simulated real world situation which places them in the position of farmers, input distributors and government officials. Participants will experience the effect on their lives of changing economic and other enviornmental factors some of which can be influenced by agricultural policy.

PERIOD	DESCRIPTION	STAFF
SESSION 1 8:00-3:30	CONTENT: 'Exaction' Simulation.	Cruz, Whelan Rassas
	--- --- **LUNCH** --- ---	
SESSION 2 4:00-6:00	CONTENT: 'Exaction' Debriefing	Fletcher Cruz, Whelan Odell
	--- --- **DINNER** --- ---	
EVENING 7:30-	o Working Groups * Review projects from the perspective of individual 'Exaction' assignments. o Reading time	

DETAILED COURSE SCHEDULE, JUNE 1 - 6, 1986

June 5
THURSDAY (Day 4)

OBJECTIVES: To identify data needs and approaches to improving data bases in support of strengthened policy analysis and decision making capabilities in LDCs. To identify institutional and organizational needs and appropriate strategies for strengthening policy analysis capability.

PERIOD	DESCRIPTION	STAFF
SESSION 1 8:30-10:30	OBJECTIVES: Evaluate and establish priorities for data collection and processing in support of ag policy analysis.	
	CONTENT: o Establishing appropriate data bases and systems. o Comparitive analysis of formal and informal data collection techniques and analysis systems.	Fletcher Wigton Herman
SESSION 2 11:00-12:00	Working Groups	Wigton Herman Core Staff
LUNCH 12:15-2:00	--- Speaker: Policy Dialogue: "Political Factors in the Ag Policy Process"	Lofchie
* SESSION 3a 2:00-3:30	OBJECTIVES: To review the record of AID ag policy and planning projects, and outline the implementation process of improving LDC capacity for policy analysis. Review the process of local organization participation.	
	CONTENT: o Introduction of the Agricultural Policy and Analysis Project. o Comparative analysis of AID agricultural policy projects. o Sudan Case Study. o Local Organizations.	Hanrahan Hanrahan Bateson Odell
* SESSION 3b 2:00-3:30	OBJECTIVES: Review techniques for measuring impacts of government marketing interventions.	
	CONTENT: o Domestic terms of trade. o Measures of nominal and effective rates of protection. o Measures of comparative advantage.	Fletcher
	BREAK	
SESSION 4 4:00-5:30	Working Groups	Hanrahan Core Staff
	--- --- DINNER --- ---	
EVENING 7:15-9:30	o Working Groups complete assignments; prepare for presentations on Friday. o No reading assignments.	Core Staff

* Note: Sessions 3a and 3b will be run concurrently, and participants can elect to attend one of these sessions.

DETAILED COURSE SCHEDULE, JUNE 1 - 6, 1986

June 6
FRIDAY (Day 5)

OBJECTIVES: Outline and present for review a program or project for implementing policy dialogue and improving LDC ag planning and policy analysis capability through individual on-the-job assignments.

PERIOD	DESCRIPTION	STAFF
SESSION 1 8:30-10:30	OBJECTIVES: Present and discuss reports of the Working Groups. Outline "Individual Policy Activities and Action Plans". Group interaction coming to consensus/differing opinions on how do organize for action. CONTENT: o Apply course content through "Report to Mission Director". These reports would include issues related to improving the policy dialogue process and LDC policy analysis capability. Reports by groups and individuals.	Core Staff
SESSION 2 11:00-12:00	Course evaluation Feedback/Discussion	Staff AID Officers

---- LUNCH ---

2:00-3:30 **RETURN TO WASHINGTON, D.C.** --- --- --- --- ---

*** **Note:** Check out from hotel: 7:30-8:30 and 12:30-1:30.

LECTURER, TRAINER AND GUEST SPEAKER LIST

NAME	TITLE
Core Staff:	
Fletcher, Lee	Senior Agricultural Policy Advisor / Professor
Odell, Malcolm	Training Methods Specialist / Synergy Int'l
Carter, Ernest	Course Supervisor / Checchi
Lecturers, Panel Members:	
Tweeten, Luther	Agricultural Pricing Policy / Professor
Pray, Carl	Public Research and Extension / Professor
Meissner, Frank	Private Sector and Parastatals / IDB
Norton, Roger	Agricultural Pricing Models / Professor
D'Silva, Brian	Price Modeling Specialist / USDA
Wigton, William	Data Collection Systems / Consultant
Hermann, Chris	Data Collection Systems / AID
Bateson, William	Data Systems and Institutions / Checchi
Hanrahan, Charles	Ag Policy Analysis Project Director / Abt
'Exaction' Trainers:	
Cruz, Paula	Lead Trainer / AID
Whelan, William	Lead Trainer / USDA
Rassas, Cheri	Assistant Trainer / Abt
Guest Speakers:	
Schuh, Edward	Economic Policy Specialist / World Bank
Mellor, John	Economic Policy Specialist / IFPRI
Lofchie, Michael	African Politics Specialist / Professor

PARTICIPANTS LIST

NAME	MISSION
1 Alter, Dinsmore	ANE/TR/ARD
2 Bayer, Gary	Panama
3 Caldwell, Richard	Dakar
4 Crawford, Paul	Rabat
5 Crowley, Chris	Dehli
6 Daniel, Ron	Kinshasa
7 Deely, Daniel	S&T/FENR
8 Fuller, Kurt	Khartoum
9 Garner, Roger	Mogadishu
10 Goldman, Rich	Islamabad
11 Hess, David	Lima
12 Martella, Elizabeth	Kartoum
13 Maxy, Andrew	Barbados
14 Miller, Timothy	Lima
15 Miner, William	BIFAD
16 Mukherjee, Tridib	ANE/TR/ARD
17 Newberg, Richard	Bamako
18 Peters, Richard	Tegucigalpa
19 Stoner, Benjamin	Kathmandu
20 Taylor, George	Kathmandu
21 Thomas, John	Kenya
22 Vordorgee, Seth	Accra
23 Wahab, Abdul	Port-au-Prince
24 Whelan, William	OICD/USDA
25 Wiegand, Kenneth	Cairo
26 Wing, Harry	Guatemala

SUNDAY

AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: Course Intoduction and Orientation **Date:** Sunday, June 1
Lead Instructors: Core Staff, AID Officers **Session #:** 1
Co-Trainer(s): None **Time:** 3:30-6:00 pm

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OBJECTIVE(S):

- o Core Staff and Participants will become acquainted with each other.
- o Participants will understand the nature of the course and its limitations.
- o Participants will understand course structure and schedules.

==========

ABSTRACT:

- o Participant/Core Staff Introductions.
- o Course Introduction:
  - * objectives, content and manuals
  - * schedules
- o Participants' needs assessment and expectations
  - * brief presentations on cases and key concerns
  - * "visioning" excercise

==========

READINGS: Required/Optional

- o None

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AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: Working Group Formation | Date: Sunday, June 1
Lead Instructor: Odell | **Session #:** 2
Co-Trainer(s): Fletcher | **Time:** 7:30 - 8:30 pm

OBJECTIVE(S): At the end of this session participants will be able to:

- o Form Working Groups.
- o Understand Group/Individual Assignments.

ABSTRACT:

- o Tasks
  - * Outline team and individual goals and objectives for the week
  - * Plan overall working strategy for "Report to Mission Director"
  - * Differentiate team and individual roles, expectations
  - * Outline questions for tomorrow's session to help address team goals/objectives

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READINGS: Required/Optional

- o None.

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DEGRELANDIA

NATURAL RESOURCES, ENVIRONMENTAL DEGRADATION AND POLICY REFORM

The country of Degrelandia is experiencing severe loss of its productive resource base, which is leading to the loss of agricultural productivity and the acceleration of rural poverty. In light of this national emergency, the government has approached AID for assistance in seeking a solution. The Mission Director suspects that many of the country's existing economic and agricultural policies are contributing to this problem.

The Mission Director seeks a report for Friday on:

a. where AID can best invest future assistance funds;

b. an evaluation of the capacity of existing land tenure and resource management systems to adapt to the exigencies of the problem; and

c. a program of supporting GOD efforts to implement policy reforms that will help reverse the resource loss problem

By Friday:

a. To a limited extent construct a profile of the economic conditions and policies of Degrelandia;

b. Describe the process for assessing the impact of economic and non-economic policies of the deteriorating productive resource base;

c. Prepare a program to assist GOD to reform its policies to effectively halt the degradation process;

d. Outline a system of monitoring GOD policy reforms progress in this area.

Participants:

Wahab
Hess
Maxy
Miller
Crawford

DEGRALANDIA

I. PROBLEM STATEMENT

- Overgrazing on collective rangeland leading to natural resource degradation including soil erosion, devegetation and loss of productivity.

II. EFFECTS OF OVERGRAZING

- Palatable and nutritious plants are chewed down to nearly ground level.
- Palatable perennials give way to annuals and unpalatable perennials.
- Bare soil is exposed and eventually blown or washed away to expose rock.
- Loss of forest cover due to lack of regeneration.
- Less moisture penetration and retention.
- Livestock must travel further to find forage and spend more time grazing.
- Livestock become more susceptible to drought.
- Low productivity leads to higher meat prices and lower producer income.

III. SERIOUSNESS OF PROBLEM IN DEGRALANDIA

- 29,000 ha. are deforested each year.
- Massive soil erosion is decreasing top soil and siltation is decreasing the capacity of reservoirs.
- Sheep losses are extreme in the winter months because of animal stress and the unavailability of forage.
- Ultimately, continued degradation of range resources will seriously reduce the productive potential of the agricultural sector.

IV. WHY OVERGRAZING OF COLLECTIVE LANDS

- "Tragedy of Commons" concept.
- Breakdown of traditional controls over rangeland due to:

o Creation of government structure which undermined traditional tribal authority. Especially related to resource management.

o Increase in population pressure led to more sheep, owned by a larger number of producers on the range.

o Destruction of traditional human migration patterns.

o Conversion of the most productive collective land from range to private cropland.

- Livestock patterns and customs which are incompatible with effective range mangement.

  o No castration of rams and indiscriminate breeding practices.

  o Lack of breeding regulation.

  o Maintenance of excess animals as store of wealth.

V. WEAKNESSES IN CURRENT GOVERNMENT APPROACH/STRUCTURE

- Livestock service oriented to poultry, dairy and intensive cattle production.

- Livestock service oriented to veterinary care not animal production.

- Breeding oriented to phenotype not genotype.

- No linkage between livestock service and extension service.

- Extension service oriented toward crops.

- Decisions on range management efforts do not include producers.

VI. POLICY CHANGES

- Encourage legislation which transfers authority to manage collective lands from the appointed local government representative to the groupements as they are formed.

- Encourage policy change within MOA to create an animal husbandry capacity for extensive livestock especially small ruminants; and a national program for sheep selection especialy oriented toward groupements and coops.

- Encourage policy analysis/statistical unit of MOA to examine extensive livestock sector issues, such as:

o The effect of slaughter tax on offtake (should the tax vary seasonally?)

o Measure progress by groupements in improving their management practices.

o Measure benefits of increasing goat herds.

o The constraints and opportunities that exist for developing a wool industry based on local production, and eliminating imports of wool for the carpet industry.

VII. DONOR AGENCY ACTIONS

A. Convince other donors to put extensive livestock production on their policy agendas.

B. Support workshops/seminars on range management; animal production and strategy preparation.

C. Provide PD & S to assist government in preparing strategy.

D. Leverage policy reforms with the promise of a Grant Funded Project.

MALIMALA

AGRICULTURAL RESEARCH AND PRODUCTION POLICY REFORM

The Government of Malimala has launched a program of total food self-sufficiency, orienting its agricultural research, extension, credit, and marketing activities toward the production of crops and animal products for which it has no long-run comparative advantage. Other potentially profitable export crops and important domestic food crops are being overlooked.

The Mission Director seeks by Friday a report on:

a. how to orient the GOM toward a more viable long-run agricultural policy of development and trade;

b. an assessment of which crops and livestock activities to support; and

c. a program designed to assist the GOM in implementing a more appropriate research and extension program

During the week:

a. To a limited extent, construct a profile of the economy and agricultural policies of Malimala;

b. Describe how you would go about assessing a more suitable mix of crops and livestock activities for Malimala;

c. Formulate a program to assist the GOM toward an appropriately targeted and cost effective program of research and extension that will focus on several important goals, including:

   i) food self-sufficiency

   ii) more equitable growth in farm income

d. Prepare a system to monitor the GOM's policy reform programs in this area.

Participants:

Taylor	Daniel
Miner	Alter
Newberg	Voodzorgbe

MALIMALA

COUNTRY PROFILE:

Area:	1,250,000 sq. kms.
Climate:	Semi-arid Tropics
Population:	7,200,000 (85% engaged in agriculture)
Major Exports:	Cotton, Livestock
Major Food Crops:	Sorghum, Millet, Rice, Peanuts
Per Capita GNP:	$160

GOM POLICY OBJECTIVES:

1. To achieve food self-sufficiency by the year 2000.
   - construction and rehabilitation of irrigation infrastructure (rice)
   - integration of livestock production into farming systems (forage, animal traction)
2. Improve balance of payments situation by increasing agricultural export production.
   - cotton production for export
   - taxing livestock exports

SCENARIO:

1. Rice irrigation schemes <u>not viable</u>.
   - low fixed producer prices
   - water and farm management problems
2. Coarse grain production <u>is viable</u>.
   - markets liberalized recently and producer prices raised
   - new technology is ready for extension and further adaptive research

3. Cotton is in trouble.
   - world market price is below current production and marketing costs
   - inputs and credit are tied to cotton production
4. Rural parastatals are not viable.
   - inefficient
   - require heavy donor support

USAID STRATEGY:

1. Irrigation infrastructure investment is not recommended.
   - cost is high and risky
   - political will to make hard choices does not exist (urban elite and military)
2. Coarse grains investment is recommended.
   - helps to meet GOM nutritional requirements
   - helps to offset cereals imports and save foreign exchange
3. Rural parastatal reform needs study.
   - possibly transfer activities to village cooperatives and the private sector
   - De-link input supply and credit from cotton production

RESEARCH ON FARMING SYSTEMS:

Rationale: Introduction of shorter duration and higher yielding varieties

1. Rainfed Cereal Cropping System
   a. sorghum, millet, corn in rotation with peanuts and cowpeas
2. Small irrigation perimeters (30-40 ha.)
   a. irrigated rice
   b. vegetables in off-season

c. focus on water management

d. water user groups

Production:

1. Technology Transfer

   - increase use of animal traction
   - introduce improved cereal varieties
   - improve coverage - e.g., radio
   - link with farming systems research

2. Inputs Supply (fertilizer, seed, pest.)

   - phase-out parastatal
   - phase-in cooperatives and private sector
   - develop local improved seed businesses

3. Credit

   - phase-out parastatal
   - phase-in Agricultural Development Bank and cooperatives

DURING DESIGN PHASE - TWO YEARS:

Under the Economic Reform Project, we propose to use the centrally funded Agricultural Policy and Planning Project to:

1. conduct policy inventory;
2. calculate NPC, EPC and DRC for all major crops (including coarse grains, rice and cotton);
3. conduct Comparative Advantage Analysis for all crops to test hypos;
4. survey private enterprises in UVA to determine possibility of transferring input delivery to private sector;
5. study cooperative legislation and propose the entry of coops into the commercial sub-sector (input delivery);

6. study parastatal legislation; and

7. conduct Policy Dialogue on:

   a. limited privatization of input delivery for coarse grains; and

   b. substitution of domestic grains for imports to help balance of payments.

MOROLANDIA

FOOD AID AND POLICY REFORM

Food aid has an impact on the recipient's economic environment and reform policies. Suppose the USAID seeks to increase food aid significantly to the country of Morolandia.

By Friday, the Mission Director wants a report on:

a. The impact of this aid on various economic/social groups;

b. How to best use aid so as to be the least disruptive;

c. How to leverage policy reforms from it.

During the week:

a. To a limited exent construct a composite profile of the economy and policies of Morolandia. (Monday)

b. Describe how you would assess the economic and non-economic impact of this food aid. (Monday & Wednesday)

c. Construct a best case scenario on how to provide the food aid. (Wednesday)

d. Formulate a program to provide food aid in a manner that would leverage and foster policy reform. (Thursday)

e. Outline a system of monitoring the food aid program you suggest.

MOROLANDIA

COUNTRY PROFILE:

Population

- 10 million people
- 70% rural, 30% urban
- 60% literacy rate
- Capital city of 2 million people

Geography

- Generally hilly; one large, flat plain close to the ocean

Infrastructure

- One richer country to the north, two poorer countries to south and west.
- No railroad, limited road system.
- Adequate, but not good, seaport facility for handling grains.
- Limited irrigation infrastructure, especially upland.
- Dry season (9 mos.); wet season (3 mos.).

Agriculture/Economy

- Majority of farmers produce rainfed upland corn with low technology.
- Irrigated cotton on coastal plain.
- Cotton exports provide 60% of foreign exchange earnings.
- Cotton provides employment for 10% (1 million) of population.
- World cotton prices have declined considerably over last two years.
- Small, weak research service concentrating on cotton.
- State-run cotton enterprises: production, input/product marketing, oil processing plant using cottonseed.

- Importation of cheap NFDM from EEC; no existing PL-480 programs.
- Existing USAID DA portfolio: rural health, education, access road construction.
- Inflation rate of 18%.
- Domestic low savings and investment levels.
- Oil bill is high and causes negative BOP.
- Commercial imports of corn (30% of total corn consumption) for urban consumers.

Existing Policies

- Subsidized fertilizer and credit to cotton industry.
- 20% export tax on cotton.
- Ceiling price to farmers for corn to keep urban prices low.
- Government storage/marketing of grains; food distribution stores.
- Fixed exchange rate equivalent to US$; Overvalued by 15%.

Working group considers PL-480 as additional resource for development policies and programs to be integrated into Mission strategy framework.

Politics

Newly elected democratic government after 10 years of military rule. AID Mission Director wants to import 15,000 MT of wheat to support the new government.

ALTERNATIVE POLICIES:

1. Devalue currency (MT).
2. Increase corn prices paid to producers.
3. Reduce input subsidies for cotton.
4. Privatize cottonseed processing facilities.

5. Reduce consumer price subsidies for corn.

6. Support diversified crop research.

7. Reduce export taxes on cotton.

STRUCTURE OF CORN MARKET:

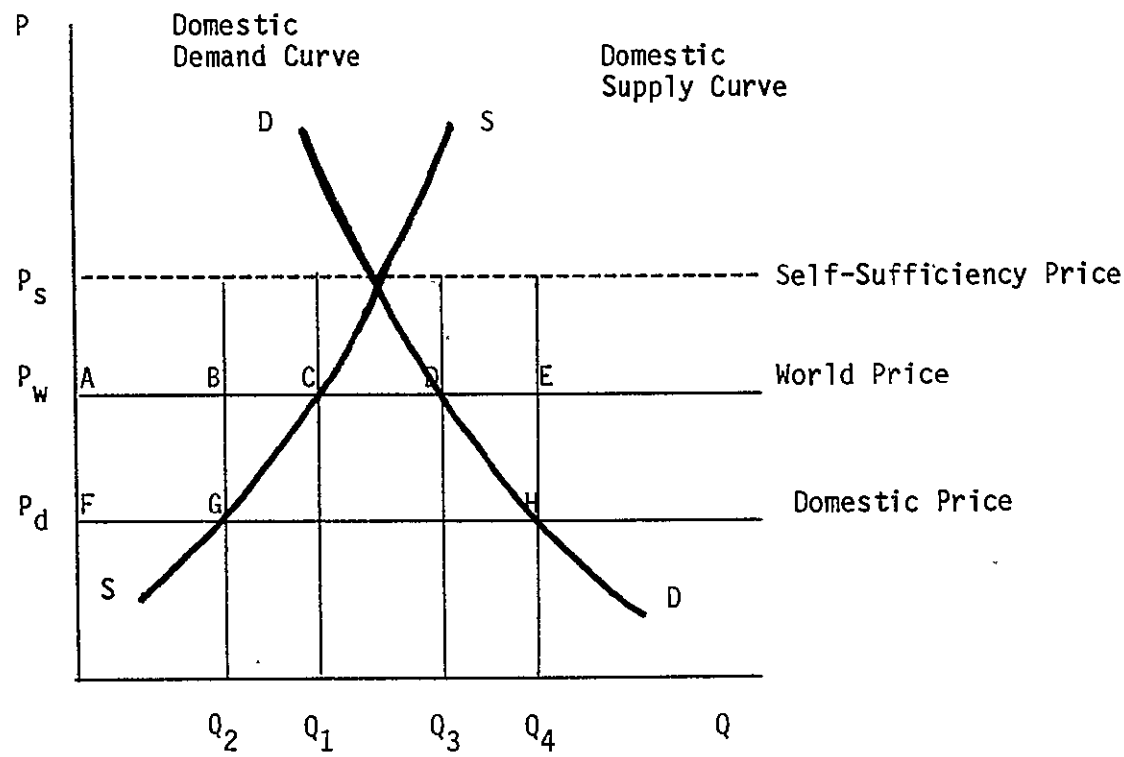
1. GOM purchases domestic corn from farmers at level 25% lower than import price of corn.

2. GOM sells its purchased corn (20% of total) through fair price shops to poor population at 20% below import price of corn.

3. GOM provides private sector with import permits to bring corn into country at going world price.

4. GOM insists that importers sell imported corn to general public at 15% below import price, giving subsidy $50 million/annually to importers for the difference (cheap food policy).

5. Local corn production not purchased and sold by GOM (80% of total) must be sold to consuming public by the private sector at 15% below import price.



Before subsidy:

1. Domestic price is equal to world price: Domestic Demand = Q_3 and Domestic Supply = Q_1
   Imports = $Q_3 - Q_1$

After subsidy:

1. Domestic price falls by $P_w - P_d$. Demand increases to Q_4 and Supply drops to Q_2. Imports increase by $Q_4 - Q_2$.

2. GOM pays subsidy on all imported corn. This is $(P_w - P_d)$ $(Q_4 - Q_2)$. BEHG above.

3. Rest of subsidy paid implicitly by farmers because of lower prices they receive. Income transfer to consumers equals ABGF plus profits lost by reducing output BCG.

CONSUMER SUBSIDY ON CORN ASPECTS:

- Subsidized corn imports taking place: Domestic price of corn in Morolandia for both producers and consumers is less than the world price.
- Quantity of domestically-reduced corn produced, amount consumed increases and corn imports are greater than before subsidy.
- GOM uses budget resources to lower price of corn so consumers are better off.
- Producers of corn lose because production, sales, profits reduced due to lower price: Producers transfer income to consumers.
- Food parity price (e.g., terms of trade) falls because domestic corn price reduced.
- Reported but unconfirmed contraband in large quantities (30%) of domestic corn production going to neighboring country to the north where prices are more favorable.

EXPECTED RESULTS OF REDUCING THE CONSUMER CORN SUBSIDY:

* We are not recommending self-sufficiency in corn, but freer market incentives to increase domestic corn production.

1. Increased domestic corn production
2. Reduced corn imports
3. Reduced corn contraband (increased effective supply)
4. Improved balance of payments
5. Reduced government expenditures on subsidies, but maintaining political serenity

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Permission to initiate negotiations with GOM

PROPOSED SELF-HELP MEASURES/PROGRAM:

1. Import crude vegetable oil, collect local proceeds (sales) from oil processing plants (monetization).
2. GOM uses 80% of sales proceeds to purchase corn from domestic producers (20% of total production) at 3-year average corn import prices (international).
3. GOM will continue to sell domestically purchased corn through fair price shops to poor population at 15% below import price.
4. Private sector required to purchase domestic corn at 3-year import average, sell to public at a profit above import price.
5. Private sector corn importers allowed to sell at profit above import price.
6. GOM uses 20% of sales proceeds to initiate diversified crop research program.
7. GOM will study location and operation of fair price shops, and other possible administrative controls (food stamps, etc.) for selling corn.
8. GOM will study the privatization of its government-owned oil processing plants.
9. GOM will undertake study to identify and prioritize agricultural policies for further dialogue with the AID Mission.

PANDAMANIA

PUBLIC/PRIVATE TRANSITION AND POLICY REFORM

Food processing, marketing, and input supply is totally controlled by the Government of Pandamania. Its bloated bureaucracy is inefficient, costly, and absorbs skilled human resources. The pressing problem of chronic public deficits has made government willing to discuss the divestiture of some of its activities.

By Friday, the Mission Director wants a report on:

a. where and under what conditions can AID best encourage privatization to occur;

b. an assessment of private sector capacity to provide agricultural services; and

c. a program of incentives to support GOP privatization efforts.

During the week:

a. To a limited extent construct a profile of the economy and policies of Pandamania.

b. Describe a process to assess private sector capacity.

c. Formulate a program to assist the government to divest some (which?) of its activities to private sector control.

d. Outline a system to monitor the GOP's policy reform progress in this area.

Participants:

Martella	Wiegand
Stoner	Thomas
Caldwell	Bayer
Goldman	

PANDAMANIA

COUNTRY PROFILE:

1. Large island in the Gulf of Mexico

2. Population: 2.2 million

3. Main Crops: Banana, Pineapple, Corn, Rice, Sugarcane

4. Terrain: Mountainous, Coastal Lowland

5. Agriculture Share of GDP:
   30% in 1976
   20% in 1986
   Agriculture stagnation due low technology in general

6. Growth Sector: Servicing of ships at two large ports

7. Government: Characterized by over employment of civil servants, parastatal organizations in production, (communal farms) processing (sugar mills), marketing (MA)

8. USAID Objectives: Increase agriculture production and productivity, assist GOP obtain share of lucrative Miami market for non-traditional produce (e.g., melons, papaya, cucumbers), and strengthen producers groups.

PROBLEM:

The Parastatal Marketing Agency (MA) is sole authorized importer of onions. MA staff are relatives and cronies of GOP political leaders. MA sets the retail price of onions to consumers. Farmers, attracted by high price of onions, have increased production of onions to the point that Pandamania could be self sufficient. MA, however, funds half of its budget from profits derived from the import and sale of onions. Thus, MA continues to import onions, flooding the market, forcing producers to sell at prices lower than production costs. The farmers, faced with overwhelming GOP competition, organize an onion growers association to control their own production. But, MA continues to import, and smaller farmers are going under, larger farmers with heavy investments are losing their shirts. What can be done?

POTENTIAL SOLUTIONS TO COUNTER MA'S DEVASTATING COMPETITION WITH ONION PRODUCERS:

1. Assist onion growers obtain crop projections which will demonstrate to the GOP the farmers' capacity to produce 100% of country's onion requirements.

Encourage Onion Growers Association to publish these statistics in national newspapers, thereby proving there is no justification for importation of onions.

a. Potential Implications:

(1) Public pressure will force MA to stop importing onion.

(2) Ministry of Agriculture will react angrily to publication of production statistics and blame USAID for thwarting GOP policy.

(3) Relatively short-term solution to problem of MA competing with farmers.

2. Benign Neglect. Leave MA alone and it will eventually fail due to growing opposition of farmers.

a. Potential Implications:

(1) Since the process is slow, most onion farmers will be forced out of business, and national onion production will decrease.

(2) Ministry of Agriculture will maintain good relations with USAID.

3. Motivate GOP to convert role of MA to that of the establishment and management of a grade and standard system as relates to both local and export market for agriculture crops.

a. USAID to offer package conversion deal:

(1) Grant of $2 million to GOP to pay bonus to half of MA's personnel who are surplus to its needs and will be dismissed.

(2) Remaining MA personnel to be trained in-country and/or the U.S. relating to grades and standards, marketing information, issuing export licenses.

b. Possible Implications:

(1) Dismissed employees may pressure GOP for new jobs, but their acceptance of "dismissal bonus" will lessen impact of their protest.

(2) Ministry of Agriculture will be able to continue, through MA, to provide some employment, thus relations with USAID will remain good.

(3) MA will help farmers upgrade quality of produce and qualify for export market.

(4) Long-term solution to MA

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AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: **Strengthening LDC Capacity for Policy Analysis** **Date:** Sunday, June 1
Guest Speaker: G. Edward Schuh **Time:** 6:00-7:30 pm

OBJECTIVE(S): At the end of this session participants will be able to:

- The importance of continuing policy dialogues with developing countries.
- The elements that make a policy dialogue sucessful.
- Policy issues of special importance.

ABSTRACT:

Please refer to Mr. Schuh's attached paper which he presented to the course participants.

HANDOUTS: Required/Optional

- None.

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STRENGTHENING COUNTRY CAPACITY FOR POLICY ANALYSIS*

G. Edward Schuh**

It is an honor to be here with you this evening at the beginning of this important course on agricultural policy. Policy reform and policy dialogue are the order of the day in international development policy. I am pleased to see it as the subject of your training session. I am also pleased to see what an excellent program your sponsors have put together for you.

In looking over your program, I have decided to focus on two sets of issues: (1) a few brief remarks on the policy dialogue and what is needed to make it a success; (2) a more extended discussion of the policy issues that need to be addressed in that policy dialogue. Under the second item, I will concentrate on some issues that seem to be neglected in your formal program.

The Policy Dialogue

There was a time not many years ago when any attempt to change economic policy in countries receiving foreign economic assistance was viewed as the worst form of interventionism, and an interference in the sovereign rights of nations. It wasn't that donor countries didn't try to influence economic policy. Almost any loan or grant program was clearly a

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* Presented to Agricultural Policy Course sponsored by USAID's Training Division and Checci and Company, Fredericksburg, Virginia, June 1, 1986.

** Director of Agriculture and Rural Development, The World Bank, Washington, DC

reflection of the donor's priorities, and usually led to a different set of investment patterns then what the recipient country would have had in the absence of the foreign assistance.

The economic crises many developing countries are experiencing in the early 1980's have led to a change in emphasis, and to a great deal more candor. This probably reflects a number of developments. First, there has been a growing recognition that bad economic policy has been an important cause of the poor economic performance of many developing countries. Second, it became increasingly clear that external resources represented a pittance compared to the total amount of resources needed to accelerate the development of developing countries, and thus the high degree of leverage which policy reform could give was essential for these external resources to have any significant impact. And third, there was a growing recognition that external resources provided in a bad economic environment had little chance of making a significant contribution to economic development. The great success of the economic reforms in China have provided the empirical support for the propositions that economic reforms do in fact matter.

The notion of policy dialogue emerged from this crucible of economic and institutional developments. It is explicit recognition that national sovereignty is still an important political issue. It is also recognition that if there is to be significant change in economic policy, there needs to be mutual agreement on what the changes in policy will be.

What does it take to have a successful policy dialogue? There is much that I could talk about here, but let me focus on just a couple of issues. First, the notion of a dialogue points to the importance of having a strong analytical capability on both sides of the table. The title of my talk points to the need to have a strong analytical capability in the recipient country. And I agree that that should have high priority. In fact, I have been critical of the World Bank's failure to help develop the analytical capability needed in the countries to which we lend money. All too often the extent of our assistance is to provide some resources to finance relevant studies by professionals in the borrowing country. Seldom do we undertake significant efforts to develop the institutional basis for a strong analytical capability in the borrowing country. The result is all too often a monologue, not a dialogue, with representatives of the borrowing country sitting on the other side of the table with documents prepared by the Bank staff. Needless to say, I don't think that is the way it should be done. Developing an indigenious capability for policy analysis should have high priority if we are to have successful policy dialogues.

Having emphasized the importance of having a strong analytical capability in the recipient country, I would hasten to add that having a strong analytical capability in the donor country is equally as important. Here I think the Bank comes off with fairly high marks, although we could almost always do better. But I would urge you to ask yourself whether AID has the in-house analytical capability for a strong policy dialogue - or whether it makes every effort to draw on existing expertise to develop the analyses needed. My purpose is not to judge you and your colleagues one

way or another. I just want to emphasize the importance of having strength on both sides of the table.

Finally, there is another point that needs stressing in developing the analytical capability. This capacity for agricultural policy analyses should be so located in the government that it can influence similar analytical groups in the planning and finance ministries. Similarly, it needs to have the analytical tools and quality of staff that will enable it to influence what comes out of those ministries. My remarks in the next section point to the kind of analytical skills needed.

The Policy Issues That Need to Be Addressed

I would like to address four topics under this rubric: (1) the need to understand the new international economy; (2) adjustment policies - the immediate priority; (3) public finance issues; (4) dealing with income distribution problems that arise from changes in economic policies.

The Need to Understand the New International Economy

There have been dramatic changes in the international economy these last 20 years. These changes have altered significantly the way that individual economies relate one to the other. They have changed the role that strictly domestic policies can play in influencing particular economies. They have provided direct links between monetary and fiscal

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policy and the agricultural sector. And they have provided strong links between financial markets and commodity markets.

What are these changes in the international economy? And what is their significance? The changes are four in number: (1) a significant growth in international trade throughout the post-World War II period, but especially in the decade of the 1970's; (2) the emergence of a well-integrated international capital market that now dominates economic relations among countries; (3) the shift in 1973 from the old Bretton-Woods fixed exchange rate system to a system of bloc-floating exchange rates; and (4) the emergence of a great deal of monetary instability in the period since 1968.

What is the significance of these for agricultural policy? A great deal could be said about each. But let me just enumerate about six issues:

1. As economies grow more dependent on international trade, that is, more open, their economies becomes increasingly beyond the reach of strictly domestic economic policies. This is the great frustration around the world, although the problem is seldom recognized for what it is.

2. The combination of a shift to floating exchange rates and the emergence of a well-integrated international capital market causes monetary and fiscal policy to effect the economy through

changes in the export and import-competing sectors. In many developing countries agriculture is an important trade sector, both on the import and export sides. Contrary to the past, therefore, monetary and fiscal policies play a major role in the performance of the agricultural sector.

3. The combination of the same two developments causes there to be a strong linkage between financial and commodity markets, both domestically in individual countries and in international markets. One can't understand what is going on in commodity markets without understanding what is happening in the financial markets.

4. Currently, the international capital market is driving the international system. In 1984, for example, total international trade flows were $2 trillion; total international capital flows, on the other hand, were on the order of $42 trillion! Clearly, the international capital flows are dominating exchange rates, that most important price in any given country.

5. Swings in the value of national currencies in countries such as the US, Britain, and France have important third-country effects. This is due to the bloc-floating nature of the new exchange rate system. The value of currencies fixed to the value of the US dollar, for example, are changed implicitly relative to the currencies of all currencies fixed relative to the value of

the British pound or French franc when the value of the dollar changes relative to those currencies. This imposes significant external shocks on national economies.

6. Commodity markets have experienced a great deal of instability during the 1970's and early 1980's due to monetary instability. We tend to think of instability in these markets as due to the weather; increasingly they are strictly monetary phenomena.

The reason I focus on these issues is that they are so fundamental in doing agricultural policy work. Without an understanding of them, no sound agricultural policy work can be done. Similarly, the analytical tools needed are not those commonly associated with the analysis of agricultural policy.

Adjustment Policy - The Immediate Priority

A great deal of the World Bank's policy dialogue currently focuses on the need for economic adjustment. The focus of this adjustment is construed rather narrowly: the need to deal with balance of payments problems. This is a reflection of the Bank's newly-found role in dealing with the international debt crisis as part of the Baker Plan. The goal, of course, is to help the developing countries develop the means to service their international debt.

It is clear that adjustment policy should receive high priority at the present time. Moreover, conceptualizing policy reforms more generally in the context of economic adjustment is a useful way to address them. To this end, it is useful to think about three fundamentally different forms of adjustment: (1) those associated with economic reforms per se; (2) those associated with international trade or the external economy; and (3) those associated with the fundamental forces of economic development.

Let me make a few remarks about each of these. The fundamental policy reforms in most developing countries involve a reduction in the discrimination in economic policy against agriculture. Typically this requires a significant devaluation of the national currency and a reduction in the relative protection of the industrial or manufacturing sector. These changes will generally lead to shifts in the domestic terms of trade in favor of agriculture, and an increase in the relative social profitability of that sector. Associated with these changes will be a reduction in agricultural imports and an increase in agricultural exports.

The implied adjustments are obvious. There will be a relative shift of resources towards agriculture. The product configuration of the agricultural sector will likely change. The demand for modern inputs such as fertilizer will increase. And there will be a need to develop a marketing system to support increased agricultural exports. Significant reforms in economic policy can bring about significant needs for adjustment in each of these areas.

Trade adjustments generally have two fundamental sources. The first is a change in international comparative advantage on the international scene. This is important on today's international scene as a new production technology for tropical food crops emerges and as industrial sectors leap-frog from one country to another. The second source of adjustment is realignments in exchange rates. As noted above, in today's world these are often driven by shifts and flows in international capital markets and by indirect, third-country effects of realignments in the values of the world's major resource countries. One only need remember the large fall in the value of the dollar through the 1978's, its unprecedented rise in the early 1980's, and now its decline again, to perceive the large adjustments imposed on many of the developing countries from this source.

It is important to recognize that many reforms of economic policy have trade adjustment implications. But trade adjustments also have a life of their own, and can arise without policy reform. It is thus better to think about them separately.

Development adjustments refer to the need to reallocate resources in response to the fundamental forces of economic developments. Among other things, this typically requires the transfer of resources out of agriculture and to the nonfarm sector. Failure to accomplish this transfer in an efficient manner can lead to a significant loss in resource efficiency and to a widening gap in per capita income between the farm and nonfarm sector.

To conclude this section, let me emphasize that successfully dealing with these adjustment problems can be both an important source of economic growth and improved equity within an economy and internationally. In the case of policy reforms, the quicker the adjustment is made the quicker the benefits of efficiency prices will be obtained.

Public Finance Issues

"Getting the prices right" has become the bellwether of policy reform. However, it is only part of the story, and the next two issues I will discuss are important to the sustainability of the policy reform.

Reforming the fiscal system is important because many policy distortions are nothing more than means of transferring resources from one group in an economy to another. For example, it is seldom that policy-makers want to purposely discriminate against agriculture. Instead, they get sucked into over-valuing their currencies, for example, out of a fear that a fall in the value of their currency would cause food prices to rise and thus create unrest among politically volatile urban consumers. Similarly, high protective tariffs for the industrial sector are designed for the benefit of that sector, without recognizing that it is an implicit export tax that discriminates against agriculture.

If policy reforms are to be sustained, reforms in the fiscal system are needed to provide the distribution of income the political process demands. Such reforms will also help make the policies more

transparent, and this too can contribute to the reform process in its own right.

Dealing with the Income Distribution Consequences of Policy Reform

Policy reforms typically have pervasive income distribution consequences. These shifts in the distribution of income are the key to the key to the political acceptability of the reforms, and thus to the sustainability of the reforms. If urban workers and consumers are unwilling to accept the reduction in real incomes associated with increases in food prices, for example, one cannot expect the reforms that brought about the increases in food prices to stick.

Two kinds of analytical skills are needed to deal with this problem. The first is the ability to analyze the income distribution consequences in their own right. This is not a particularly wide-spread skill. The second is the ability to design institutional arrangements that will help deal with the problem. In the case of dealing with the problem of high prices, this will typically involve some targeted feeding system such as food stamps, fair price shops, or whatever.

Concluding Comments

In concluding my remarks I would like to stress how significant the changes in the international economy are for the new analytical capacity we need to be developing in the low income countries. These

changes give us a new policy agenda, and require that we think differently about the policy reform process itself. Needless to say, the analytical skills needed for this changed world are different, as is the new international perspective and the emphasis on monetary and fiscal policy that it requires. A changed international economy requires a new kit of economic tools.

MONDAY

READINGS FOR MONDAY

Session	Required/Optional
Session 1	
o World Bank, "Agriculture and Economic Development," World Development Report 1982, Part II, Washington, 1982, pp. 39-98.	X /
o Adelman, I., "Beyond Export-Led Growth," World Development, No. 9, 1986, pp. 937-49.	X /
o Reynolds, L., "The Functions of Government," Chapt. 6 in Economic Growth in the Third World, Yale University Press, New Haven and London, 1985, pp. 419-40.	X /
Session 2	
o Timmer, C.P., Falcon, W.P. and Pearson, S.R., "Macro-economic Policies and the Food System," Food Policy Analysis, Published for the World Bank, The John Hopkins University Press, Baltimore and London, 1983, pp. 215-59.	X /
o World Bank, "Pricing for Efficiency," Chapt. 6 in World Development Report 1983, Washington, 1983, pp. 57-63.	X /
Lunch	
o Mellor, John, "Agriculture on the Road to Industrialization," IFPRI, Reprint # 83, Washington.	/ X
o Mellor, John and Johnston, Bruce, "The World Food Equation: Interrelations Among Development, Employment, and Food Consumption," IFPRI, Reprinted from the Journal of Economic Literature, Vol. 22, June 1984.	/ X
Session 3	
o Tweeten, L., Introduction to Agricultural Policy Analysis: The Distribution of Economic Costs and Benefits from Market Intervention, Abt Associates, USAID, 1985.	X /

AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: Ag Sector Performance and Economic Growth in Developing Countries
Date: Monday, June 2
Lead Instructor: Fletcher
Session #: 1
Co-Trainer(s):
Time: 8:30-10:00 am

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OBJECTIVE(S): At the end of this session participants will be able to:

- o Understand the nature of good agricultural sector performance in relation to overall national economic growth and development.
- o Identify the types of government policies and interventions affecting agriculture.
- o Appreciate why policies matter, and how they interact to affect growth and equity for producers and consumers.

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ABSTRACT:

- o Role of Agriculture in Economic Development: A Framework for Analysis
  - * product contributions
  - * market contributions
  - * factor contributions
  - * foreign exchange contributions
  - * summary and conclusions
- o Public Policies Influencing Resource Allocation and Performance in Agriculture
  - * direct public-sector intervention in agricultural production, marketing or input supply, with the state acting as entrepreneur
  - * government expenditures for infrastructure, supporting services, and regulations that guide and stimulate production, marketing and consumption
  - * government market interventions involving taxes, subsidies, tariffs, and direct controls that affect prices of outputs and inputs

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READINGS: Required/Optional

- o World Bank, "Agriculture and Economic Development," World Development Report 1982, Part II, Washington, 1982, pp. 39-98. X /___
- o Adelman, I., "Beyond Export-Led Growth," World Development, No. 9, 1986, pp. 937-49. X /___
- o Reynolds, L., "The Functions of Government," Chapt. 6 in Economic Growth in the Third World, Yale University Press, New Haven and London, 1985, pp. 419-40. X /___

Day One; Session One; 8:30-10:00 a.m.

Agricultural Sector Performance and Economic Growth in Developing Countries

Outline

I. Indicators of Socioeconomic Performance of National Economies
   A. Overall Economy
      1. Income per person and output per worker
      2. GDP growth: trends and fluctuations
      3. Life expectancy: nutritional and health status
      4. Infant mortality
      5. Inflation and budget deficits
      6. Balance of payments deficits; debt service
      7. Inequality in income distribution
   B. Agricultural Sector
      1. Agricultural GDP growth
      2. Calorie supply per capita
      3. Productivity and income in rural areas
      4. Agricultural income distribution
      5. Food price inflation
      6. Agricultural/food inports and exports; self-sufficiency ratios

II. Role of Agriculture in Economic Development: A Framework of Analysis
   A. Product Contributions
   B. Market Contributions
   C. Factor Contributions
   D. Foreign Exchange Contributions
   E. Implications for Development Strategies and Policies

III. Linkages Among Policy Objectives, Government Policy Instruments and Agricultural Sector Performance
   A. Agricultural Policy Objectives
      1. Increased food and agricultural production
      2. Low and/or stable food prices
      3. Improved food security or self-sufficiency
      4. Government revenues and expenditures
      5. Foreign exchange earnings and costs
   B. Government Policy Instruments
      1. Direct public-sector intervention in agricultural production, marketing or input supply, with the state acting as entrepreneur
      2. Government expenditures for infrastructure, supporting services and institutions that guide and stimulate private production, marketing and consumption activities
      3. Government market interventions that affect production incentives through taxes, subsidies, and direct controls that influence market prices of outputs and inputs

Table 1. Basic indicators

	Population (millions) mid-1983	Area (thousands of square kilometers)	GNP per capita[a] Dollars 1983	GNP per capita[a] Average annual growth rate (percent) 1965–83[b]	Average annual rate of inflation[a] (percent) 1965–73	Average annual rate of inflation[a] (percent) 1973–83[c]	Life expectancy at birth (years) 1983
Low-income economies	2,335.4 *t*	31,603 *t*	260 *w*	2.7 *w*	1.4 *w*	5.4 *w*	59 *w*
China and India	1,752.3 *t*	12,849 *t*	280 *w*	3.2 *w*	0.9 *w*	3.7 *w*	62 *w*
Other low-income	583.0 *t*	18,754 *t*	200 *w*	0.7 *w*	4.8 *w*	13.8 *w*	51 *w*
Sub-Saharan Africa	245.2 *t*	15,451 *t*	220 *w*	−0.2 *w*	3.9 *w*	17.5 *w*	48 *w*
1 Ethiopia	40.9	1,222	120	0.5	1.8	4.4	43
2 Bangladesh	95.5	144	130	0.5	7.3	9.6	50
3 Mali	7.2	1,240	160	1.2	7.6	10.3	45
4 Nepal	15.7	141	160	0.1	5.8	8.1	46
5 Zaire	29.7	2,345	170	−1.3	18.7	48.2	51
6 Burkina	6.5	274	180	1.4	2.6	10.8	44
7 Burma	35.5	677	180	2.2	2.8	6.5	55
8 Malawi	6.6	118	210	2.2	4.5	9.8	44
9 Uganda	13.9	236	220	−4.4	5.6	62.7	49
10 Burundi	4.5	28	240	2.1	2.9	12.4	47
11 Niger	6.1	1,267	240	−1.2	4.0	11.8	45
12 Tanzania	20.8	945	240	0.9	3.2	11.5	51
13 Somalia	5.1	638	250	−0.8	3.8	20.1	45
14 India	733.2	3,288	260	1.5	6.3	7.7	55
15 Rwanda	5.7	26	270	2.3	7.7	11.2	47
16 Central African Rep.	2.5	623	280	0.1	3.0	14.4	48
17 Togo	2.8	57	280	1.1	3.1	8.3	49
18 Benin	3.8	113	290	1.0	3.6	10.8	48
19 China	1,019.1	9,561	300	4.4	−1.0	1.7	67
20 Guinea	5.8	246	300	1.1	3.0	4.0	37
21 Haiti	5.3	28	300	1.1	4.0	7.8	54
22 Ghana	12.8	239	310	−2.1	8.1	51.6	59
23 Madagascar	9.5	587	310	−1.2	4.1	13.9	49
24 Sierra Leone	3.6	72	330	1.1	1.9	14.7	38
25 Sri Lanka	15.4	66	330	2.9	5.1	14.5	69
26 Kenya	18.9	583	340	2.3	2.3	10.8	57
27 Pakistan	89.7	804	390	2.5	4.8	11.1	50
28 Sudan	20.8	2,506	400	1.3	7.2	18.0	48
29 *Afghanistan*	17.2	648	.	0.5	3.8	..	36
30 *Bhutan*	1.2	47	.			..	43
31 *Chad*	4.8	1,284	..	.	4.5	8.3	43
32 *Kampuchea, Dem*	.	181	..	.	.		..
33 *Lao PDR*	3.7	237	..	..		.	44
34 *Mozambique*	13.1	802			.	.	46
35 *Viet Nam*	58.5	330		.	..		64
Middle-income economies	1,165.2 *t*	40,525 *t*	1,310 *w*	3.4 *w*	5.2 *w*	29.3 *w*	61 *w*
Oil exporters	542.6 *t*	15,511 *t*	1,060 *w*	3.3 *w*	4.4 *w*	19.6 *w*	57 *w*
Oil importers	622.6 *t*	25,014 *t*	1,530 *w*	3.5 *w*	5.7 *w*	34.4 *w*	64 *w*
Sub-Saharan Africa	148.2 *t*	5,822 *t*	700 *w*	1.9 *w*	4.8 *w*	12.4 *w*	50 *w*
Lower middle-income	665.1 *t*	18,446 *t*	750 *w*	2.9 *w*	5.6 *w*	17.9 *w*	57 *w*
36 Senegal	6.2	196	440	−0.5	3.0	8.9	46
37 Lesotho	1.5	30	460	6.3	4.4	11.9	53
38 Liberia	2.1	111	480	0.8	1.5	7.2	49
39 Mauritania	1.6	1,031	480	0.3	3.9	7.8	46
40 Bolivia	6.0	1,099	510	0.6	7.5	35.2	51
41 Yemen, PDR	2.0	333	520	.	..	..	46
42 Yemen Arab Rep.	7.6	195	550	5.7		13.9	44
43 Indonesia	155.7	1,919	560	5.0	63.0	18.0	54
44 Zambia	6.3	753	580	−1.3	5.2	10.3	51
45 Honduras	4.1	112	670	0.6	2.9	8.6	60
46 Egypt, Arab Rep.	45.2	1,001	700	4.2	2.6	13.2	58
47 El Salvador	5.2	21	710	−0.2	1.6	11.7	64
48 Ivory Coast	9.5	322	710	1.0	4.1	11.9	52
49 Zimbabwe	7.9	391	740	1.5	3.0	9.7	56
50 Morocco	20.8	447	760	2.9	2.0	8.4	52
51 Papua New Guinea	3.2	462	760	0.9	6.6	6.9	54
52 Philippines	52.1	300	760	2.9	8.8	11.7	64
53 Nigeria	93.6	924	770	3.2	10.3	13.3	49
54 Cameroon	9.6	475	820	2.7	5.8	12.6	54
55 Thailand	49.2	514	820	4.3	2.5	8.7	63
56 Nicaragua	3.0	130	880	−1.8	3.4	16.5	58
57 Costa Rica	2.4	51	1,020	2.1	4.7	23.2	74
58 Peru	17.9	1,285	1,040	0.1	10.1	52.3	58
59 Guatemala	7.9	109	1,120	2.1	1.9	9.9	60
60 Congo, People's Rep	1.8	342	1,230	3.5	4.6	12.4	63
61 Turkey	47.3	781	1,240	3.0	10.5	42.0	63
62 Tunisia	6.9	164	1,290	5.0	3.4	9.4	62
63 Jamaica	2.3	11	1,300	−0.5	5.9	16.0	70
64 Dominican Rep	6.0	49	1,370	3.9	2.7	8.5	63

Note For data comparability and coverage see the technical notes

Table 2. Growth of production

	Average annual growth rate (percent)									
	GDP		Agriculture		Industry		(Manufacturing)[a]		Services	
	1965–73[b]	1973–83[c]	1965–73[b]	1973–83[c]	1965–73[b]	1973–83[c]	1965–73[b]	1973–83[c]	1965–73[b]	1973–83[c]
Low-income economies	5.5 *w*	5.0 *w*	2.6 *w*	2.9 *w*	7.2 *w*	7.1 *w*	..	..	4.2 *w*	5.0 *w*
China and India	6.0 *w*	5.4 *w*	2.5 *w*	3.0 *w*	7.4 *w*	7.5 *w*	..	..	..	5.3 *w*
Other low-income	3.7 *w*	3.3 *w*	2.8 *w*	2.2 *w*	5.6 *w*	3.5 *w*	..	..	4.2 *w*	4.4 *w*
Sub-Saharan Africa	4.2 *w*	1.7 *w*	3.1 *w*	1.2 *w*	6.9 *w*	0.6 *w*	..	..	4.6 *w*	2.9 *w*
1 Ethiopia	4.1	2.3	2.1	1.2	6.1	2.6	8.8	3.5	6.7	3.6
2 Bangladesh	()	5.2	0.4	3.2	−6.1	8.1	..	..	1.5	7.4
3 Mali	3.1	4.1	0.9	5.0	5.2	0.6	..	..	4.7	4.5
4 Nepal	1.7	3.0	1.5	1.0	.	..	.	.	2.1	6.9
5 Zaire	3.9	−1.0	..	1.4		−2.0	.		.	−1.1
6 Burkina	2.4	3.5	..	1.3		5.1		.	.	4.5
7 Burma	2.9	6.0	2.8	6.6	3.6	7.7	3.2	6.1	2.8	5.1
8 Malawi	5.7	4.2		4.1	..	4.2		.		4.2
9 Uganda	3.6	−2.1	3.6	−1.6	3.0	−10.1	.	..	3.8	−1.0
10 Burundi	4.8	3.6	4.7	2.3	10.4	8.3	.	.	3.0	5.3
11 Niger	−0.8	5.2	−2.9	1.6	13.2	10.9	.	..	−1.5	5.9
12 Tanzania	5.0	3.6	3.1	2.6	6.9	0.2	.	.	6.2	5.4
13 Somalia		2.8		3.5		1.1	.	.	..	2.6
14 India	3.9	4.0	3.7	2.2	3.7	4.3	4.0	4.2	4.2	6.1
15 Rwanda	6.3	5.6	..	.	..	.	.	..	.	
16 Central African Rep	2.7	1.0	2.1	2.4	7.1	1.0	.	.	1.6	−0.7
17 Togo	5.3	2.3	2.6	1.1	6.2	2.6	.	.	7.3	3.0
18 Benin	2.2	4.8		2.7		6.9		..		6.0
19 China	7.4	6.0	1.9	3.5	9.1	8.4	..	.	..	4.5
20 Guinea	3.0	3.1	..	2.4	..	6.7		.	..	1.9
21 Haiti	1.7	3.0	−0.3	0.7	4.8	5.3	3.0	6.1	2.5	3.8
22 Ghana	3.4	−1.3	4.5	(.)	4.3	−7.0	6.5	−6.2	1.1	−0.3
23 Madagascar	3.5	0.3	..	−0.2	.	−1.8			..	1.2
24 Sierra Leone	3.7	1.9	1.5	2.2	1.9	−2.9	3.3	2.5	7.1	4.1
25 Sri Lanka	4.2	5.2	2.7	4.1	7.3	4.8	5.5	3.4	3.8	6.0
26 Kenya	7.9	4.6	6.2	3.4	12.4	5.3	12.4	6.3	7.8	5.3
27 Pakistan	5.4	5.6	4.7	3.4	6.6	7.2	6.2	7.0	5.4	6.3
28 Sudan	0.2	6.3	0.3	3.5	1.0	6.7		..	0.5	8.6
29 *Afghanistan*	1.0	2.4	−1.5	.	4.0	.	.	.	5.1	
30 *Bhutan*	.	..	..	..	.	..		..	..	..
31 *Chad*	0.5	−5.8	..	..	.		..	..		
32 *Kampuchea, Dem*	−2.7	.	..	..	.		..	..		.
33 *Lao PDR*	.	..	..	..	..		..	..	.	
34 *Mozambique*	.	.	.		.			.	..	..
35 *Viet Nam*	.	..		.	..		.	.	..	..
Middle-income economies	7.1 *w*	4.7 *w*	3.3 *w*	2.5 *w*	9.1 *w*	4.9 *w*	9.3 *w*	4.9 *w*	7.5 *w*	5.3 *w*
Oil exporters	7.2 *w*	4.9 *w*	3.5 *w*	1.8 *w*	10.0 *w*	5.2 *w*	9.1 *w*	8.4 *w*	7.1 *w*	5.9 *w*
Oil importers	7.0 *w*	4.5 *w*	3.2 *w*	3.1 *w*	8.5 *w*	4.7 *w*	9.4 *w*	4.2 *w*	7.8 *w*	4.9 *w*
Sub-Saharan Africa	7.7 *w*	1.4 *w*	2.4 *w*	−1.3 *w*	17.7 *w*	1.0 *w*	..	..	7.1 *w*	3.5 *w*
Lower middle-income	6.6 *w*	4.1 *w*	3.4 *w*	1.9 *w*	10.6 *w*	4.4 *w*	8.5 *w*	5.4 *w*	6.8 *w*	5.3 *w*
36 Senegal	1.5	2.6	0.2	0.3	3.5	6.1	..		1.5	2.2
37 Lesotho	3.9	5.5	..	.	..		..		.	..
38 Liberia	5.5	0.2	6.5	2.0	6.2	−1.5	13.2	0.5	3.8	0.8
39 Mauritania	2.6	2.5	−2.1	2.6	3.5	()		..	8.7	3.9
40 Bolivia	4.4	1.5	3.5	1.5	5.1	−0.6	4.2	1.7	4.3	2.6
41 Yemen, PDR	.	.	.	.		.	..	.		..
42 Yemen Arab Rep	.	8.2	.	2.1	.	13.2	.	.	.	11.3
43 Indonesia	8.1	7.0	4.8	3.7	13.4	8.6	9.0	12.6	9.6	9.0
44 Zambia	3.0	0.2	.	1.4	.	−0.3	.		..	0.6
45 Honduras	4.4	4.0	2.4	3.3	5.8	5.1	6.5	5.5	5.5	4.0
46 Egypt, Arab Rep.	3.8	8.8	2.6	2.5	3.8	10.6		.	4.7	11.1
47 El Salvador	4.4	−0.1	3.6	0.7	5.2	−1.4	5.1	−2.4	4.4	0.0
48 Ivory Coast	7.1	4.7	3.7	4.0	8.8	7.4	8.9	4.5	8.5	4.1
49 Zimbabwe	7.3	1.8	.	1.2		()		.		3.3
50 Morocco	5.7	4.7	4.8	0.7	5.4	4.0	6.1	4.0	6.1	6.1
51 Papua New Guinea	6.7	1.0	.	2.6		3.7		..	..	−0.1
52 Philippines	5.4	5.4	4.1	4.3	7.4	6.4	8.5	5.0	4.8	5.2
53 Nigeria	9.7	1.2	2.8	−1.9	19.7	0.3	15.0	10.7	8.8	4.1
54 Cameroon	4.2	6.8	4.7	1.8	4.7	13.7	7.5	9.9	3.6	7.3
55 Thailand	7.8	6.9	5.2	3.8	9.0	9.0	11.4	8.9	9.1	7.6
56 Nicaragua	3.9	−1.3	2.8	1.4	5.5	−0.9	7.2	0.8	3.6	−2.9
57 Costa Rica	7.1	2.7	7.0	1.7	9.3	3.0	.	..	6.1	2.9
58 Peru	3.5	1.8	2.0	0.9	4.1	1.6	4.4	0.4	3.6	2.2
59 Guatemala	6.0	3.7	5.8	2.3	7.2	5.1	7.4	4.0	5.8	3.8
60 Congo, People's Rep	6.8	7.9	4.1	0.4	9.3	12.7	..		6.7	6.8
61 Turkey	6.5	4.1	2.5	3.4	7.9	4.2	9.5	3.7	8.4	4.3
62 Tunisia	7.3	6.0	6.9	1.6	8.6	8.1	10.3	11.1	6.7	6.3
63 Jamaica	5.4	−1.7	0.6	−0.2	4.5	−4.3	4.0	−3.6	6.8	−0.3
64 Dominican Rep.	8.5	4.4	5.9	3.2	14.4	3.9	12.0	4.4	6.9	5.2

Note For data comparability and coverage see the technical notes.

Table 6. Agriculture and food

	Value added in agriculture (millions of 1980 dollars)		Cereal imports (thousands of metric tons)		Food aid in cereals (thousands of metric tons)		Fertilizer consumption (hundreds of grams of plant nutrient per hectare of arable land)		Average index of food production per capita (1974–76=100)
	1970	1983[a]	1974	1983	1974/75[b]	1982/83[b]	1970[c]	1982	1981–83
Low-income economies			22,899 *t*	30,553 *t*	5,661 *t*	4,572 *t*	179 *w*	592 *w*	111 *w*
China and India			14,437 *t*	23,447 *t*	..	327 *t*	230 *w*	804 *w*	115 *w*
Other low-income			8,462 *t*	7,106 *t*	4,079 *t*	4,245 *t*	148 *w*	387 *w*	102 *w*
Sub-Saharan Africa			2,232 *t*	3,277 *t*	765 *t*	1,969 *t*	23 *w*	42 *w*	94 *w*
1 Ethiopia	1,663	1,971	118	325	59	344	4	26	106
2 Bangladesh	5,427	6,545	1,719	1,844	2,130	1,252	142	512	101
3 Mali	403	606	281	183	114	88	29	30	106
4 Nepal	1,102	1,255	19	72	0	44	30	138	91
5 Zaire	1,503	1,866	343	273	()	110	8	8	93
6 Burkina	444	517	99	59	0	45	3	42	100
7 Burma	1,705	3,256	26	7	14	10	34	167	121
8 Malawi	.		17	21	()	3	52	138	101
9 Uganda	2,579	*2,614*	37	19	16	14	13		91
10 Burundi	468	585	7	20	6	7	5	10	97
11 Niger	851	649	155	45	75	12	1	8	122
12 Tanzania	1,583	*1,886*	431	214	148	171	30	44	103
13 Somalia	434	*570*	42	246	110	189	31	9	72
14 India	45,793	58,981	5,261	4,280	1,582	282	114	346	108
15 Rwanda	..		3	23	19	12	3	10	114
16 Central African Rep.	241	325	7	29	1	5	11	4	94
17 Togo	212	238	6	61	0	5	3	19	99
18 Benin	.	415	8	67	9	14	33	17	95
19 China	73,170	116,986	9,176	19,167	..	45	418	1,575	119
20 Guinea	.	755	63	112	49	25	18	17	85
21 Haiti	..		83	209	25	90	4	51	90
22 Ghana	2,323	2,265	177	285	43	58	9	98	65
23 Madagascar	1,111	*1,171*	114	240	7	141	56	52	90
24 Sierra Leone	261	312	72	119	10	29	13	6	98
25 Sri Lanka	812	1,199	951	775	271	369	496	713	127
26 Kenya	1,223	2,253	15	160	2	165	224	289	86
27 Pakistan	5,005	7,061	1,274	396	619	369	168	616	105
28 Sudan	1,610	2,318	125	435	50	330	31	44	94
29 *Afghanistan*	.	..	5	156	10	66	24	56	105
30 *Bhutan*		..	23	13	0	3	()	10	104
31 *Chad*	339		50	54	13	36	7	17	101
32 *Kampuchea, Dem*		.	223	83	226	46	13	36	98
33 *Lao PDR*		..	53	35	13	()	4	6	125
34 *Mozambique*	..	.	62	287	34	166	27	130	68
35 *Viet Nam*		..	1,854	239	6	27	512	506	111
Middle-income economies			41,293 *t*	78,552 *t*	2,340 *t*	4,127 *t*	211 *w*	445 *w*	105 *w*
Oil exporters			18,022 *t*	43,580 *t*	1,078 *t*	2,355 *t*	139 *w*	468 *w*	105 *w*
Oil importers			23,271 *t*	34,972 *t*	1,262 *t*	1,772 *t*	254 *w*	432 *w*	105 *w*
Sub-Saharan Africa			1,521 *t*	4,859 *t*	111 *t*	411 *t*	40 *w*	91 *w*	93 *w*
Lower middle-income			16,778 *t*	29,831 *t*	1,491 *t*	3,999 *t*	176 *w*	398 *w*	105 *w*
36 Senegal	603	702	341	591	28	91	20	35	71
37 Lesotho	94	..	49	91	14	28	17	151	76
38 Liberia	235	334	42	126	3	57	55	35	92
39 Mauritania	259	258	115	227	48	71	6	5	102
40 Bolivia	540	643	207	415	22	164	13	8	87
41 Yemen, PDR		..	149	205	38	9	()	109	84
42 Yemen Arab Rep.	451	761	158	556	0	28	1	51	80
43 Indonesia	12,097	20,225	1,919	2,992	301	155	119	750	121
44 Zambia	444	562	93	247	1	83	71	185	74
45 Honduras	477	664	52	83	31	95	160	137	107
46 Egypt, Arab Rep	3,282	4,728	3,877	8,154	610	1,816	1,282	3,346	92
47 El Salvador	736	871	75	171	4	211	1,048	830	91
48 Ivory Coast	1,733	2,670	172	562	4	0	71	85	108
49 Zimbabwe	557	673	56	124	.	6	466	532	79
50 Morocco	2,783	2,848	891	1,896	75	142	130	253	89
51 Papua New Guinea	655	926	71	155	.	0	76	151	95
52 Philippines	5,115	8,609	817	1,343	89	49	214	288	113
53 Nigeria	17,186	16,001	389	2,336	7	0	3	65	98
54 Cameroon	1,492	1,955	81	178	4	6	28	57	84
55 Thailand	5,631	9,444	97	225	0	9	76	183	112
56 Nicaragua	410	608	44	109	3	51	184	186	74
57 Costa Rica	666	898	110	201	1	194	1,086	1,134	88
58 Peru	1,716	1,649	637	1,772	37	111	297	266	82
59 Guatemala	.		138	129	9	19	224	498	102
60 Congo, People's Rep	147	164	34	90	2	9	112	19	99
61 Turkey	8,701	12,890	1,276	177	70	0	166	535	104
62 Tunisia	697	1,191	307	1,131	1	160	82	168	87
63 Jamaica	204	209	340	394	1	127	886	571	95
64 Dominican Rep	993	1,577	252	392	16	167	354	353	95

Note For data comparability and coverage see the technical notes

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Table 9. Growth of merchandise trade

	Merchandise trade (millions of dollars)		Average annual growth rate[a] (percent)				Terms of trade (1980 = 100)	
			Exports		Imports			
	Exports 1983	Imports 1983[b]	1965–73	1973–83[c]	1965–73	1973–83[c]	1981	1983
Low-income economies	**45,991 *t***	**57,333 *t***	1.5 *w*	0.9 *w*	−2.0 *w*	1.4 *w*	95 *m*	98 *m*
China and India	**31,931 *t***	**34,952 *t***	..	..	..	..	..	.
Other low-income	**14,060 *t***	**22,381 *t***	1.3 *w*	−0.8 *w*	0.2 *w*	0.6 *w*	95 *m*	96 *m*
Sub-Saharan Africa	**7,827 *t***	**11,501 *t***	2.4 *w*	−4.0 *w*	2.3 *w*	−2.2 *w*	88 *m*	94 *m*
1 Ethiopia	422	875	3.0	1.4	−0.2	2.7	68	86
2 Bangladesh	789	1,502	−6.5	1.7	−8.2	4.1	102	102
3 Mali	106	344	13.1	5.1	8.5	3.9	110	118
4 Nepal	94	464	.	.	.	.		
5 Zaire	*1,459*	*953*	6.5	−8.7	9.6	−13.7	87	92
6 Burkina	99	288	−1.0	1.7	7.2	4.2	109	114
7 Burma	382	270	−4.8	4.9	−6.7	−0.6	111	84
8 Malawi	220	312	3.8	2.8	6.4	−0.6	106	126
9 Uganda	354	340	0.2	−8.0	−2.5	1.9	75	79
10 Burundi	76	194		..	..	..		.
11 Niger	*301*	*443*	6.1	19.0	4.4	11.5	84	112
12 Tanzania	*480*	*1,134*	0.9	−4.6	7.1	−2.7	88	91
13 Somalia	163	422	6.7	7.3	1.4	0.0	109	118
14 India	9,705	13,562	2.3	4.9	−5.7	2.8	91	96
15 Rwanda	80	279	6.3	2.6	4.6	12.9	65	66
16 Central African Rep	*106*	*132*	−0.4	3.8	−0.5	2.5	73	97
17 Togo	242	284	4.4	3.5	6.6	7.4	103	107
18 Benin	85	523	12.4	−1.4	13.2	4.5	95	89
19 China	22,226	21,390	.	..			.	.
20 Guinea	390	279	.					
21 Haiti	412	620	..	..	..	.	.	.
22 Ghana	895	719	3.5	−6.4	−3.3	−8.0	69	63
23 Madagascar	329	*439*	5.4	−4.3	1.5	−2.5	79	93
24 Sierra Leone	202	171	2.2	−5.3	0.9	−5.0	84	94
25 Sri Lanka	1,066	1,788	−4.7	2.6	−3.2	4.7	95	104
26 Kenya	876	1,274	3.8	−4.8	5.9	−4.6	87	89
27 Pakistan	3,075	5,341	3.7	8.1	−2.9	5.7	99	101
28 Sudan	624	1,354	3.8	−1.5	4.9	1.3	103	88
29 *Afghanistan*	391	798	5.9	6.8	−0.6	4.7	102	105
30 *Bhutan*		.	..	..	.	..	.	..
31 *Chad*	*58*	*109*	−3.5	−3.1	18.7	−8.6	105	112
32 *Kampuchea, Dem.*	.	.	..	..	..		.	
33 *Lao PDR*	26	96	.	..	.			..
34 *Mozambique*	260	635	−7.9	−8.3	−8.9	−4.2	96	96
35 *Viet Nam*	.	..	.	..		..	.	
Middle-income economies	**333,532 *t***	**350,734 *t***	5.9 *w*	−0.4 *w*	8.3 *w*	4.1 *w*	95 *m*	94 *m*
Oil exporters	**146,833 *t***	**132,305 *t***	5.8 *w*	−5.1 *w*	5.9 *w*	7.6 *w*	110 *m*	102 *m*
Oil importers	**186,699 *t***	**218,430 *t***	6.3 *w*	7.3 *w*	9.3 *w*	1.9 *w*	92 *m*	90 *m*
Sub-Saharan Africa	**27,201 *t***	**25,961 *t***	6.9 *w*	−5.8 *w*	6.5 *w*	8.2 *w*	95 *m*	99 *m*
Lower middle-income	**91,138 *t***	**110,575 *t***	4.8 *w*	0.1 *w*	4.5 *w*	1.4 *w*	94 *m*	94 *m*
36 Senegal	585	984	−1.3	−0.9	5.4	−1.2	104	88
37 Lesotho[d]		.	.	..	.	..	.	.
38 Liberia	841	415	8.9	−2.3	3.6	−4.3	93	104
39 Mauritania	246	227	9.7	0.5	15.4	−0.8	95	102
40 Bolivia	766	424	5.1	−2.4	0.9	−0.9	84	84
41 Yemen, PDR	*449*	*1,010*	..	..		..		.
42 Yemen, Arab Rep.	*204*	*1,521*		..	.		.	.
43 Indonesia	21,145	16,346	11.1	1.4	13.9	9.8	110	102
44 Zambia	866	690	−0.3	−0.8	3.0	−7.3	81	82
45 Honduras	660	823	4.2	0.6	3.1	−1.3	83	87
46 Egypt, Arab Rep.	4,531	10,274	3.8	2.3	−3.9	10.1	113	103
47 El Salvador	735	891	2.7	1.4	1.8	−2.2	73	72
48 Ivory coast	2,068	1,814	7.1	−1.4	7.8	0.1	92	102
49 Zimbabwe	*1,273*	*1,432*	.	..	..	.	.	.
50 Morocco	2,062	3,599	6.0	0.5	6.2	0.8	108	100
51 Papua New Guinea	822	1,071	.	.	.	..		
52 Philippines	4,932	7,980	4.2	7.5	3.1	1.3	88	92
53 Nigeria	*17,509*	*17,600*	8.9	−6.2	8.9	13.6	112	94
54 Cameroon	1,067	1,226	4.2	3.9	6.3	5.1	77	76
55 Thailand	6,368	10,279	6.9	9.0	4.4	3.3	96	89
56 Nicaragua	411	799	2.6	−0.4	2.0	−3.7	70	67
57 Costa Rica	1,071	993	10.3	2.7	8.6	−2.4	90	95
58 Peru	3,015	2,688	−2.1	8.5	−2.0	−0.6	94	109
59 Guatemala	1,220	1,126	5.1	4.6	3.6	−0.1	76	83
60 Congo, People's Rep	887	806	−2.2	4.4	−2.3	12.0	117	104
61 Turkey	5,671	8,548	..	6.3	..	−0.2	67	.
62 Tunisia	1,851	3,117	8.6	0.2	7.7	5.3	100	98
63 Jamaica	726	1,518	3.9	−3.0	6.6	−4.7	89	90
64 Dominican Rep	648	1,279	11.0	2.2	13.3	−0.9	125	85

Note For data comparability and coverage see the technical notes

Table 10. Structure of merchandise exports

	Percentage share of merchandise exports									
	Fuels, minerals, and metals		Other primary commodities		Textiles and clothing		Machinery and transport equipment		Other manufactures	
	1965	1982[a]	1965	1982[a]	1965	1982[a]	1965	1982[a]	1965	1982[a]
Low-income economies	11 *w*	20 *w*	65 *w*	30 *w*	16 *w*	18 *w*	1 *w*	5 *w*	7 *w*	28 *w*
China and India	..	21 *w*	..	23 *w*	..	17 *w*	..	6 *w*	..	33 *w*
Other low-income	12 *w*	15 *w*	78 *w*	55 *w*	5 *w*	20 *w*	(.) *w*	2 *w*	4 *w*	8 *w*
Sub-Saharan Africa	20 *w*	22 *w*	75 *w*	69 *w*	(.) *w*	1 *w*	(.) *w*	2 *w*	4 *w*	5 *w*
1 Ethiopia	()	8	99	91	(.)	()	(.)	()	()	1
2 Bangladesh	..	2	.	36	.	47		4		11
3 Mali	1		96	..	1		1	..	1	..
4 Nepal	..	()	.	72		10		()	.	17
5 Zaire	72		20		(.)	..	()	.	8	..
6 Burkina	1	(.)	94	85	2	2	1	6	1	7
7 Burma	5	.	94	..	()	..	()	..	()	
8 Malawi	(.)	()	99	88	()	6	()	3	1	3
9 Uganda	13	..	86	..	()	.	()	..	1	
10 Burundi	(.)	.	94		()	..	(.)		5	
11 Niger	()	81	95	17	1	1	1	1	3	1
12 Tanzania	1	5	86	82	()	3	()	2	13	7
13 Somalia	()	()	86	99	()	()	4	(.)	10	()
14 India	10	7	41	33	36	24	1	7	12	29
15 Rwanda	40	..	60	.	(.)	..	()	..	1	
16 Central African Rep	..	.	..	..	..	..		.		.
17 Togo	33	52	62	33	()	1	1	1	4	13
18 Benin	1	.	94	.	()	.	2		3	
19 China	..	26	..	20		15	..	6		34
20 Guinea	..		..	.	.	..	.		.	
21 Haiti	.	.	..	..	.	.				
22 Ghana	13	..	85	.	(.)	.	1		2	.
23 Madagascar	4	12	90	81	1	4	1	1	4	2
24 Sierra Leone	..		..		.	.	..			.
25 Sri Lanka	2	14	97	59	(.)	17	()	2	1	8
26 Kenya	13	29	77	57	()	()	()	2	9	12
27 Pakistan	2	6	62	34	29	46	1	2	6	12
28 Sudan	1	5	98	93	(.)	1	1	1	()	()
29 *Afghanistan*	(.)	..	87	..	13	.	0		()	..
30 *Bhutan*	.		.	..	..		.	..		
31 *Chad*	5	.	92	..	()	..	()	..	3	
32 *Kampuchea, Dem.*	()	.	99		()	..	()		()	.
33 *Lao PDR*	62	.	32	..	()		()	.	6	
34 *Mozambique*	14	.	84		1	.	()		1	
35 *Viet Nam*	..		..		.		..	.		
Middle-income economies	36 *w*	37 *w*	48 *w*	21 *w*	4 *w*	8 *w*	3 *w*	11 *w*	10 *w*	23 *w*
Oil exporters	60 *w*	79 *w*	34 *w*	12 *w*	2 *w*	1 *w*	1 *w*	3 *w*	3 *w*	4 *w*
Oil importers	19 *w*	13 *w*	57 *w*	27 *w*	6 *w*	12 *w*	4 *w*	15 *w*	4 *w*	33 *w*
Sub-Saharan Africa	40 *w*	..	52 *w*	..	1 *w*	..	1 *w*	..	5 *w*	..
Lower middle-income	26 *w*	47 *w*	66 *w*	34 *w*	2 *w*	6 *w*	1 *w*	2 *w*	5 *w*	11 *w*
36 Senegal	9	52	88	29	1	5	1	4	2	11
37 Lesotho[b]	.	..		..	..	.	..	..	.	
38 Liberia	72	67	25	31	()	()	1	1	2	1
39 Mauritania	94	..	5	..	()	..	1	..	()	
40 Bolivia	93	..	3	..	()	..	()	.	4	
41 Yemen, PDR	79	..	15	..	2	..	2	..	2	.
42 Yemen Arab Rep.	..		.	.	.	.	..	..		.
43 Indonesia	43	85	53	11	()	1	3	1	1	2
44 Zambia	97		3		()	..	()	.	()	
45 Honduras	6	4	90	87	1	2	()	()	3	7
46 Egypt, Arab Rep.	8	70	71	22	15	6	()	()	5	2
47 El Salvador	2	5	81	55	6	15	1	3	10	22
48 Ivory Coast	2	13	93	76	1	2	1	3	3	6
49 Zimbabwe	24	..	47	..	6	.	6		17	..
50 Morocco	40	39	55	26	1	12	()	1	4	21
51 Papua New Guinea	()	51	90	40	()	()	()	2	10	7
52 Philippines	11	12	84	38	1	7	()	3	5	39
53 Nigeria	32	.	65	.	()	.	0		2	.
54 Cameroon	17	49	77	44	(.)	2	3	1	2	4
55 Thailand	11	7	84	64	()	10	()	6	4	13
56 Nicaragua	4	1	90	91	()	()	()	()	5	7
57 Costa Rica	(.)	1	84	71	2	3	1	4	13	21
58 Peru	45	69	54	17	(.)	8	(.)	1	1	5
59 Guatemala	()	2	86	69	4	5	1	2	9	22
60 Congo, People's Rep				.		.	.	..	.	
61 Turkey	9	10	89	47	1	20	()	5	1	18
62 Tunisia	31	57	51	10	2	15	()	2	16	16
63 Jamaica	28	22	41	18	4	3	()	4	27	54
64 Dominican Rep	10	1	88	82	(.)	()	()	3	2	13

Note For data comparability and coverage see the technical notes

Table 11. Structure of merchandise imports

	Percentage share of merchandise imports									
	Food		Fuels		Other primary commodities		Machinery and transport equipment		Other manufactures	
	1965	1982[a]	1965	1982[a]	1965	1982[a]	1965	1982[a]	1965	1982[a]
Low-income economies	21 *w*	17 *w*	6 *w*	18 *w*	8 *w*	11 *w*	32 *w*	20 *w*	34 *w*	34 *w*
China and India	..	17 *w*	..	15 *w*	..	15 *w*	..	17 *w*	..	36 *w*
Other low-income	20 *w*	16 *w*	5 *w*	24 *w*	4 *w*	4 *w*	28 *w*	25 *w*	43 *w*	30 *w*
Sub-Saharan Africa	17 *w*	15 *w*	8 *w*	23 *w*	4 *w*	3 *w*	28 *w*	28 *w*	45 *w*	31 *w*
1 Ethiopia	7	10	6	25	5	3	37	31	44	31
2 Bangladesh	..	26	..	12	..	8	.	22	..	32
3 Mali	21	..	6	..	3	.	23	.	47	.
4 Nepal	..	*16*	..	*13*	..	3	..	*18*	.	*50*
5 Zaire	19	..	7	..	4	..	33	..	37	..
6 Burkina	25	*25*	4	*16*	12	3	19	*24*	40	*32*
7 Burma	15	.	4	..	5	..	18	..	58	..
8 Malawi	16	*11*	5	*17*	2	2	21	*24*	57	*46*
9 Uganda	.	5	..	23	..	1	..	42		29
10 Burundi	18	..	6	..	7	..	15		55	
11 Niger	13	*24*	6	*15*	4	*4*	21	*26*	55	*32*
12 Tanzania	..	7	..	*31*	.	2	.	35	.	*25*
13 Somalia	33	*20*	5	*2*	5	6	24	*50*	33	*21*
14 India	22	9	5	35	14	10	37	18	22	28
15 Rwanda	12	.	7	..	4	..	28	..	50	.
16 Central African Rep.	13	..	7	..	2	..	29	..	49	..
17 Togo	18	*26*	4	*8*	2	*3*	32	*21*	45	*42*
18 Benin	23	..	6	.	2	..	17	.	53	..
19 China	.	23	..	1	..	18	..	17	..	41
20 Guinea	..	..	..	..	..	..	..	..	..	.
21 Haiti	..	26	..	12	..	4	..	21	..	37
22 Ghana	13	.	4	..	2	..	33	..	48	.
23 Madagascar	20	16	5	24	2	3	25	30	48	27
24 Sierra Leone	19	24	9	14	1	1	29	18	41	42
25 Sri Lanka	41	13	8	31	4	3	12	24	34	30
26 Kenya	..	8	..	37	.	3	..	27	.	25
27 Pakistan	20	14	3	31	5	7	38	23	34	26
28 Sudan	24	*19*	5	*19*	3	*3*	21	*22*	47	*37*
29 *Afghanistan*	17	..	4	..	1	..	*8*	.	69	..
30 *Bhutan*	..	..	..	..	..	..	..	..	.	.
31 *Chad*	13	.	20	..	3	..	21	..	42	..
32 *Kampuchea, Dem.*	6	.	7	..	2	..	26	..	58	
33 *Lao PDR*	32	.	14	..	1	..	19	..	34	..
34 *Mozambique*	17	..	8	..	7	..	24	..	45	.
35 *Viet Nam*	..	.	..	..	..	.	.	..	.	..
Middle-income economies	16 *w*	12 *w*	8 *w*	21 *w*	9 *w*	6 *w*	29 *w*	30 *w*	38 *w*	31 *w*
Oil exporters	16 *w*	15 *w*	6 *w*	10 *w*	6 *w*	4 *w*	33 *w*	39 *w*	39 *w*	32 *w*
Oil importers	17 *w*	10 *w*	8 *w*	28 *w*	11 *w*	6 *w*	27 *w*	26 *w*	37 *w*	31 *w*
Sub-Saharan Africa	13 *w*	20 *w*	5 *w*	7 *w*	3 *w*	3 *w*	32 *w*	35 *w*	47 *w*	35 *w*
Lower middle-income	17 *w*	14 *w*	7 *w*	19 *w*	5 *w*	5 *w*	29 *w*	31 *w*	41 *w*	32 *w*
36 Senegal	37	*27*	6	*30*	4	*1*	15	*18*	38	*23*
37 Lesotho[b]	..	..	..	..	..	..	..	..		..
38 Liberia	18	*22*	8	*27*	1	2	33	*25*	39	*24*
39 Mauritania	9	..	4	..	1	.	56	..	30	..
40 Bolivia	20	12	1	2	2	1	34	45	42	40
41 Yemen, PDR	21	..	39	..	3	..	10	..	26	..
42 Yemen Arab Rep.	..	*32*	..	*8*	..	*1*	..	*25*	..	*34*
43 Indonesia	6	7	3	21	2	5	39	38	50	29
44 Zambia	10	9	10	19	2	1	33	34	45	37
45 Honduras	12	10	6	22	1	2	26	20	56	46
46 Egypt, Arab Rep.	28	31	7	4	10	5	23	29	31	30
47 El Salvador	16	18	5	25	3	3	28	12	48	42
48 Ivory Coast	18	19	6	21	2	2	28	23	46	34
49 Zimbabwe	7	..	(.)	..	4	.	41	..	47	..
50 Morocco	36	16	5	27	9	10	18	24	31	23
51 Papua New Guinea	25	20	4	19	1	1	25	30	45	30
52 Philippines	20	10	10	26	7	4	33	22	30	38
53 Nigeria	9	21	6	3	3	3	34	38	48	35
54 Cameroon	12	10	5	4	3	2	28	35	51	49
55 Thailand	7	5	9	31	5	7	31	24	49	33
56 Nicaragua	13	12	5	23	1	1	30	23	51	40
57 Costa Rica	9	9	5	20	2	3	29	15	54	53
58 Peru	17	18	3	2	5	3	41	44	34	34
59 Guatemala	11	*6*	7	*38*	2	*3*	29	*16*	50	*37*
60 Congo, People's Rep	15	17	6	15	1	1	34	25	44	42
61 Turkey	6	3	10	44	10	6	37	26	37	22
62 Tunisia	16	*14*	6	*21*	6	*8*	31	*27*	41	*30*
63 Jamaica	22	19	9	29	4	4	23	18	42	30
64 Dominican Rep	25	16	10	34	2	3	23	19	40	29

Note For data comparability and coverage see the technical notes

Table 14. Balance of payments and reserves

	Current account balance (millions of dollars)		Receipts of workers' remittances (millions of dollars)		Net direct private investment (millions of dollars)		Gross international reserves: Millions of dollars		Gross international reserves: In months of import coverage
	1970	1983[a]	1970	1983[a]	1970	1983[a]	1970	1983[a]	1983[a]
Low-income economies									6.4 *w*
China and India									8.2 *w*
Other low-income									3.0 *w*
Sub-Saharan Africa									2.2 *w*
1 Ethiopia	−32	−171	..	..	4		72	206	2.5
2 Bangladesh	.	−77	.	629	.	()		546	2.6
3 Mali	−2	−103	6	36	.	2	1	23	0.6
4 Nepal	.	−143	..	..	..	.	94	191	4.1
5 Zaire	−64	−559	2	119	42	331	189	269	..
6 Burkina	9		18	..	()	..	36	89	
7 Burma	−63	−343	..	.	..		98	185	2.6
8 Malawi	−35	−72	..		9	..	29	29	0.8
9 Uganda	20	−256	..	..	4	..	57	..	.
10 Burundi	..	.	.	..	.	..	15	34	
11 Niger	()	.	.	..	1	..	19	57	..
12 Tanzania	−36			..	..	..	65	19	..
13 Somalia	−6	−150	..	22	5	()	21	16	0.4
14 India	−394	−2,780	113	2,617	6	.	1,023	8,242	5.4
15 Rwanda	7	−49	1	2	()	11	8	111	4.1
16 Central African Rep	−12	−28	.	..	1	4	1	51	2.4
17 Togo	3	−32	.	..	1	..	35	178	7.1
18 Benin	−1	.	2	..	7	.	16	8	.
19 China	..	4,460	..	..		..	.	19,698	10.5
20 Guinea	..		..	.		..	.	..	
21 Haiti	2	−100	17	89	3	15	4	16	0.4
22 Ghana	−68	−218	.	1	68	−6	58	291	4.3
23 Madagascar	10	−369		..	10	.	37	29	.
24 Sierra Leone	−16	−33	..	.	8	2	39	16	1.0
25 Sri Lanka	−59	−472	3	294	0	38	43	321	1.7
26 Kenya	−49	−174	..	.	14	50	220	406	2.8
27 Pakistan	−667	21	86	2,925	23	31	194	2,683	4.5
28 Sudan	−42	−213	..	275	..	..	22	17	0.2
29 *Afghanistan*	.	..	..	..	.	.	49	582	
30 *Bhutan*		.	..	..		.	..		
31 *Chad*	2	38	..		1	()	2	32	2.2
32 *Kampuchea, Dem*		..	..		..	.	..	..	.
33 *Lao PDR*		.	..	..	.		6	.	.
34 *Mozambique*	..		..	..	..	.	..	.	
35 *Viet Nam*	..	..	..	..	..	..	243	.	.
Middle-income economies									2.8 *w*
Oil exporters									3.3 *w*
Oil importers									2.6 *w*
Sub-Saharan Africa									1.0 *w*
Lower middle-income									2.2 *w*
36 Senegal	−16	..	3	..	5		22	23	
37 Lesotho	.	−14	..	..	..	4	..	67	1.4
38 Liberia		−135	..	..	..	3	..	20	0.4
39 Mauritania	−5	−196	1	1	1	1	3	110	2.1
40 Bolivia	4	−183	..	1	−76	43	46	509	5.2
41 Yemen, PDR	−4	−309	60	451		..	59	297	3.6
42 Yemen Arab Rep	.	−558	.	1,161	.	8	.	369	2.1
43 Indonesia	−310	−6,294	..	.	83	289	160	4,902	2.2
44 Zambia	108	−252	..	..	−297		515	137	1.3
45 Honduras	−64	−225		..	8	21	20	120	1.3
46 Egypt, Arab Rep	−148	−785	29	3,293		845	165	1,699	1.8
47 El Salvador	9	−152	..	41	4	−1	64	344	3.5
48 Ivory Coast	−38	−743	.	.	31	.	119	37	0.2
49 Zimbabwe	.	−459	..	2	..	−2	59	300	2.0
50 Morocco	−124	−889	63	916	20	46	141	376	0.9
51 Papua New Guinea	..	−372	.	..	..	137	.	474	3.8
52 Philippines	−48	−2,760	..	180	−29	104	255	896	0.9
53 Nigeria	−368	−4,752	..		205	354	223	1,252	1.0
54 Cameroon	−30	−289	..	23	16	156	81	170	1.1
55 Thailand	−250	−2,886	..	847	43	348	912	2,556	2.5
56 Nicaragua	−40	−451	..	..	15	8	49	171	2.1
57 Costa Rica	−74	−317	..	..	26	50	16	345	2.7
58 Peru	202	−871	.	..	−70	37	339	1,898	4.6
59 Guatemala	−8	−226	..	..	29	45	79	409	3.4
60 Congo, People's Rep.	.	−400	..			56	9	12	0.1
61 Turkey	−44	−1,880	273	1,514	58	72	440	2,710	2.8
62 Tunisia	−53	−561	29	359	16	186	60	639	2.1
63 Jamaica	−153	−355	29	42	161	−19	139	63	0.4
64 Dominican Rep	−102	−442	25	190	72	−1	32	171	1.1

Note. For data comparability and coverage see the technical notes.

Table 16. External public debt and debt service ratios

	External public debt outstanding and disbursed				Interest payments on external public debt (millions of dollars)		Debt service as percentage of			
	Millions of dollars		As percentage of GNP				GNP		Exports of goods and services	
	1970	1983	1970	1983[a]	1970	1983	1970	1983[a]	1970	1983[a]
Low-income economies			17.4 *w*	22.5 *w*			1.2 *w*	1.4 *w*	12.8 *w*	14.4 *w*
China and India			..	..			..	..	..	.
Other low-income			21.3 *w*	42.3 *w*			1.5 *w*	2.6 *w*	8.9 *w*	18.7 *w*
Sub-Saharan Africa			18.0 *w*	52.3 *w*			1.3 *w*	2.5 *w*	5.4 *w*	14.5 *w*
1 Ethiopia	169	1,223	9.5	25.9	6	24	1.2	1.4	11.4	11.5
2 Bangladesh	..	4,185	..	37.7	..	63		1.3	.	14.7
3 Mali	238	881	88.1	89.3	(.)	6	0.2	1.3	1.3	6.1
4 Nepal	3	346	0.3	14.1	(.)	4	0.3	0.3		3.0
5 Zaire	311	4,022	17.6	91.5	9	87	2.1	2.9	4.4	
6 Burkina	21	398	6.4	38.2	(.)	7	0.6	1.3	6.3	
7 Burma	101	2,226	4.7	36.3	3	64	0.9	2.4	15.8	33.8
8 Malawi	122	719	43.2	55.2	3	30	2.1	4.5	7.1	20.3
9 Uganda	138	623	7.5	17.9	4	17	0.4	1.9	2.7	
10 Burundi	7	284	3.1	26.2	(.)	3	0.3	0.7	.	.
11 Niger	32	631	8.7	48.7	1	36	0.6	5.6	3.8	..
12 Tanzania	250	2,584	19.5	58.9	6	36	1.2	1.5	4.9	..
13 Somalia	77	1,149	24.4	62.0	(.)	10	0.3	1.2	2.1	13.1
14 India	7,940	21,277	14.9	11.2	189	553	0.9	0.7	22.0	10.3
15 Rwanda	2	220	0.9	13.9	(.)	2	0.2	0.3	1.3	2.6
16 Central African Rep	24	215	13.3	33.1	1	7	1.6	2.7	4.8	11.3
17 Togo	40	805	16.0	113.9	1	28	0.9	6.3	2.9	16.8
18 Benin	41	615	16.0	59.2	(.)	13	0.7	2.5	2.3	..
19 China	.	..	.	.	..		..	.	.	.
20 Guinea	314	1,216	47.4	69.2	4	22	2.2	4.0	..	
21 Haiti	40	433	10.3	26.8	(.)	7	1.0	0.9	7.7	5.0
22 Ghana	489	1,095	24.2	28.3	12	30	1.2	1.9	5.0	14.2
23 Madagascar	93	1,490	10.8	52.3	2	64	0.8	4.9	3.5	.
24 Sierra Leone	59	359	14.3	34.5	2	3	2.9	0.9	9.9	7.2
25 Sri Lanka	317	2,205	16.1	43.7	12	86	2.0	3.3	10.3	11.9
26 Kenya	319	2,384	20.6	43.1	12	127	1.8	5.5	5.4	20.6
27 Pakistan	3,060	9,755	30.5	31.3	76	309	1.9	3.4	23.6	28.1
28 Sudan	306	5,726	15.2	77.8	13	37	1.7	1.2	10.7	11.2
29 *Afghanistan*	547	..	58.1		9	..	2.5	.	..	.
30 *Bhutan*	..	..	..		.	.		..	.	..
31 *Chad*	32	129	11.9	43.5	(.)	(.)	1.0	0.1	3.9	0.6
32 *Kampuchea, Dem*	..	..	.	.	.	.	..	.	.	
33 *Lao PDR*	.	..		..	.		..	..		.
34 *Mozambique*	..	.	.	..	..	..	..		..	
35 *Viet Nam*	.	..	..	..	..	..	..		..	
Middle-income economies			12.7 *w*	34.2 *w*			1.6 *w*	4.5 *w*	10.5 *w*	18.1 *w*
Oil exporters			13.4 *w*	34.1 *w*			1.8 *w*	5.4 *w*	10.7 *w*	21.1 *w*
Oil importers			12.3 *w*	31.3 *w*			1.5 *w*	4.0 *w*	10.4 *w*	16.1 *w*
Sub-Saharan Africa			12.4 *w*	29.0 *w*			1.2 *w*	4.2 *w*	..	19.7 *w*
Lower middle-income			15.3 *w*	33.6 *w*			1.6 *w*	4.2 *w*	9.9 *w*	19.7 *w*
36 Senegal	100	1,496	11.9	61.2	2	31	0.8	1.9	2.8	..
37 Lesotho	8	145	7.8	23.0	(.)	6	0.4	1.9	..	2.5
38 Liberia	158	699	49.6	72.1	6	21	5.5	3.2		6.6
39 Mauritania	27	1,171	13.9	158.2	(.)	23	1.7	5.0	3.2	10.0
40 Bolivia	479	2,969	33.8	77.7	6	165	1.6	7.0	11.3	30.5
41 Yemen, PDR	.	1,263	..	118.5		14	..	4.3		25.1
42 Yemen Arab Rep.	..	1,574	..	38.4	.	13	..	1.0	.	13.9
43 Indonesia	2,443	21,685	27.1	28.9	24	1,256	0.9	3.4	6.9	12.8
44 Zambia	623	2,638	37.0	83.9	26	78	3.5	4.0	5.9	12.6
45 Honduras	90	1,570	12.9	56.3	3	83	0.8	4.3	2.8	14.9
46 Egypt, Arab Rep.	1,750	15,229	23.2	49.4	54	540	4.6	6.5	36.4	27.5
47 El Salvador	88	1,065	8.6	29.2	4	37	0.9	1.8	3.6	6.4
48 Ivory Coast	256	4,824	18.3	78.8	11	413	2.7	12.9	6.8	31.0
49 Zimbabwe	233	1,497	15.7	27.9	5	105	0.6	8.1		31.6
50 Morocco	711	9,445	18.0	69.6	23	510	1.5	8.3	8.4	38.2
51 Papua New Guinea	36	911	5.8	40.4	1	63	0.1	4.7		11.2
52 Philippines	572	10,385	8.1	30.4	23	650	1.4	3.7	7.2	15.4
53 Nigeria	480	11,757	4.8	17.7	20	974	0.6	3.1	4.2	18.6
54 Cameroon	131	1,883	12.1	26.7	4	107	0.8	3.1	3.1	13.9
55 Thailand	324	7,060	4.9	18.0	16	531	0.6	2.4	3.4	11.3
56 Nicaragua	156	3,417	15.7	133.3	7	37	2.4	3.2	11.1	18.3
57 Costa Rica	134	3,315	13.8	126.3	7	504	2.9	22.7	10.0	50.6
58 Peru	856	7,932	12.6	48.1	44	406	2.1	4.6	11.6	19.6
59 Guatemala	106	1,405	5.7	15.8	6	76	1.4	1.6	7.4	11.7
60 Congo, People's Rep	144	1,487	53.9	76.1	3	77	3.3	12.2		20.5
61 Turkey	1,854	15,396	14.4	30.2	42	1,169	1.3	4.6	22.0	28.9
62 Tunisia	541	3,427	38.2	42.4	18	195	4.5	7.4	19.0	22.3
63 Jamaica	160	1,950	11.8	65.2	9	101	1.1	6.9	2.7	15.4
64 Dominican Republic	226	2,202	15.5	26.7	5	110	0.8	2.8	4.7	22.7

Note For data comparability and coverage see the technical notes

Table 23. Indicators related to life expectancy

	Life expectancy at birth (years)				Infant mortality rate (aged under 1)		Child death rate (aged 1-4)	
	Male		Female					
	1965	1983	1965	1983	1965	1983	1965	1983
Low-income economies	49 *w*	58 *w*	51 *w*	60 *w*	122 *w*	75 *w*	19 *w*	9 *w*
China and India	51 *w*	61 *w*	53 *w*	63 *w*	115 *w*	61 *w*	16 *w*	6 *w*
Other low-income	44 *w*	50 *w*	45 *w*	52 *w*	147 *w*	115 *w*	27 *w*	18 *w*
Sub-Saharan Africa	42 *w*	48 *w*	45 *w*	49 *w*	156 *w*	119 *w*	35 *w*	23 *w*
1 Ethiopia	43	..	47	.	166	..	37	..
2 Bangladesh	45	49	44	50	153	132	24	19
3 Mali	37	43	39	47	184	148	47	31
4 Nepal	40	47	39	45	184	143	30	21
5 Zaire	43	49	46	52	142	106	30	20
6 Burkina	40	43	42	46	193	148	52	31
7 Burma	45	53	48	57	143	93	21	11
8 Malawi	37	43	40	45	201	164	55	38
9 Uganda	46	48	49	50	126	108	26	21
10 Burundi	42	45	45	48	169	123	38	25
11 Niger	40	43	42	47	181	139	46	28
12 Tanzania	41	49	44	52	138	97	29	18
13 Somalia	..	43	..	46	166	142	37	30
14 India	46	56	44	54	151	93	23	11
15 Rwanda	47	45	51	48	159	125	35	26
16 Central African Rep.	40	46	41	49	184	142	47	29
17 Togo	40	47	43	50	158	112	36	17
18 Benin	41	46	43	50	193	148	52	31
19 China	55	65	59	69	90	38	11	2
20 Guinea	34	37	36	38	197	158	53	36
21 Haiti	46	53	47	56	160	107	37	15
22 Ghana	49	57	52	61	132	97	25	12
23 Madagascar	41	49	44	50	99	66	18	10
24 Sierra Leone	32	37	33	38	230	198	69	54
25 Sri Lanka	63	67	64	71	63	37	6	2
26 Kenya	48	55	51	59	124	81	25	14
27 Pakistan	46	51	44	49	150	119	23	16
28 Sudan	39	47	41	49	161	117	37	19
29 *Afghanistan*	34	.	35	..	223		39	
30 *Bhutan*	34	44	32	42	184	162	30	26
31 *Chad*	39	42	41	45	184	142	47	29
32 *Kampuchea, Dem.*	43	..	45	..	135		19	
33 *Lao PDR*	39	42	42	45	196	159	34	25
34 *Mozambique*	36	44	39	47	148	109	31	16
35 *Viet Nam*	47	62	50	66	89	53	8	4
Middle-income economies	51 *w*	59 *w*	55 *w*	63 *w*	112 *w*	75 *w*	18 *w*	9 *w*
Oil exporters	47 *w*	55 *w*	49 *w*	58 *w*	129 *w*	91 *w*	23 *w*	12 *w*
Oil importers	55 *w*	62 *w*	59 *w*	66 *w*	98 *w*	61 *w*	15 *w*	6 *w*
Sub-Saharan Africa	41 *w*	48 *w*	44 *w*	51 *w*	150 *w*	112 *w*	32 *w*	17 *w*
Lower middle-income	47 *w*	55 *w*	50 *w*	59 *w*	127 *w*	87 *w*	22 *w*	11 *w*
36 Senegal	40	44	42	47	172	140	42	28
37 Lesotho	47	51	50	55	138	109	20	14
38 Liberia	41	47	43	50	149	111	32	17
39 Mauritania	39	44	41	47	171	136	41	16
40 Bolivia	42	49	46	53	161	123	37	21
41 Yemen, PDR	38	45	39	47	194	137	52	27
42 Yemen Arab Rep.	37	43	38	45	200	152	55	33
43 Indonesia	43	52	45	55	138	101	20	13
44 Zambia	42	49	46	52	137	100	29	19
45 Honduras	48	58	51	62	131	81	24	8
46 Egypt, Arab Rep.	48	56	49	59	123	102	21	14
47 El Salvador	52	62	56	66	120	70	20	6
48 Ivory Coast	43	50	45	53	160	121	37	20
49 Zimbabwe	50	52	58	60	106	69	15	7
50 Morocco	48	51	51	54	149	98	32	12
51 Papua New Guinea	44	54	44	53	148	97	23	12
52 Philippines	55	63	58	66	90	49	11	4
53 Nigeria	40	47	43	50	152	113	33	17
54 Cameroon	44	52	47	55	155	116	34	19
55 Thailand	53	61	58	65	90	50	11	4
56 Nicaragua	49	56	51	60	129	84	24	9
57 Costa Rica	63	72	66	76	74	20	8	1
58 Peru	49	57	52	60	131	98	24	12
59 Guatemala	49	58	51	62	109	67	16	5
60 Congo, People's Rep	52	62	56	65	116	82	19	8
61 Turkey	52	61	55	66	157	82	35	8
62 Tunisia	51	60	52	63	145	83	30	8
63 Jamaica	63	68	67	72	51	28	4	2
64 Dominican Rep	52	61	56	65	103	63	14	5

Note For data comparability and coverage see the technical notes

Table 24. Health-related indicators

	Population per: Physician 1965[a]	Physician 1980[a]	Nursing person 1965[a]	Nursing person 1980[a]	Daily calorie supply per capita: Total 1982	As percentage of requirement 1982
Low-income economies	12,419 *w*	5,556 *w*	6,762 *w*	4,564 *w*	2,408 *w*	105 *w*
China and India	.	1,858 *w*	..	3,279 *w*	2,503 *w*	109 *w*
Other low-income	26,097 *w*	17,990 *w*	7,296 *w*	8,697 *w*	2,118 *w*	93 *w*
Sub-Saharan Africa.	38,268 *w*	27,922 *w*	4,627 *w*	3,148 *w*	2,098 *w*	91 *w*
1 Ethiopia	70,190	69,390	5,970	5,910	2,162	93
2 Bangladesh	..	7,810	.	22,570	1,922	83
3 Mali	49,010	22,130	3,200	2,380	1,731	74
4 Nepal	46,180	30,060	..	33,420	2,018	86
5 Zaire	39,050	13,940	..	1,810	2,169	98
6 Burkina	74,110	48,510	4,170	4,950	1,879	79
7 Burma	11,660	4,680	11,410	4,770	2,483	115
8 Malawi	46,900	41,460	12,670	3,830	2,242	97
9 Uganda	11,080	26,810	3,130	4,180	1,807	78
10 Burundi	54,930	45,020	7,310	..	2,206	95
11 Niger	71,440	38,790	6,210	4,650	2,456	105
12 Tanzania	21,840	17,740	2,100	3,010	2,331	101
13 Somalia	35,060	15,630	3,630	2,550	2,102	91
14 India	4,860	3,690	6,500	5,460	2,047	93
15 Rwanda	74,170	31,340	7,450	9,790	2,202	95
16 Central African Rep	44,490	26,750	3,000	1,740	2,194	97
17 Togo	24,980	18,100	4,990	1,430	2,167	94
18 Benin	28,790	16,980	2,540	1,660	2,154	101
19 China		1,740		1,710	2,562	109
20 Guinea	54,610	17,110	4,750	2,570	1,987	86
21 Haiti	12,580	8,200	3,460	2,490	1,903	84
22 Ghana	12,040	7,160	3,710	770	1,573	68
23 Madagascar	9,900	10,220	3,620	3,670	2,577	114
24 Sierra Leone	18,400	17,520	4,890	2,040	2,049	85
25 Sri Lanka	5,750	7,170	3,210	1,340	2,393	107
26 Kenya	12,840	7,890	1,780	550	2,056	88
27 Pakistan	3,160	3,480	9,900	5,820	2,277	99
28 Sudan	23,500	8,930	3,360	1,430	2,250	96
29 *Afghanistan*	15,770	16,730	24,450	26,000	2,285	94
30 *Bhutan*	3,310	18,160	.	7,960	.	
31 *Chad*	73,040	47,640	13,620	3,860	1,620	68
32 *Kampuchea, Dem.*	22,490	.	3,670	..	1,792	81
33 *Lao PDR*	26,510		5,320	.	1,992	90
34 *Mozambique*	18,700	39,140	4,720	5,610	1,844	79
35 *Viet Nam*		4,190		2,930	2,017	93
Middle-income economies	11,388 *w*	5,995 *w*	3,651 *w*	1,945 *w*	2,661 *w*	114 *w*
Oil exporters	20,016 *w*	8,089 *w*	5,436 *w*	2,053 *w*	2,612 *w*	113 *w*
Oil importers	4,146 *w*	3,870 *w*	2,162 *w*	1,840 *w*	2,703 *w*	114 *w*
Sub-Saharan Africa	35,517 *w*	11,929 *w*	4,745 *w*	2,650 *w*	2,370 *w*	101 *w*
Lower middle-income	18,399 *w*	7,555 *w*	4,891 *w*	2,292 *w*	2,495 *w*	109 *w*
36 Senegal	21,130	13,780	2,640	1,390	2,392	101
37 Lesotho	22,930	18,640	4,700		2,285	100
38 Liberia	12,450	8,550	2,300	2,940	2,267	98
39 Mauritania	36,580	14,500		2,100	2,228	97
40 Bolivia	3,310	.	3,990		2,158	90
41 Yemen, PDR	12,870	7,120	1,850	820	2,329	97
42 Yemen Arab Rep.	58,240	11,670	.	4,580	2,346	97
43 Indonesia	31,820	11,530	9,500	2,300	2,393	111
44 Zambia	11,390	7,670	5,820	1,730	2,054	89
45 Honduras	5,450	3,120	15,40	700	2,156	95
46 Egypt, Arab Rep	2,260	970	2,030	1,500	3,210	128
47 El Salvador	4,630	3,220	1,300	910	2,060	90
48 Ivory Coast	20,690	..	1,850	..	2,652	115
49 Zimbabwe	5,190	5,900	990	940	2,119	89
50 Morocco	12,120	10,750	2,290	1,830	2,671	110
51 Papua New Guinea	12,520	13,590	620	960	2,109	79
52 Philippines	1,310	7,970	1,130	6,000	2,393	106
53 Nigeria	44,990	12,550	5,780	3,010	2,443	104
54 Cameroon	29,720	13,990	1,970	1,950	2,102	91
55 Thailand	7,230	7,100	5,020	2,400	2,296	103
56 Nicaragua	2,490	1,800	1,390	550	2,268	101
57 Costa Rica	2,040	1,460	630	450	2,635	118
58 Peru	1,620	1,390	880	970	2,114	90
59 Guatemala	3,830	8,610	8,250	1,620	2,115	97
60 Congo, People's Rep	14,210	5,510	950	790	2,504	113
61 Turkey	2,860	1,630	6,340	1,130	3,077	122
62 Tunisia	8,040	3,690	1,150	890	2,656	111
63 Jamaica	1,930	2,830	340	630	2,489	111
64 Dominican Rep	1,720	2,410	1,640		2,179	96

Note For data comparability and coverage see the technical notes

Table 28. Income distribution

	Year	Percentage share of household income, by percentile groups of households[a]					
		Lowest 20 percent	Second quintile	Third quintile	Fourth quintile	Highest 20 percent	Highest 10 percent
Low-income economies							
China and India							
Other low-income							
Sub-Saharan Africa							
1 Ethiopia		.	.	.	.	.	.
2 Bangladesh	1976–77	6.2	10.9	15.0	21.0	46.9	32.0
3 Mali		.	.	.	.	.	.
4 Nepal	1976–77	4.6	8.0	11.7	16.5	59.2	46.5
5 Zaire		.	.	.	.	.	.
6 Burkina		.	..	.	.	.	.
7 Burma		..	..	..	..	..	..
8 Malawi	1967–68	10.4	11.1	13.1	14.8	50.6	40.1
9 Uganda		..	..	..	..	.	
10 Burundi		..	..	..	.		
11 Niger		.	.	..	.	..	
12 Tanzania	1969	5.8	10.2	13.9	19.7	50.4	35.6
13 Somalia			..				
14 India	1975–76	7.0	9.2	13.9	20.5	49.4	33.6
15 Rwanda		..		..	..		
16 Central African Rep		.	..			.	..
17 Togo		..	.	..			..
18 Benin		..	..	..	..	..	.
19 China		..	.	.	..	..	.
20 Guinea		..	..	.		..	
21 Haiti		.	.	.	.	..	
22 Ghana		..	.		..	.	
23 Madagascar		.	.	.	.	..	.
24 Sierra Leone	1967–69	5.6	9.5	12.8	19.6	52.5	37.8
25 Sri Lanka	1969–70	7.5	11.7	15.7	21.7	43.4	28.2
26 Kenya	1976	2.6	6.3	11.5	19.2	60.4	45.8
27 Pakistan		..	..	..	..	.	..
28 Sudan	1967–68	4.0	8.9	16.6	20.7	49.8	34.6
29 *Afghanistan*		.	.	..	..		..
30 *Bhutan*		..	..	..	..		..
31 *Chad*		..	..	..	.	.	
32 *Kampuchea, Dem*		..	.	.	.	..	
33 *Lao PDR*		..	.	..	..	.	
34 *Mozambique*		..	..	..	.	..	.
35 *Viet Nam*		.		.		..	
Middle-income economies							
Oil exporters							
Oil importers							
Sub-Saharan Africa							
Lower middle-income							
36 Senegal				.		..	.
37 Lesotho		.	.	.	.	..	..
38 Liberia		..	.	.	..	..	
39 Mauritania		..	.	..	.	.	
40 Bolivia		..	.	..	..	..	
41 Yemen, PDR			..	..	.	..	
42 Yemen Arab Rep.		..	..	.		..	
43 Indonesia	1976	6.6	7.8	12.6	23.6	49.4	34.0
44 Zambia	1976	3.4	7.4	11.2	16.9	61.1	46.3
45 Honduras		.	..	..		.	.
46 Egypt, Arab Rep	1974	5.8	10.7	14.7	20.8	48.0	33.2
47 El Salvador	1976–77	5.5	10.0	14.8	22.4	47.3	29.5
48 Ivory Coast		.		.	..	..	
49 Zimbabwe		..	..	..	..	..	.
50 Morocco		.	.	..	..	.	..
51 Papua New Guinea		.	.	.	.	.	.
52 Philippines	1970–71	5.2	9.0	12.8	19.0	54.0	38.5
53 Nigeria			..	..		..	.
54 Cameroon				..		.	
55 Thailand	1975–76	5.6	9.6	13.9	21.1	49.8	34.1
56 Nicaragua		.	..				
57 Costa Rica	1971	3.3	8.7	13.3	19.9	54.8	39.5
58 Peru	1972	1.9	5.1	11.0	21.0	61.0	42.9
59 Guatemala		..	..	.	.		
60 Congo, People's Rep		..		.	..		.
61 Turkey	1973	3.5	8.0	12.5	19.5	56.5	40.7
62 Tunisia		..	.	.	.	..	
63 Jamaica		..	..	.	.	..	
64 Dominican Rep		.				.	

Note. For data comparability and coverage see the technical notes

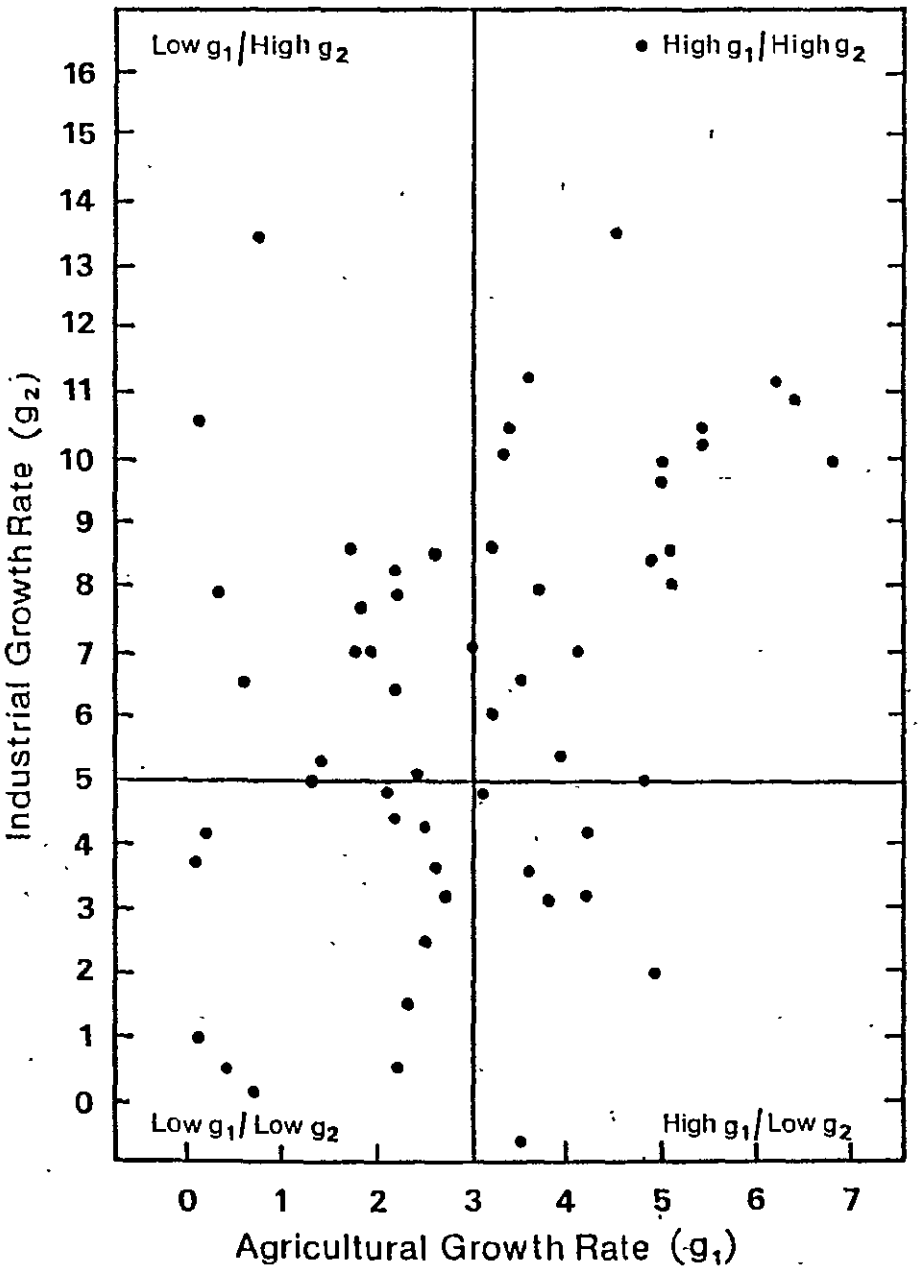
CHART 1B.—CLASSIFICATION OF 58 DEVELOPING COUNTRIES BY AGRICULTURAL AND INDUSTRIAL GROWTH RATES

Industrial Growth Rate (g_2)	Less than 3 percent	Greater than 3 percent
Greater than 5 percent	Algeria Bangladesh Burundi Central African Republic Congo Peoples Republic Costa Rica Ecuador Egypt Greece Haiti Honduras Lesotho Mexico Singapore Togo	Brazil Burma Cameroon China Colombia Dominican Republic El Salvador Guatemala Indonesia Ivory Coast Kenya Malawi Malaysia Paraguay Philippines Republic of Korea Romania Syria Thailand Tunisia Turkey Yemen Yugoslavia
Less than 5 percent	Argentina Chad Ethiopia India Madagascar Pakistan Panama Peru Spain Sri Lanka Sudan Uruguay Zambia	Bolivia Chile Mali Nicaragua Senegal Tanzania Venezuela

Agricultural Growth Rate (g_1)

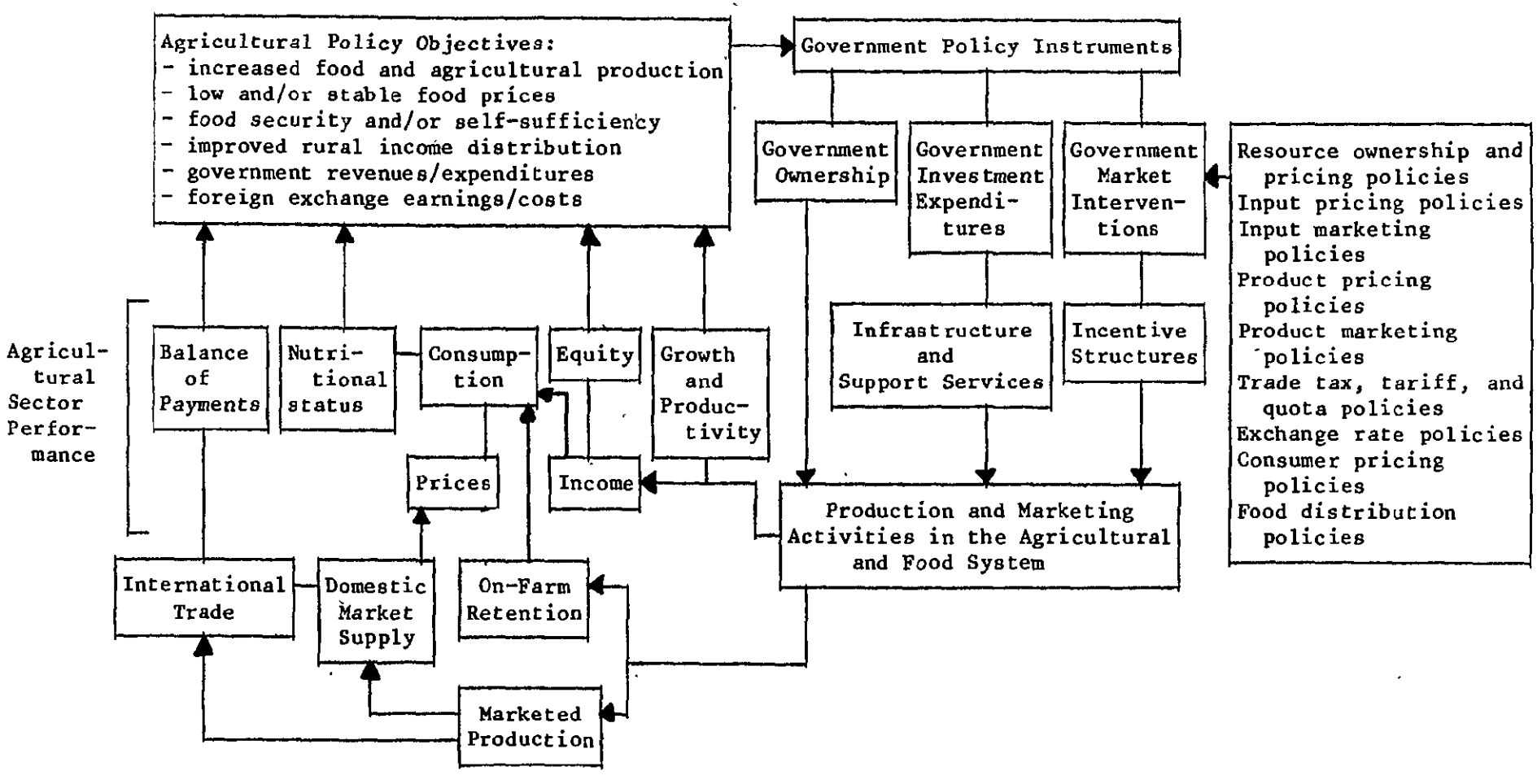
Source: World Bank, *World Development Report, 1981.*

CHART 1A.—AGRICULTURAL AND INDUSTRIAL GROWTH RATES OF 58 DEVELOPING COUNTRIES, 1970 TO 1979
(*Percent per year*)



Source: World Bank, *World Development Report, 1981*, p. 136.

LINKAGES AMONG AGRICULTURAL POLICY OBJECTIVES, GOVERNMENT POLICY INSTRUMENTS, AND AGRICULTURAL SECTOR PERFORMANCE



Fletcher

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Part II Agriculture and Economic Development

Great strides have been made in transforming the lives and the livelihoods of tens of millions of people in the developing world over the past three decades. Yet for close to two-thirds of these countries' populations—among whom are the vast majority of the world's poor—agriculture is still the main source of income, just as farming is their chief occupation.

This part of the Report concentrates on the policies and programs needed to sustain and in many instances to accelerate agricultural development, and on agriculture's contribution to ameliorating the problems of poverty. In the 1970s, a growing concern in the world community with problems of poverty coincided with massive evidence from the Green Revolution in Asia and elsewhere that rapid growth of production and productivity in agriculture was possible. The result was a variety of new programs in agricultural development, many addressed to the problems of the small farmer, supported by a large increase in capital and technical assistance from aid donors. This Report draws on the rapidly accumulating body of experience from these recent efforts and the lessons that are emerging from it.

Lessons from the more distant past are also relevant. While the role of agriculture in development has been debated for hundreds of years, the evidence, both historical and contemporary, is remarkably consistent. In Europe, Japan, and the United States, for example, a dynamic agriculture accompanied—and in some instances led—the process of industrialization and growth. The evidence, discussed in the next chapter, is equally convincing that this is still the case among contemporary developing economies.

History provides other pointers relevant to current problems. The key to agriculture's growth among the present industrial economies was the farmer himself, who sparked a stream of cost-reducing innovations and also financed and carried out the investment in land improvement needed to exploit new technology. The evidence from a wide range of developing countries shows that farmers behave no differently today The key factors are still the opportunity and the incentive to improve the land and with it the farmer's livelihood.

In two respects, though, conditions today are fundamentally different. First, the rapid growth of population and the concomitant need to expand food production far surpass the historical experience In the developing world of the eighteenth and nineteenth centuries, agricultural growth was much slower than the rates achieved by developing countries in the past thirty years. Second, farmers have access to an agricultural science that is a much greater source of innovation and a better catalyst of productivity growth than ever before. But this is true much more for some groups of farmers than for others.

Agricultural development in the recent past is characterized by an extraordinary diversity both within and between countries. Many still largely traditional farming systems that were sustainable with a low density of population are becoming increasingly strained by, and vulnerable to, the pressure of rising population. Spectacular environmental damage exemplifies the consequences of this pressure as land-hungry cultivators push into the tropical forests, up the hillsides, and across drought-prone, semi-and savannah. Thus a growing prosperity among some groups is contrasted with deepening poverty among others less fortunate.

Winning the race between a growing population and the food supplies needed to match it is a still formidable challenge in many low-income countries So, too, is the task of alleviating poverty in these largely rural societies. Technology and sensible policy are the means of successfully transforming agriculture for the benefit of the economy and of the people who live and work in agriculture—and who will eventually leave it.

5 Agricultural development and economic growth

Agriculture has been transformed in the past three decades Output has increased at nearly twice the rate of earlier periods, fueled partly by the developing world's greatly increased capacity to produce food and partly by changes in the developed countries. Above all else, there has been unprecedented technical change in agriculture throughout the world.

Alongside this remarkable and sometimes underestimated achievement stands the "world food problem" Hundreds of millions of people in the developing world are still without enough food. Population growth, the effects of which are often exacerbated by a highly unequal income distribution, has sharply reduced both the per capita benefits of increased food production and the associated increases in income per capita.

This paradox—of poverty in the midst of plenty—has long plagued popular understanding of the role of agriculture in economic development. On the one hand, it has led to a sense of hopelessness about the world's malnourished; on the other, to technological overconfidence. Overanxiety about food crises has alternated with taking agriculture for granted, even neglecting it.

None of these extreme reactions is appropriate or helpful. Agriculture does indeed face special problems, of which two in particular stand out. The first is biological—the close dependence on the natural environment This results in output levels that fluctuate unpredictably from season to season, and growth that varies greatly from one region to another depending on natural resources and the extent to which their potential has already been developed. The second is economic—the problem of the radical adjustments farmers face in the process of agricultural development. While its output may continue to grow, agriculture's share of both GDP and employment invariably decreases as economies develop and industrialize Indeed, at later stages of development, the absolute size of the labor force in agriculture declines, ultimately to a very small fraction of the total.

In most ways, though, agriculture is not unique. Farmers, like other workers, respond to incentives. In buying food, consumers are influenced by relative prices and available income, as they are when they buy other things. Agriculture's success or failure therefore owes much to factors that influence all economic activity. If it lags, it is because of inadequate investment, lack of incentives, and inappropriate policies, as well as problems of technology, climate, and soil.

This chapter describes some key elements in the worldwide expansion and transformation of agriculture. It discusses where growth has taken place, where it has not, and the problems which patterns of growth have produced or failed to solve. In particular it highlights the following features of agricultural development·

- Progress has been slowest in the low-income countries. These countries account for most of the world's poor, the vast majority of whom work on the land.
- There are strong links between agriculture and overall economic growth. Few countries have achieved sustained economic growth without first, or simultaneously, developing their agriculture.
- As it proceeds, development dictates a declining role for agriculture. Initially dominant, it eventually accounts for only a small fraction of net output, employment, and income Successful adjustment to agriculture's changing role determines not only the pace and pattern of development as a whole, but also the severity of the problems rural people face in the development process.
- The international economic environment—trade, technology, commercial capital, and development assistance—has contributed to major changes in world agriculture Most changes have been beneficial, but some serious problems remain: notably the agricultural protection policies of the developed countries, which limit the market access of developing-country producers, at high cost both to governments and to consumers in the developed world.

The pattern of recent growth

While the rate of growth of agricultural output over the past three decades was about double that of earlier years, it was decelerating during the period. Worldwide, output rose at 3.1 percent a year in the 1950s, 2 6 percent in the 1960s, and 2.2 percent in the 1970s. The broad pattern was one of declining growth rates in the nonmarket industrial economies, while rapid growth was maintained in developing countries and industrial market economies. (Table 5.1 and Figure 5 1 show the pattern for the 1960s and 1970s.)

In the industrial market economies agricultural growth has been led by rising demand for high-value products such as meat, poultry, dairy produce, fruit, and vegetables. This stimulated rapid growth in the production of cereals, especially in North America and Australia, because changes in animal husbandry led to heavy demand for feed grains. Today, grain fed to livestock accounts for 70 percent of their grain consumption. Between them, livestock and feed grain account for over 65 percent of gross agricultural output (see Box 5.1 and Chapter 6).

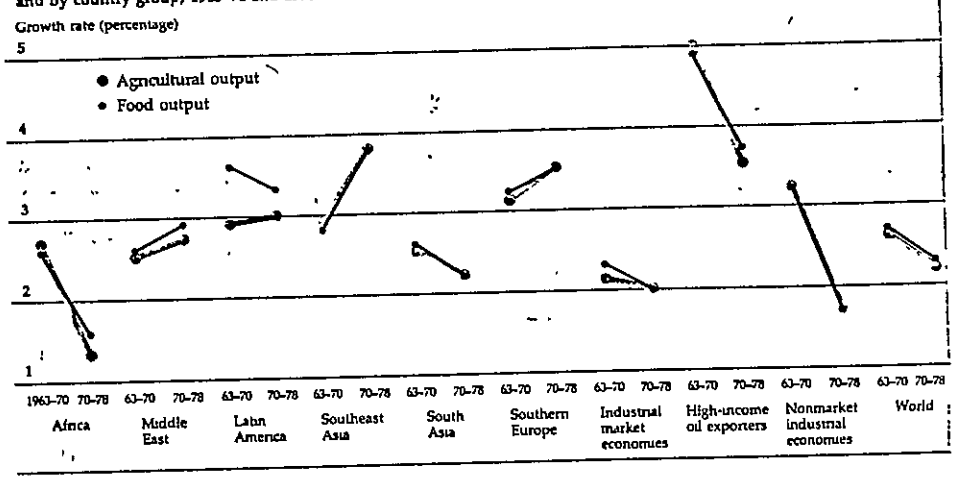
Rapid economic growth has drawn people away from agriculture. Agriculture's share of the labor force in most developed countries is now only one-third of what it was in 1960, averaging only 6 percent in the developed market economies in 1980. As a result of a major shift toward labor-saving technology, labor productivity (output per worker) has

Table 5.1 Growth rates of agricultural and food output by major world regions (excluding China), 1960–80

	Agricultural output				Food output			
	Total		Per capita		Total		Per capita	
Region and country group	*1960–70*	*1970–80*	*1960–70*	*1970–80*	*1960–70*	*1970–80*	*1960–70*	*1970–80*
Developing countries	2.8	2 7	0.3	0.3	2.9	2 8	0.4	0.4
Low-income	2.5	2.1	0.2	−0.4	2.6	2.2	0.2	−0.3
Middle-income	2.9	3.1	0 4	0 7	3.2	3 3	0 7	0 9
Africa	2.7	1.3	0 2	−1.4	2 6	1.6	0.1	−1.1
Middle East	2 5	2.7	0 0	0 0	2 6	2.9	0.1	0 2
Latin America	2.9	3.0	0 1	0.6	3 6	3.3	0 1	0.6
Southeast Asia	2 9	3.8	0 3	1 4	2 8	3 8	0 3	1 4
South Asia	2.5	2 2	0.1	0.0	2 6	2 2	0.1	0.0
Southern Europe	3 1	3.5	1.8	1 9	3 2	3 5	1.8	1 9
Industrial market economies	2.1	2 0	1.1	1.2	2.3	2 0	1.3	1.1
Nonmarket industrial economies	3.2	1.7	2 2	0 9	3.2	1.7	2 2	0 9
Total world	2 6	2 2	0.7	0.4	2.7	2 3	0.8	0.5

Source. FAO.
Note· Production data are weighted by world export unit prices. Decade growth rates are based on midpoints of five-year averages, except that 1970 is the average for 1969–71.

Figure 5.1 Agricultural and food output, by major world region and by country group, 1963–70 and 1970–78



Note: Excludes China
Source· FAO

ox 5.1 Food versus feed?

"Sheep eat men" was the seventeenth-century slogan of English peasants dispossessed when common land was enclosed for private pastures. Today, some 600 million tons of cereals are fed to animals every year This amount could feed 2.5 billion people, more than twice the number in poverty. Moreover, grain converted to meat loses 75 to 90 percent of its calories and 65 to 90 percent of its protein Accordingly, a lively school of thought maintains that feeding grain to cattle, pigs, and chickens takes food away from the hungry.

The issue is not a simple one, however The main use of cereals for feed occurs in developed countries, where over two-thirds of the grain consumption is accounted for by animals This pattern of grain use reflects the high incomes of consumers in the developed countries If cereals were not fed to livestock, cereal production in these countries would decline sharply.

A massive transfer of purchasing power from rich countries to poor ones would be needed to shift consumption from animals to people. Even if this unlikely prospect were realized, the longer-term consequences are problematic. Most of the world's hungry are farmers or live in farm areas where basic cereals are grown. It would be difficult if not impossible to inject large amounts of cereals into these areas without reducing incomes and production in the very regions where increased income is most needed. Direct food assistance has an important role to play, but it needs to be carefully balanced with other forms of assistance that stimulate food production and incomes.

As development proceeds, the interaction between livestock producers and grain farmers plays an increasingly important part in sustaining agricultural growth. The rapid growth in demand for feed is one factor responsible for the dramatic increase in cereal yields in the industrial countries—to nearly 3 5 tons a hectare. In the 1930s cereal yields were almost identical in developed and developing countries, about 1.1 tons per hectare. Rapidly developing middle-income countries are already following the pattern established by agriculture in the developed world; about 25 percent of the grain they consume is used for livestock feed.

frequently risen faster in agriculture than in other sectors. Agriculture has greatly increased its use of other inputs such as fertilizer and machinery, which now represent nearly half the value of gross output. Agricultural value added has therefore risen less rapidly than gross output—at less than 1 percent a year during the 1970s in many countries.

In the nonmarket industrial economies of eastern Europe and the USSR, output grew rapidly in the 1950s and 1960s because virgin land was opened up and the use of fertilizer and machinery increased. Between 1970 and 1980, however, agricultural growth slowed sharply in the two largest countries, the USSR (averaging 1.9 percent a year) and Poland (1.3 percent a year) This slowdown came at a time when the demand for meat and other livestock products was rising rapidly. Despite greatly increased imports of feed grains, agriculture has been slow to adapt to this changing pattern of demand. Some of the reasons for this failure lie in history—Soviet agriculture suffered heavily from war and neglect for thirty-five years after the Revolution of 1917—while others lie in the difficulties of an overly centralized system.

Agricultural output in the developing countries considered as a group grew at historically high rates, with growth of just under 3 percent a year during both the 1960s and the 1970s (see Table S 1). But the rate of growth of population was also unprecedentedly high. The outcome was a modest (0.3 and 0.4 percent a year) increase in agricultural and food output per capita.

As is usually the case, these aggregates conceal substantial differences. In particular, there was an acceleration of growth of agricultural output in Southeast Asia; from being near the average for developing countries (0.3 percent per capita a year) in the 1960s, it rose to 1.4 percent a year in the 1970s. The Latin American countries also increased their growth of agricultural output per capita, up to 0.6 percent a year in the 1970s from 0.1 percent in the 1960s.

By contrast, the yearly rate of growth of agricultural output in Africa declined (from 2.7 percent in the 1960s to 1.3 percent in the 1970s)—and the rate of population growth accelerated. These changes meant that output per capita grew at 0.2 percent a year during the 1960s, but then fell by 1.4 percent a year in the 1970s. Part of the decline was associated with a slowdown in the production of nonfood crops (tropical beverages and fibers); but the growth of food output per capita was also transformed from a modest increase in the 1960s to a decline (−1.1 percent) in the 1970s.

In South Asia, the balance between population growth and agricultural growth remained essentially unchanged over the two decades. In spite of growth rates of agricultural output which averaged 2.5 and 2.2 percent, respectively, output per capita grew at only 0.1 percent in the 1960s and about zero percent in the 1970s. This performance—disappointing, since South Asia had been one of the major beneficiaries of the Green Revolution and of massive investments in irrigation and fertilizer—is a salutory reminder of the consequences of high and sustained rates of population growth.

Of course, these growth rates were not uniform within each region, nor were they uniform within countries. In India, for example, not all regions are endowed with the fertile soil, effective flood control, and irrigation and drainage systems that have permitted some areas to show spectacular increases in agricultural production by adopting the new crop technologies. In the 1960s, agricultural growth exceeded 5 percent a year in about a third of the country's 281 districts, but output actually fell in a fifth of the districts and rose at less than 1 percent a year in another fifth.

Such regional differences in agricultural growth rates are a common phenomenon in most countries, both developed and developing. Within each of the EEC countries, for example, there are regions of increasing and decreasing agricultural income during the 1960–80 period. These regional disparities tend to be accentuated during early development stages, however, because of the proportionately greater impact of natural conditions, the variable effect of technology, and the limited capacity of governments to support agricultural growth in less favored regions. In the United States, for example, which provides both national and state support for agriculture, agricultural output increased in every state between 1930 and 1970, although growth rates still varied significantly between 1.7 and 6 percent.

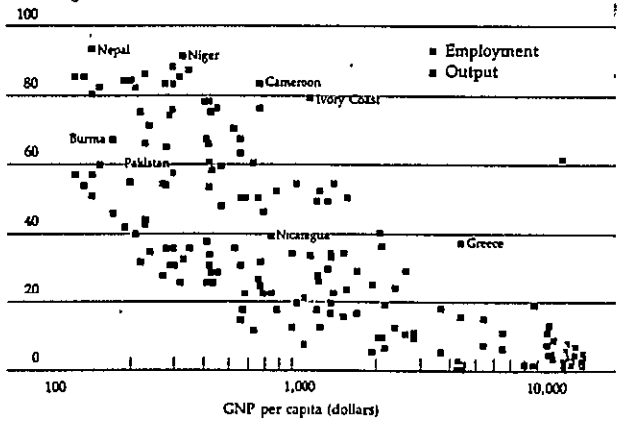
Low or negative growth in agricultural production per capita in South Asia and Africa presents a major challenge to domestic policymakers and the international community alike. The unprecedented advances in plant breeding, in the use of fertilizer, and in investment in irrigation over the past twenty years have resulted in a tie in the race between population growth and agricultural production in South Asia In Africa, where no comparable advances in agricultural technology have been realized, the race is at present being lost. The challenge is to accelerate the pace of biological innovation, to provide the policy environment and the complementary resources that make the new technologies effective in increasing output and incomes, and to reduce the rapid rate of growth of population.

The role of agriculture in development

Economic growth is invariably accompanied by a declining share of agriculture in total output, income, and employment. At advanced stages of development, the labor force in agriculture starts to decline absolutely. Two main forces, which together produce the major structural transformations shown in Figure 5.2, are at the heart of the development process. First, the pace of agricultural growth is limited by the growth of demand for its output, 90 percent of which is food in all but a handful of countries (see Chapter 6). In turn, the growth of demand is limited by the tendency for the proportion of household spending on food to decline as incomes rise. In India, with a per capita income of $240, for example, households spend 60 to 70 percent of their income on food; in a $10,000 per capita economy such as Canada, they spend less than 20 percent on food and are able to enjoy variety and quality to a greater extent.

This tendency, known as Engel's Law, is observed in all economies as they grow The limits to agricultural growth imposed by the growth in domestic demand can, however, be raised if income growth is broadly diffused in the economy and countries export their surplus produc-

Figure 5.2 Cross-country share of employment and output in agriculture, 1980



Note Excludes high income oil exporters

tion. (This option is available only to a limited extent, because Engel's Law operates on a global scale, as well as for individual countries.)

In the case of nonfood agriculture, competition from industrial substitutes grows as investment and innovation lower the price of industrial goods and services relative to agricultural raw materials. Common examples are the use of synthetics instead of natural fibers (cotton, wool, jute) for clothing, the substitution of oil or coal for wood, and the switch from timber to steel and cement in construction. Substitution is seldom total, however, so demand for natural products usually continues to grow. To benefit, producers have to concentrate on marketing as well as on efficient production.

With development, farmers become increasingly removed from consumers As subsistence farming gives way to marketed production, the scope for specialized marketing, transport, processing, and packaging is enlarged. In the industrialized economies, these activities produce much more value added and employment than does agriculture itself; the farm-gate value of food is now only one-third of the price consumers pay for it.

The second main force accounting for the structural change in agriculture is increased agricultural productivity, made possible by technological innovations and accumulated public and private investment. Employment expands and diversifies as a consequence of the relative decline in the agricultural work force In the early stages of development, almost everybody works in agriculture Most of the activities later classified as "industrial" and "service" are initially carried out, if not within agriculture, at least in rural areas—the manufacture of clothing, furniture, and tools, construction of housing and other buildings; transport, processing, and marketing; education, medicine, social and cultural activities. As development progresses, these activities become differentiated and separated from agriculture, until only core agricultural production functions remain. While some nonagricultural activities are still carried out in rural areas, modern industry and services open up new and qualitatively different opportunities, many of which require relatively high skills and education. Although this process is one of the most desirable benefits of growth, it is also the most difficult to handle in human terms (see Chapter 7).

The transfer of labor from agriculture (where the amount of capital per worker and average productivity is relatively low) to industry and services (where capital per worker and average productivity are relatively high) is the key to raising incomes and output. The higher average productivity of labor in the nonagricultural economy is reflected in income differences between it and agriculture. In most countries, incomes are lower in agriculture than elsewhere, as shown by the fact that farming's output share is consistently lower than its employment share (Figure 5.2) This income difference provides the incentive for people to move out of agriculture into nonagricultural activities in urban centers. The agricultural shares of output and employment are roughly equalized only at a comparatively late stage of development.

The process of change can be very rapid in historical terms: in Japan and the less developed parts of Europe, the agricultural labor force represented 40 to 50 percent of total employment as recently as 1950. Developed countries no longer depend heavily on agriculture: it accounts for only 4 percent of output and 6 percent of employment in industrial market economies, and 15 and 17 percent, respectively, in planned economies. In low-income countries, by contrast, agriculture still accounts for 30 to 50 percent of output and an average of 70 percent of employment. Even in most middle-income countries, 10 to 20 percent of output and over 40 percent of employment are derived from agriculture.

The continuing importance of agriculture in the economies of the developing countries is reflected in the association between the growth of agriculture and of the economy as a whole. Among countries where the agricultural share of GDP was greater than 20 percent in 1970, agricultural growth in the 1970s exceeded 3 percent a year in 17 of the 23 countries whose GDP growth was above 5 percent a year (Table 5.2). During the same period, 11 of the 17 countries with GDP growth below 3 percent a year managed agricultural growth of only 1 percent or less. Agricultural and GDP growth differed by less than two percentage points in 11 of 15 countries experiencing moderate growth. There have been exceptions, of course, but they prove the rule: fast GDP growth and sluggish agriculture was a feature of some of the oil- or mineral-based economies such as Algeria, Ecuador, Morocco, and Nigeria (see Box 5.2)

The parallels between agricultural and GDP growth suggest that the factors which affect agricultural performance may be linked to economy-wide social and economic policies. In the many low-income countries where agriculture predominates, effective policies, institutions, and investment

Table 5.2 Growth of agriculture and GDP in the 1970s

Agricultural growth	*GDP growth*			
	Above 5 percent		*3–5 percent*	*Below 3 percent*
Above 3 percent	Cameroon China* Colombia Dominican Rep Guatemala Indonesia Ivory Coast Kenya Korea, Rep of	Malawi* Malaysia Paraguay Philippines Thailand Tunisia Turkey Yemen Arab Rep.	Bolivia Burma* Mali* Somalia* Tanzania*	Liberia Nicaragua Senegal
1–3 percent	Costa Rica Ecuador Egypt Lesotho		Bangladesh Central African Rep.* El Salvador Haiti* Honduras India* Pakistan* Sri Lanka* Sudan* Upper Volta*	Burundi* Sierra Leone* Zaire*
Below 1 percent	Morocco Nigeria		Togo*	Angola* Chad* Congo, Rep. Ethiopia* Ghana Madagascar* Mauritania* Mozambique* Nepal* Niger* Uganda*

*Low-income countries
Source World Development Indicators

programs for agriculture are virtually synonymous with effective overall management. This is not surprising since there are many important growth linkages between agriculture and the rest of the economy. Expanding agricultural production through technological change and trade creates important demands for the outputs of other sectors, notably fertilizer, transportation, commercial services, and construction. At the same time, agricultural households are often the basic market for a wide range of consumer goods that loom large in the early stages of industrial development—textiles and clothing, processed foods, kerosene and vegetable oils, aluminum holloware, radios, bicycles, and construction materials for home improvements. In most middle-income economies, agricultural policies are only slightly less influential. Despite the similar resources and history of the countries, agricultural productivity has increased twice as fast in Cameroon and Liberia in recent years as it has in neighboring Guinea and Ghana—and four times as fast in Tunisia and Colombia as in Morocco and Peru.

Managing agricultural development

The process of transformation is well advanced in many middle-income countries, where agriculture's contribution to output and employment has already declined to modest levels and the agricultural labor force is starting to shrink in absolute terms In these circumstances, mechanization and other labor-saving techniques (such as the use of herbicides) play a major role in sustaining agricultural growth. Education and training are needed to help people move into industrial and service jobs—especially people from backward areas. In some of the advanced middle-income economies, marketed farm produce is increasing sharply, often several times faster than the overall rate of increase in agriculture. Heavy investment in roads, railways, ports, and other links in the marketing chain are required, together with policies and institutional arrangements to ensure efficient transport, processing, and storage. Similar considerations apply to the timely availability,

variety, and cost of industrial inputs such as chemical fertilizer. Finally, farmers and traders rely more on efficient (and increasingly complex) financial arrangements to provide credit for investment and working capital (see Chapter 6). Among the middle-income economies, rural poverty becomes a less severe, and hence more manageable, problem. In better-off rural communities, nonfarm employment is increasingly important; for many, farming itself becomes a part-time occupation. Where problems do persist, many countries have targeted investment toward rural health, nutrition, and infrastructure.

While middle-income countries expanded their agricultural output by 3.1 percent a year in the 1970s, low-income countries managed only 2.1 percent. As a consequence, agricultural output per capita increased by 0.7 percent a year in middle-income countries, while because of the poor performance of the African economies it actually declined in low-income countries by 0.4 percent a year.

The challenges of agricultural development are clearly much harder to meet in countries at earlier stages of development, when the economy itself is largely agricultural. Agriculture merits support and stimulus—yet it has to provide them itself, being the only real source of income, savings, and growth. At the same time, countries have other competing priorities, including industrial and urban development. Against this background, two sets of policy issues assume particular importance. The first is domestic: what incentives should be given to farmers and how should they change over time? The second set is international: how can governments in the developed countries assist agricultural progress in the developing countries?

Relative prices and other incentives are often biased against the farmer in developing countries. Overvalued exchange rates, taxation of agricultural exports, heavy protection of fledgling industry, and inefficient parastatal processing and marketing agencies—all contribute to this bias. Some of the issues involved in trying to measure the effects of these factors are discussed in Box 5.4.

The relatively low prices received by farmers have seriously hampered growth in many developing countries. Where prices have not been kept artificially low, and where other conditions for growth have been favorable, farmers have responded by increasing output. The responsiveness of farmers to incentives—in contrast to the outmoded and mistaken view that peasants are set in traditional ways—has been observed in societies with diverse social systems and levels of development (see Box 5.3).

Pricing alone is neither a complete explanation of agricultural performance nor the sole key to progress, however. Other areas of government policy are important:

- *Comparative advantage.* Many countries have traditionally encouraged specialization in agriculture to exploit the comparative advantage given to them by nature. In recent years, countries such as the Ivory Coast, Malaysia, and the Philippines have achieved rapid agricultural growth by encouraging export crops while also expanding food output.

The importance of trade for the agricultural growth of developing countries is evident from the share of agricultural output which is exported. Based on the FAO's production data (see Table 5.1), in 1979, out of ninety developing countries, exports accounted for 50 percent or more of total agricultural output in ten countries, more than 20 percent in thirty; and more than 10 percent in fifty. Among countries exporting more than half their total output, Jordan, Malaysia, Mauritius, and the Central American and Caribbean countries figure prominently. Among those exporting between a half and one-third of total output, nearly half are in sub-Saharan Africa. For developing countries in these two categories, the export market is a major factor determining agricultural growth. Since these are often countries where agriculture is a dominant sector, agricultural exports are an important factor in their overall economic growth as well.

Exporting is a rewarding but also a risky business. Between 1961 and 1978, African cocoa producers lost market share to Latin Americans; South Asian dominance in tea was eroded by competition with African and Chinese exporters and fell from 80 percent of world exports to under 50 percent; Latin American coffee producers supplied only 51 percent of the market in 1978, compared with 62 percent in 1961; and the small, sugar-producing islands of the Caribbean have been unable to expand into new sugar markets and have lost ground to East Asian and Latin American producers.

Specialization involves heavy investment and a commitment to research. Brazil's exports of soybeans are a notable recent example of exploiting the comparative advantage of a crop that was already being grown in the country (see Box 5.5). But greater difficulties are posed for very small

Box 5.2 Oil and agriculture: The Nigerian experience

Oil exports—about 2 million barrels a day in 1980—have become Nigeria's major foreign exchange earner. But oil has been a decidedly mixed blessing for agriculture.

In the early 1960s, agriculture was thriving. Small farmers, who made up more than 70 percent of the Nigerian work force, expanded their production of food and cash crops. Agricultural exports were booming and small farmers produced about 90 percent of them. Nigeria was the world's leading exporter of groundnuts, groundnut oil, palm kernels, and palm oil, and the second largest cocoa exporter (after Ghana). Income generated in the farming sector supported the development of many local manufacturing and service industries and provided most of the foreign exchange needed to build roads and other infrastructure.

Progress in agriculture was cut short by the oil boom in the mid-1960s and was further disrupted by the three-year civil war, which began in 1967. As a result, farming has yet to recover. Agricultural growth has been close to zero over the twenty years from 1960 to 1980, despite economy-wide growth of 4.8 percent a year. In the 1970s, the volume of agricultural imports quadrupled while agricultural exports were halved. By the late 1970s, Nigeria was a net importer of agricultural produce.

Oil income has depressed agriculture in the following ways:

- A substantial revaluation of the *naira* and high local inflation made exporting increasingly unprofitable, while food imports became increasingly competitive with local production. Higher incomes led urban Nigerians to change their eating habits in favor of imported foods.
- An immense urban boom attracted large numbers of young Nigerians into the towns. Because of rapid overall labor force growth, the number of farm workers may not have fallen absolutely, but the rate of increase was very slow and the proportion of older workers increased sharply.
- The considerable effort made to sustain agriculture through public investment and new development schemes was greatly hampered by the dearth of trained and experienced manpower, which was largely drawn into other, more buoyant sectors.

Oil clearly offers a major opportunity to accelerate the process of structural transformation. But the Nigerian experience suggests lessons for other countries in whose economies oil has a major potential role. Oil revenues must be used to support an efficient transformation process. This means that close attention must be paid to manpower constraints, that public sector financial discipline must be tight, and that the impact of oil on the exchange rate must be carefully monitored. Public investment needs to focus on expanding the economy's absorptive capacity—concentrating on removing bottlenecks in transport, power, and other infrastructure sectors. Expenditures on education and training need to expand to meet the human resource requirements of a more advanced and diversified post-oil economy.

Box 5.3 Improving incentives in Chinese agriculture

As part of a general shift toward greater flexibility, agricultural policies in China started changing in 1977. The system of rigid production planning in collectivized agriculture was relaxed, and household and other private agricultural activities were encouraged. The approach still sets local sales targets for the main crops, but allows production teams more latitude in their decisions on crops, land, and input use. Deregulation of local markets helps promote the private sale and exchange of produce.

Incentives to promote the production of priority commodities have been increased. Between 1977 and 1979 state purchasing prices for all the important commodities were raised by 20 to 30 percent. In addition, farmers are being encouraged to sell crops and livestock products to state agencies via entitlements to special allocations of grain or fertilizer (at relatively favorable prices) along with normal sales proceeds. Extra production is particularly favored: grain sales above quota attract a premium of 50 percent over base prices.

Within the production cooperatives, incentives have also been sharpened. The changes involve improvements to "work point" systems so that less is apportioned to workers as basic rations and more as a return for the quality and quantity of individual work. Various types of contractual arrangements are being encouraged under which small groups of workers manage collective land and other assets under contract to the production team, with bonuses for above norm performance.

Although it is too early to assess the long-term impact of these changes, they have already resulted in a dramatic upsurge in agricultural output:

- Between 1977 and 1980, the growth of output averaged close to 7 percent a year.
- Food-grain output increased by some 37 million tons, with growth averaging close to 5 percent a year, though in both 1977 and particularly 1980 bad weather was responsible for poor wheat crops.
- More remarkable was the upsurge among some of the other major field crops. Cotton output increased 23 percent in 1979–80, and oilseeds by 92 percent from 1977 to 1980, in both cases there was a sizable expansion of cultivated area as well as yield increases. Large increases are also reported for sugar, silkworm cultivation, and jute. There is evidence that these increases reflect substantial shifts in cropping patterns based on area specialization and local comparative advantage.
- Meat production (almost entirely pork) increased over 50 percent during the past three years—a response both to improved producer prices and to policies that give livestock producers greater freedom to use grain for animal feed.

China's planners did not anticipate so big a response. Nor did they adjust consumer sales prices for the leading items, therefore subsidies, already quite a large item in the budget, have shot up to around $5 billion a year.

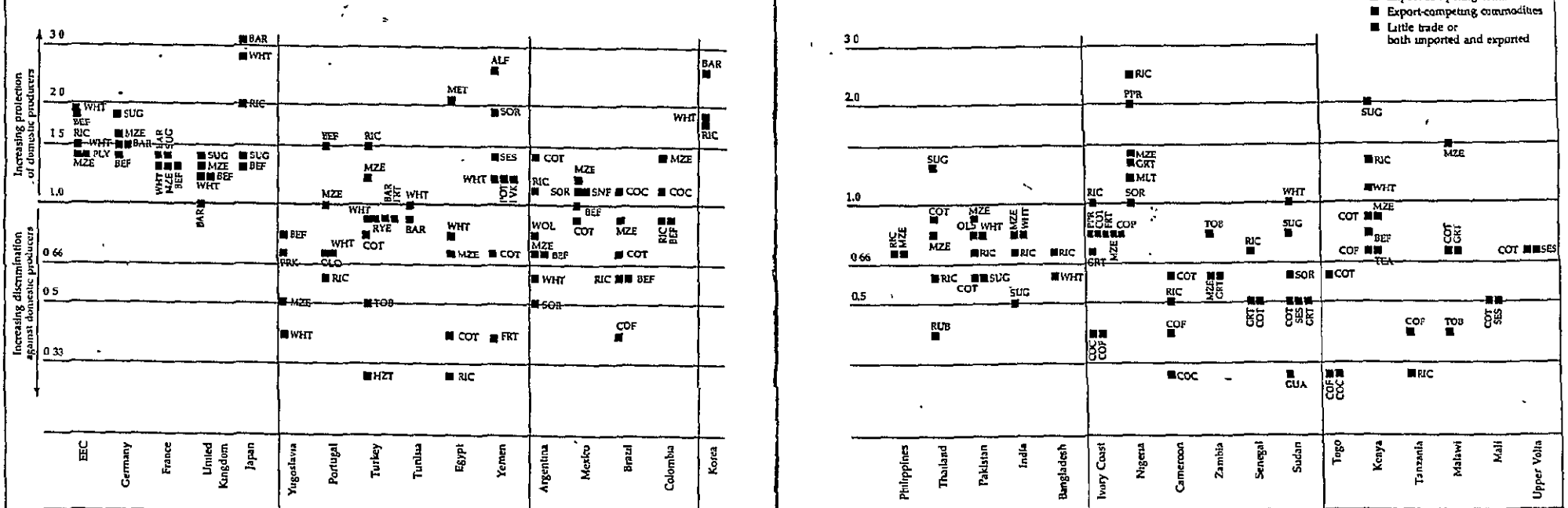
Box 5.4 Nominal protection and foreign exchange valuation

Determining the incentives or disincentives farmers face in different countries is a rough science. The protection measures shown in the figure compare the domestic prices that farmers are paid with prices they could expect to face if the country in question were freely trading on the world market. Too much significance should not be attached to individual crop and country data since year-to-year changes can be large. But the data confirm the high level of protection in many developed countries, where many producer prices are 50 to 100 percent above world market levels, in contrast to the situation of most developing countries, where prices are often well below the world market.

Nominal protection coefficients (NPCs) take into account tariffs, quotas, and nontariff barriers that protect farmers as well as the impact of export taxes or restrictions that penalize farmers. Protection is also a function of the country's exchange rate as it is influenced by policy. Protecting domestic industries, for example, reduces industrial imports below their probable level in an unprotected market. This tends to overvalue a country's exchange rate. Agricultural exporters then have a harder time competing in the world market, since their costs are increased in local currency while their dollar export receipts exchange for less local currency than otherwise. The NPCs shown in the figure are adjusted to account for over- or undervaluation of the exchange rate.

The NPCs are not adjusted for one other important factor—the protection given to tradable inputs used in production, chiefly fertilizer and machinery. Such effective protection coefficients (EPCs) are more difficult to compute because data on input uses in agriculture are more elusive. Research at the World Bank and elsewhere suggests, however, that the levels of traded inputs in agricultural outputs are relatively low in developing countries, so that the qualitative results of EPCs and NPCs are similar.

Adjusted nominal agricultural protection coefficients, by country, late 1970s



Note: ALF is alfalfa, BAR, barley, BEF, beef, BEN, beans, COC, cocoa, COF, coffee, COP, copra, COT, cotton, FRT, fruits, GRT groundnuts, GUA, gum arabic, HZT, hazelnuts, LVK livestock, MET, meat, MLT, millet, MZE maize, OLO olive oil, OLS, oilseeds, PLY, poultry, POT, potatoes, PPR, palm products, PRK, pork, RIC, rice, RUB rubber, RYE rye, SES, sesame, SNF, sunflower, SOR sorghum, SUC, sugarcane, SUG sugar, TOB, tobacco, WHT, wheat, WOL, wool

poor countries—for example, Burundi, Gambia, Guinea, and Uganda—that lack a research capability and are almost totally dependent (for 75 to 95 percent of their foreign exchange) on one or a few tropical export crops. Exceptional efforts will be required to achieve greater stability and diversity in the largely agricultural economies, including support from the international community to assist them in this difficult task.

- *Technological progress.* In the past, agricultural research relevant to developing countries' needs was confined largely to tropical export crops. Some, such as cane sugar, have been through several Green Revolutions over the past century. In general, though, research has become critical only in modern times; it has been applied to considerable effect in countries such as China, India, Indonesia, and the Philippines. Much remains to be done for crops grown in semi-arid areas and for rain-fed annual crops generally (see Chapter 6). Although research is one of the cheaper investments that governments can make, it requires highly skilled people to direct it. Foreign assistance has played a major role in this area, especially through the establishment of international agricultural research centers and through the financing and initial staffing of national research efforts in poorer countries.
- *Mobilization of rural resources.* Motivating and organizing farm communities to help in collective works and infrastructure is widely recommended, though less often systematically practiced. China is the outstanding example of what can be done to improve roads, land, and irrigation through community efforts that use little public money. There and in some other countries, land reform has

provided an early stimulus for common action. This is not surprising, since collective action and individual benefit become more closely and more directly aligned as holdings of land and other assets become more nearly equal Labor is the most plentiful and cheapest resource available in low-income countries, while capital is scarce and expensive. Using the rural work force for infrastructure improvement is an important means of converting labor into capital. Management is often the key constraint (see Chapter 7).

• *Public sector investment and support.* Agriculture attracts a surprisingly small share of government spending—between 5 and 10 percent of most developing countries' central government budgets. Nevertheless, public sector outlays on critical bottlenecks have helped to stimulate and sustain growth by the development of large-scale irrigation, research, and rural infrastructure. This approach has been particularly useful in areas where the potential for rapid growth already exists, and special programs often combine several elements into a development package. In some countries—Indonesia and the Republic of Korea, for example—fertilizer subsidies have been used to encourage growth The effectiveness of such techniques should not disguise the fact that they can become very costly; removing them once they have achieved their objective can be difficult.

In some cases, however, the intervention of the public sector has been counterproductive. Instances of ineffective parastatal organizations involved in the marketing of agricultural products and the supply of inputs abound. Some governments have taken bold steps to improve the efficiency of distribution systems by opening up the sector to cooperatives and private traders (see Box 5.6).

• *Foreign capital.* Much early agricultural development in, for example, Argentina, Brazil, Malaysia, and East and West Africa was largely based on private investment, often involving foreign management and control. Private foreign investment and loans are still important in some middle-income economies. In the low-income economies, little external private investment or lending has recently gone into agriculture. Instead, foreign aid has become the main external source of foreign exchange and technical support, particularly after 1973 (see Table 5 3).

In the mid-1960s, while nearly a quarter of all official development assistance (ODA) was food aid ($1.4 billion out of $5.9 billion), project and technical assistance for agricultural programs was small. The food crisis of the early 1970s, coupled with a growing realization that poverty and malnutrition were persistent problems in large parts of the world, produced a major shift toward agriculture. Flows of ODA and other official assistance for agriculture more than doubled in real terms between 1973 and 1980. The share of agriculture and rural development in the lending of the multilateral institutions rose to nearly 30 percent.

The share of aid in agricultural investment varies widely from country to country. In China, by far the largest country, virtually no external assistance was received during the past twenty-five years. Similarly, in India, though large amounts of aid have been received, it represents only 3 to 5 percent of total spending on agriculture Its use is concentrated on selected areas such as irrigation, and its effectiveness is largely determined by overall agricul-

Box 5.5 Brazilian soybeans: Creating a comparative advantage

Brazil's expansion of soybean production is a dramatic agricultural success story. Before 1960 production was insignificant, but by the end of the 1970s soybeans surpassed coffee as the principal Brazilian crop in value, covered some 17 percent of the cropped area, and constituted 14 percent of world soybean output Over this period, Brazilian soybean production grew at 27 percent a year: in the 1960s entirely through expansion of the area planted, and in the 1970s boosted by yield improvements of more than 2 percent a year Brazilian exports of soy and soy products (oil, meal, and cake) rose from $53 million in 1969 to $2 3 billion in 1980, a remarkable 42 percent a year rate of growth Soybeans make up more than 10 percent of Brazil's annual exports. As soy oil was substituted for imported vegetable oils, domestic consumption grew almost 28 percent a year over the 1970s, and there was also growing demand for soy meal, mainly for chicken feed

A number of factors helped to stimulate this impressive growth:

• Rapid expansion of world demand for protein for human and animal consumption, stagnation in the output of alternative protein sources (such as the Peruvian anchovy); the fact that Brazil's soybean crop comes to market during the US winter, when world supplies are seasonably low; and the US embargo on its soya exports in 1973 (which stimulated Japanese importers to find alternative sources).

• Farmers typically double-crop soybeans in the summer and wheat in the winter New wheat varieties that mature earlier enabled soybean-wheat double-cropping to expand to other areas. Cultural practices for the two crops are similar, and soybeans benefited from support aimed at promoting wheat production (for example, the fivefold real expansion of subsidized agricultural credit in the 1970s, about 20 percent of which was for soybeans).

• Research was a critical factor More than sixty soybean cultivars brought to Brazil from the United States during the 1960s contributed to the development of domestic cultivars by the National Center for Soybean Research. Of the forty-eight cultivars distributed to farmers at the end of the 1970s, twenty-six had been developed in Brazil. It has been estimated by the Brazilian Agricultural Research Enterprise (EMBRAPA) that two-thirds of yield increases have come from genetic improvements. The other third has come from improving soil management practices—proper application of fertilizers, correctives, nitrogen-fixing bacteria, and herbicides—also derived from intensive and continuous research That national yields grow apace with increases achieved at the research centers attests to the successful diffusion of the research results and their adoption by farmers.

Box 5.6 Private complements public: The Bangladesh experiment

In the mid-1970s, Bangladesh planners estimated that fertilizer use had to expand by 15 percent a year to attain the targeted 4 percent yearly agricultural growth rate. At that time, the Bangladesh Agricultural Development Corporation (BADC), a public corporation under the Ministry of Agriculture, handled all marketing of farm supplies as well as all procurement of fertilizer. It had done well, but the strains had begun to tell

In 1978 BADC established the New Marketing System (NMS) to reduce restrictions on private traders and thus move toward a more open system for distributing fertilizer. BADC would gradually withdraw from retailing and, except in remote areas, sell mainly to wholesalers at "primary distribution points." Private dealers and cooperatives would be permitted to buy from all BADC warehouses. Private movement of fertilizer would be unrestricted except in the border zones

With bilateral assistance from the United States, BADC began the NMS in the Chittagong Division, which covers one-fourth of the area of the country and accounts for a third of total fertilizer consumption It increased official dealers' margins, permitted farmers to buy from any trader, and made it easier to become a trader. It developed a private dealer credit system from commercial banks BADC set up a monitoring system for the NMS and took steps to cut down its internal transport and storage problems.

The NMS enjoyed reasonable success. Fertilizer sales increased, and forty-five government warehouses were put out of business, leaving the government active mainly in remote areas which did not attract wholesalers Retail prices dropped below official prices around the primary distribution points. The new fertilizer wholesalers showed they could move fertilizer cheaply and effectively from surplus to deficit areas, selling to both farmers and retailers.

On the basis of this pilot experience, the NMS was adopted nationwide. As of mid-1980, major accomplishments of the NMS included:

• BADC's fertilizer points of sale were reduced by 55 to 60 percent, about one-third of the original 130 warehouses were closed.

• Farmer access to fertilizer points of sale greatly increased in the Chittagong Division.

• Farmers paid less for fertilizer under the NMS

• A new class of entrepreneurs had emerged.

The net results of the program have been almost entirely positive. The private distribution system is more flexible and can supply farmers at lower costs, and much of BADC's managerial and labor force can be released for other tasks The costs of constructing and maintaining the marketing and storage infrastructure have been substantially reduced The government is now collaborating more actively with the private sector in other areas.

Table 5.3 Official assistance (commitments) to agriculture, 1973–80
(millions of dollars, constant 1979 prices)

Item	*1973*	*1974*	*1975*	*1976*	*1977*	*1978*	*1979*	*1980*
Official development assistance (ODA)								
DAC[a]	1,594	2,819	2,359	2,246	3,279	3,633	4,304	3,773
Multilateral agencies	1,533	1,833	1,530	1,814	2,139	2,761	2,503	2,969
OPEC (bilateral and multilateral)	69	218	640	378	461	307	243	179
Total ODA	3,196	4,870	4,529	4,438	5,879	6,701	7,050	6,921
Percentage change		+82	−6	−2	+32	+14	+5	−2
Other official flows (OOF)								
DAC[a]	351	275	137	395	159	403	329	222
Multilateral agencies	902	1,610	2,944	2,150	2,816	3,275	2,319	2,621
OPEC (bilateral and multilateral)	63	90	333	221	80	49	99	48
Total OOF	1,316	1,975	3,414	2,766	3,055	3,727	2,747	2,891
Percentage change	.	+50	+60	−19	+10	+22	−26	+5
Grand total (all donors)	4,512	6,845	7,943	7,204	8,934	10,428	9,797	9,812
Percentage change	. .	+62	+16	−9	+24	+17	−6	( )

Source OECD
a Includes EEC.

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tural investment. Elsewhere, especially in the poorer African countries, aid accounts for 20 percent of public investment in agriculture. There too, the effectiveness of aid still depends on the government's interest in, and commitment to, agriculture.

The need for policy and investment changes is not uniform among developing countries. Many have been quite successful in managing their agriculture and adapting to structural changes. They need little advice, although they may need continued financial support to sustain well-designed policies and programs. Others need to make major changes. They are not alone. The developed countries have found it extremely difficult to manage the last stages of structural change in agriculture; their capacity to deal more effectively with these challenges will be an important factor in developing countries' success or failure.

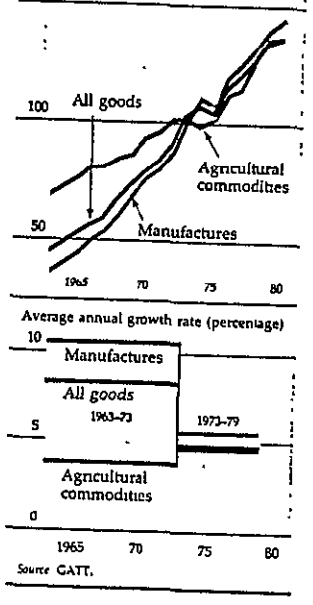
The international environment

The international environment can support or restrict agricultural development in developing countries in two main ways. First, through the mechanisms described in Part I of this Report, the international economy powerfully conditions the overall growth prospects of developing countries. In turn, more buoyant overall growth simultaneously provides both strong support for agricultural growth and the resources to permit an expansion of productive capacity.

Second, trading opportunities for agricultural products permit agricultural growth beyond the limits set by the expansion of domestic demand alone. Agricultural exports remain a major source of foreign exchange for many developing countries, and therefore an important determinant of overall economic growth. Patterns of agricultural trade have varied markedly over the past three decades, reflecting in part the growth of the world economy and in part the differential agricultural growth performance described earlier in this chapter.

During the period of fastest growth in the world economy—roughly, from 1955 to 1973—the expansion of international trade was dominated by manufactured goods, fuel, and minerals. World trade grew at 8 percent a year, trade in agricultural goods by less than half that. By 1973, developing countries' agricultural exports had fallen from 60 percent of the value of their total exports in 1955 to only 30 percent. Nevertheless, agricultural goods remained the single most important category of exports for more than two-thirds of the low- and middle-income economies.

Figure 5.3 Index and growth rates of world exports, by volume



Source GATT.

The early 1970s proved a turning point in the agricultural trade of developing countries. Since 1973, the growth of world trade has declined to 4.7 percent a year, in line with the slowdown of the world economy. But the growth of agricultural trade has accelerated to 4.8 percent a year, largely because the demand for food has increased rapidly (see Figure 5.3). The extra purchasing power of the oil-exporting countries boosted their share of world food imports from less than 6 percent in 1973 to 10 percent in 1978. Over the same period, strong demand for meat and poultry in eastern Europe, coupled with a poor supply response from domestic agriculture, boosted the region's maize and wheat imports from 3 to 14 percent of its total food imports. Eastern Europe now accounts for about one-third of world imports of maize and wheat. China has also become a major grain importer. In total, the world grain trade has expanded from about 30 million tons in the mid-1950s to average 130 million tons a year in the 1976–80 period—nearly one-half because of rising imports by developing countries (including China) and one third because of import growth by the USSR and eastern Europe

The extra demand has been met mainly by developed countries. The biggest relative increases in exports have come from the EEC, which produced trade surpluses in a number of commodities as a result of continued agricultural growth and stagnant demand in the home market. By contrast, the large rise in North American grain exports only slightly increased their importance in world food trade. Overall, the net food deficit of the industrial market economies narrowed from 16 percent of world food trade in 1965 to less than 5 percent in 1978

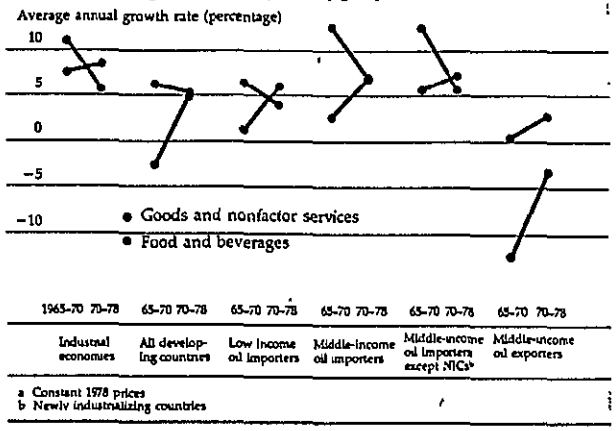
The oil-importing developing countries gave greater emphasis to agricultural exports during the 1970s. By 1978, their trade surplus on food amounted to $21 billion, sharply up from $6 billion in 1973. Performance has varied widely by region and country. Some countries have been able to penetrate expanding markets; examples include Brazil's successful soybean exports and Thailand's new trade in cassava chips for livestock feed. A number of low-income countries sharply increased their food exports to Middle Eastern markets after 1973 (see Figure 5.4). These markets now account for more than 20 percent of low-income countries' food exports, compared with 4 percent in 1973.

These were the successes. In other cases, however, especially where exports were based on traditional tropical crops, inelastic demand limited increases in foreign exchange earnings. Although volume expanded in the 1970s, the terms of trade deteriorated considerably. Had agricultural prices been moving in line with prices of manufactured goods, this higher volume of exports would have given low-income oil importers an additional $1.2 billion of foreign exchange in 1978 and middle-income ones an extra $5.7 billion—enough to finance 15 percent and 27 percent of their respective current account deficits (see Table 5.4).

Slowing demand in protected developed-country markets has altered the shape of developing countries' agricultural trade. When trade was limited to a few commodities consumed almost exclusively in the developed world, export volume and prices were determined by fluctuations in industrial countries' growth and by production changes in the developing countries. Today, developed countries remain the major markets for food exports, taking about 70 percent of middle-income countries' exports and 50 percent of low-income countries' exports. But developing countries' food exports to these markets grew much more slowly between 1965 and 1978 (1.1 percent a year) than their exports to oil-exporting developing countries (6 3 percent a year), to high-income oil exporters (8.9 percent a year), and to centrally planned economies (4.9 percent a year). These three groups now represent the most dynamic and open markets for the agricultural exports of developing countries, weakening the historical link between commodity trade and the growth of industrial countries.

The trade and agricultural policies of developed countries influence the options open to the developing countries in important ways. In contrast to the situation in most developing countries, agriculture in the developed world is heavily protected and supported. The aim has been to support farm incomes in the face of rapid growth of earnings elsewhere in the economy. In some instances, governments have also sought to retain a farm economy capable of supplying most of their countries' food. Countries in the

Figure 5.4 Export growth rates[a], by country group



a Constant 1978 prices
b Newly industrializing countries

Table 5.4 Oil-importing developing countries' food and beverage trade, 1970 and 1978
(billions of 1978 dollars)

	Low-income oil importers			*Middle-income oil importers*		
Item	*Exports*	*Imports*	*Net*	*Exports*	*Imports*	*Net*
1978 value	5 98	3.04	2.94	38.79	20 90	17.89
1970 value	5.03	2.91	2.12	30.38	16.65	13 73
Difference	0.95	0.13	0 82	8.41	4.25	4 16
Value change due to:						
Volume growth	2.22	0 24	1.98	16.19	6.36	9.83
Price decline	−1.27	−0.11	−1.16	−7 78	−2.11	−5 67

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EEC have protection levels between 30 and 80 percent above the commodity prices in world trade (see Box 5.4). The United States has less explicit protection, but its budgetary expenditures as a percentage of agricultural value added (38 percent) are similar to those of the EEC (39 percent). Japan has the most heavily protected farmers, largely because of import restrictions (the domestic price of rice, for example, is twice its import price, and wheat and barley are protected even more). Developed countries also subsidize their agriculture through programs of research, technical assistance, credit, and income-maintenance schemes. By 1980, public spending on agriculture by the EEC countries, Japan, and the United States was about $80 billion; the EEC accounts for close to half the total.

These protectionist policies have had mixed consequences for the developing countries. An important positive feature is that these policies have stimulated research and technical development in agriculture, which benefit developing countries through the international transfer of technology. More controversial are the lower international prices for some commodities associated with developed-country disposal of agricultural surplus, notably grains and milk products. While clearly benefiting importing developing countries in the short run, in the longer term the lower prices may depress farm incentives for local food production and stimulate permanent changes in preferences for foods which cannot be locally produced. The benefits tend to accrue largely to a relatively affluent urban minority of consumers, while adverse effects are felt by the poor rural majority.

For developing-country exporters, the impact of agricultural protection is clearly negative in several respects (see Box 5.7). Developing-country exporters have been hard hit by this legislated inability to expand into traditional industrial-country markets. For example, the share of developing-country sugar exports going to the developed word has fallen from 88 percent in 1970 to 64 percent in 1978. Although they have been able to expand their share in other developing-country sugar import markets, this has not been sufficient to maintain the value of sugar exports in real dollar terms, relative to 1970. Moreover, strong competition from the industrial countries' surplus has captured increasingly large shares of the growing market in those developing countries that import sugar; 46 percent in 1978 compared with 24 percent in 1970.

By comparison with trade in manufactures, little progress was made in reducing agricultural protection in the most recent (1975–78) Tokyo Round of multilateral trade negotiations. That lack of progress is compounded by the fact that nontariff measures are often used to exclude developing countries' agricultural exports.

Governments in industrial countries are sensitive to the protectionist demands of their own farmers, and this factor exacerbates the uncertainties and risks of agricultural trade. For example, the EEC is considering ways to reduce the budgetary costs of the common agricultural policy—not by reducing protection, but by extending tariff barriers to imported vegetable oils. Such measures, particularly if they lead to higher domestic production, as they have done with sugar, are bound to harm efficient producers in the developing world and to force consumers in developed countries to pay even higher prices for food.

Protection also creates substantial volatility in world prices. By insulating domestic producers and consumers from external market realities, governments are placing the burden of balancing global supply and demand on a relatively small part of the market. Since it is disproportionately the developing countries who participate in the open world market, they have to bear the bulk of this burden. Fluctuating commodity prices make planning more difficult and wrong investment decisions more likely. One legacy of record sugar prices in 1974 was a proliferation of costly import-substituting schemes for growing sugar. They continue to act as a drain on budgets and, as heavy debt-service payments fall due, on foreign exchange.

A considerable degree of instability of agricultural commodity prices is, however, inherent in their underlying demand and supply relationships. Neither demand nor supply are very sensitive to short-run price changes, on the other hand, the demand for agricultural raw materials in particular varies significantly with fluctuations in industrial country growth, and the supply of these products is often quite variable too. It can be affected by weather conditions, disease, and pests in major producing areas, and by the long gestation period which separates plantings of new tree crops from the period of maximum yield. Commodity prices therefore often rise and fall dramatically and impart a high degree of instability to the economies of countries heavily dependent on these commodities for their export earnings.

In addition to various protection measures taken by the consuming countries to insulate themselves from price fluctuations, efforts to deal with unstable commodity prices have taken the form of long-term bilateral trade agreements and multilateral commodity agreements. The latter have met with limited success for a variety of reasons—

Box 5.7 Measuring the impact of agricultural protection

The International Food Policy Research Institute (IFPRI) has completed the most recent study of the impact of protection on agricultural trade. Based on data of the mid-1970s, their study concluded that a 50 percent reduction in OECD developed-country trade barriers (affecting some 99 agricultural commodities) would increase agricultural exports from some fifty-six developing countries by about 11 percent, equivalent to $3 billion of extra sales at 1977 prices. Long-term benefits might considerably exceed these estimates, if a more liberal trade environment (that exporters had confidence would be sustained) encouraged new investment and expanded specialized production over a longer period.

The distribution of benefits from trade liberalization reflects the uneven pattern of protection, the patterns of comparative advantage of the various developing-country producers, and their export policies. Roughly a third of extra export revenues would accrue to sugar producers, beverages, tobacco, and meat products account for another third. Close to 60 percent of the additional revenues would accrue to Latin American producers, over 20 percent to countries in Asia, and 10 percent each to sub-Saharan Africa and the North Africa and Middle East region. Benefits would also be considerable for smaller exporting countries not included in the sample of fifty-six (which were selected on the basis of a population of 4 million or more in mid-1975), for example, Cuba, Jamaica, and Mauritius (as sugar producers), Cyprus (wine), Zimbabwe (tobacco), and Costa Rica (meat, coffee)

Box 5.8 The "food crisis" and its food security aftermath

Between 1972 and 1974 the world price of wheat and rice roughly trebled from $60 to $200 a ton and from $130 to $500 a ton, respectively, fertilizer prices shot up still faster from $50–$75 to $300 a ton. These unprecedented increases in the prices of the world's most basic foods and of a critical input needed to increase food production were dramatic manifestations of the "world food crisis." They were seen—along with anxieties about land availability and reports of hunger and famine—as harbingers of an impending collapse of the world food system, and of a future beset by dramatically higher and more unstable food prices.

By 1976, however, the prices of wheat, rice, maize, and fertilizer had fallen as dramatically as they had risen. Wheat prices in particular were below their pre-1972 level. It was clear that a fundamental shortage of food was not in the offing. Prices of cereals and most agricultural commodities are now not expected to be much above present levels until well into the 1990s.

In retrospect, the factors causing the food crisis were avoidable. Over the period from 1955 to 1972, large publicly held grain stocks in the developed countries and heavy food aid shipments had created an environment in which some developing countries had little incentive to produce food and fertilizer. At the same time, developed-country domestic policies led to the atrophy of efficient grain-marketing mechanisms. The sharp rise in grain stocks in 1968 led to an abrupt reduction of wheat production by the grain-exporting countries between 1969 and 1971. In 1972, world grain production declined, simultaneously, large grain purchases were made by the USSR.

Domestic markets in a number of importers, notably those in western Europe and the planned economies, were insulated by governments from the effect of world prices. Consequently, the burden of adjustment fell most heavily on those who were not protected, including many developing economies and the grain-exporting countries (where high grain prices dramatically reduced the feeding of grain to livestock). Grain stocks were not sufficient to contain prices, which rose rapidly. Fearing a shortage, many countries bought more grain than they needed, driving prices still higher.

The food crisis taught some painful but important lessons. A repeat of the 1972–74 situation seems unlikely owing to the following responses to it:

- Much greater emphasis has been given to increasing food production, the essential long-term source of food security.
- More widely held and carefully monitored stocks have been established.
- Grain markets are now functioning more effectively than in the past. The feeding of grain to livestock and decisions to buy, to sell, to store, and to trade grain are more responsive to price changes.
- Countries have imposed limits on the amounts of grain they will export before reviewing the grain market.
- Countries are giving more thought to the broader impact on food security of production and acreage adjustments previously considered to be of purely domestic concern.

Governments have also reached a number of international agreements that improve world food security.

- An *International Emergency Food Reserve* of 500,000 tons was established in 1976, and contributions of 588,000 tons were made to it in 1981.
- A new *Food Aid Convention* was negotiated in 1980 which raised the minimum annual contribution of food aid from 4.2 to 7.6 million tons.
- The *IMF Food Facility* was established in 1981 as an extension of the *IMF Compensatory Fund Facility* to provide financial assistance to offset fluctuations in countries' food import bills either because of shortfalls in domestic production or higher world food prices.

Whether these changes, together with increases in world stocks, provide "adequate world food security" is still being argued, further mechanisms to promote stability and security may emerge. But the food crisis had the additional effect of increasing awareness among planners and policymakers that a properly functioning international world food market also contributes substantially to improved world food security.

incomplete participation by all producing and consuming countries, lack of agreement on target prices, limited financial support for buffer stocks, or lack of commitment by participants to the actions required in the face of price changes. These problems are further complicated by the tendency of most commodity prices to rise and fall together. Efforts to diversify production within tropical products as a means of achieving greater stability have therefore not been very successful. And only limited overall stability can be gained from a single commodity agreement. While more effective commodity agreements may be achieved, including a common fund to support such agreements, the long-term solutions are diversification into other exports, such as manufactures, and into agricultural products (including foods) for a more stable domestic market. In the short term, domestic economic management policies to reduce the internal impact of fluctuating external prices can contribute to longer-term diversification.

Volatile prices make governments more receptive to the idea of agricultural self-sufficiency and more prone to intervene in production and trade. The issue of food security provides another important example. To the extent that the 1972–74 world food crisis made governments more aware of the instability caused by insulated agricultural markets, its wider impact may have been favorable (see Box 5.8). Generally, though, governments tend to react to instability by further protecting their own markets or by creating or revamping international regulatory mechanisms. These do indeed mitigate some of the adverse effects of price cycles, but at substantial real costs, both economic and political. They do not tackle the roots of the problem, which lie in the distorted structure of trade.

To sum up, the challenge for policymakers in developing and developed countries alike is to break out of the web of restrictive measures that impede agriculture in some countries and overstimulate it in others; to create a trading system in which comparative advantage plays a more important role in production and trade decisions; and to encourage market mechanisms that reduce the risks of participating in the system. The restructuring of incentive policies at home and the creation of such a trading system would promote the effective long-run deployment of the world's agricultural resources and help meet the developing economies' pressing short-term needs for improved access to overseas markets for their agricultural exports.

6 Sources of agricultural growth

Farming has come a long way since man learned to cultivate plants 10,000 years ago The constraints of soil and climate have gradually been eased. Virgin land has been settled, its productivity raised. Hands have been helped by hoes, then by plows and animals, and finally by sophisticated machines. The search for new and better farming methods continues, assisted by the full weight of scientific research.

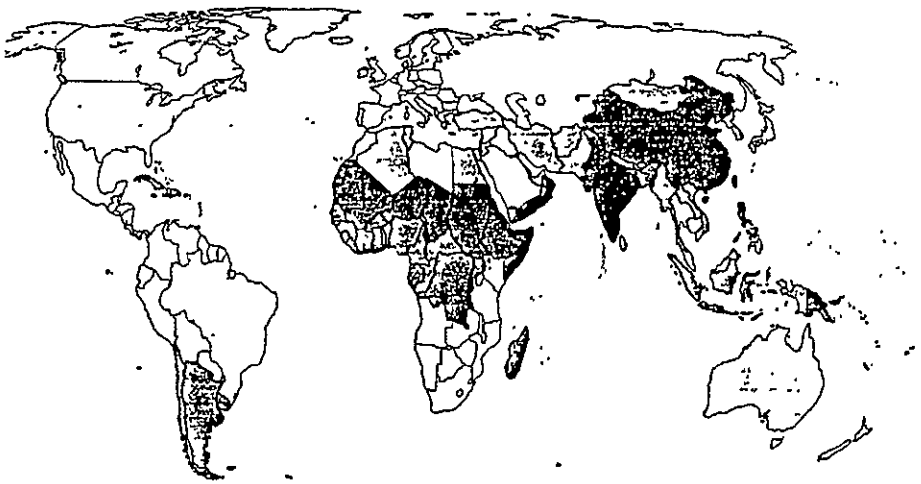
Until the 1950s, agricultural progress in most developing countries was slow and uneven, barely keeping pace with population growth. Although the expansion of agricultural trade had boosted tropical exports, farming for food was largely neglected during the colonial period. In the past twenty years, however, great strides have been made. Hundreds of millions of people, from peasants farming a few acres in Kenya to commune members in China, have transformed the ways in which they farm the land. They have been assisted by science, and spurred on by the prospect of higher incomes and security for their families. Their considerable achievements cannot obscure the size of the challenge that still lies ahead, however. Many developing countries' populations are growing faster than their agricultural production, and many millions of farmers have not yet shared in the progress of the past twenty years.

The reasons for this patchy progress are the main focus of this chapter. It examines the sources of agricultural growth, paying special attention to the role of science and technology in discovering new farming methods. The task of adapting those discoveries to the circumstances of particular countries and people; of disseminating the results and encouraging farmers to adopt them; of providing the numerous back-up services that are then needed to turn good intentions into concrete results—these are the themes that will recur repeatedly. Throughout, the discussion shows how agricultural success flows from a unique combination of private and public endeavor. Government can supply some of the support and incentives from which all farmers can benefit but which none could organize independently. It is then for farmers to take the inevitable risks associated with large rewards.

As noted in Chapter 5, agricultural progress has been remarkably successful in many ways during recent years, and the prime source of growth has been food production in the developing countries. Differences in soil and climate have produced an almost infinite variety of cropping systems in these countries. Five main crop zones can be identified, however, on the basis of the staple food crop that predominates in each (see Figures 6.1 and 6 2).

- Rice, which first grew on the water-retentive soils in the humid tropics of Asia, has been adapted to fit a wide range of environments. Farmers now grow rice in the river valleys and coastal plains of South China, South and Southeast Asia, the Indonesian and the Philippine islands, Japan, and Korea, as well as small areas of Latin America and East and West Africa. In many nearby high-rainfall areas with more permeable soils, upland rice is grown with other crops
- Starchy root crops (cassava, yams) are grown in areas of the humid tropics where soils are less fertile and not well suited for cereal cultivation, such as western and central Africa and parts of Oceania and Latin America. Cassava has also spread to northern Thailand where it has emerged as an important export crop.
- Maize is the most important staple in the subhumid tropics of Latin America and Africa The most common crops farmed with maize are cotton, groundnuts, soybeans, and sorghum in the drier areas; coffee, cocoa, and starchy root crops in the wetter areas
- Sorghum is the main food grain in the wetter parts of the semi-arid tropics and millet in the drier regions. Groundnuts, cotton, cowpeas, and pigeon peas are the most common associated crops
- Wheat is the most important

Figure 6.1 Major crop zones in developing countries



Key Crop zone	Predominant agroclimatic condition	Total population (millions)	Agricultural population (millions)	Agricultural population density (persons/ha.)	Average yield of primary cereals (kg/ha.)	Arable land reserves
Root crop zone	Humid tropical	193	120	1.6	750	Abundant
Rice zone	Humid tropical and humid temperate	574	358	3 5	2050	Moderately abundant
Maize zone	Subhumid tropical	353	161	1.1	1450	Abundant
Sorghum and millet zone	Semi arid tropical	86	70	1.6	670	Moderately abundant
Wheat zone	Temperate/Mediterranean	395	182	1.0	1850	Scarce
Mixed (India)	Warm temperate and and to humid tropical	673	439	2 5	1310	Very scarce
Mixed (China)	Cold temperate to subhumid tropical	977	572	5.8	2700	Very scarce

Note: Because of limited data for subdivisions of countries, the borders between crop zones have been adjusted to coincide with national boundaries
Sources: IFPRI, FAO

grain in much of the temperate zone but is grown over an increasing area of the cooler tropics as a winter crop in association with monsoon-grown grains or cotton.

The first section of this chapter deals with land, noting in particular the increasingly limited role which settlement of new land will play in agricultural expansion. The second section examines the alternative to settlement—intensive agricultural development—as a source of growth and discusses the important contributions made by irrigation, intensified farming in rain-fed areas, and livestock development. Two sections follow on the prime forces behind intensive development: technology (machinery, pesticides, herbicides, and fertilizers) and research, together with their results (the Green Revolution in cereals and progress in other tropical crops). The chapter concludes with a discussion of some of the key elements of ongoing support for agriculture: infrastructure, extension, marketing, and credit.

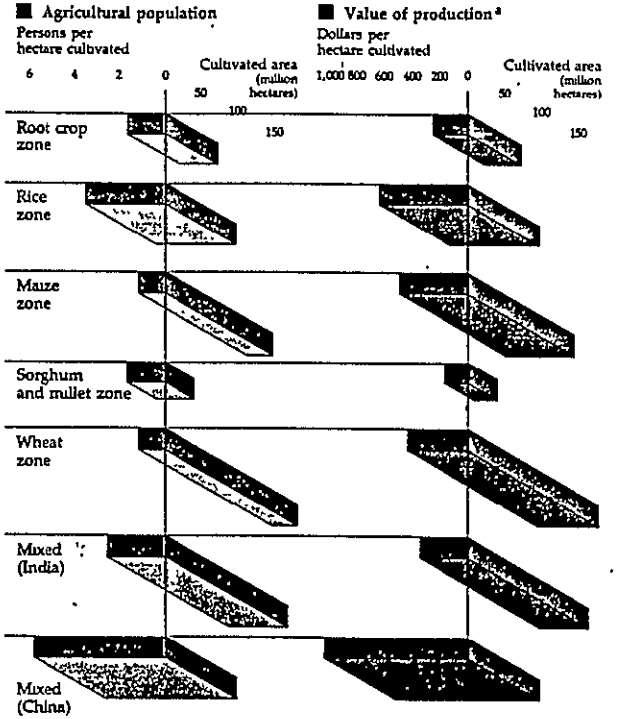
Land

For centuries, farmers increased their output mainly by increasing the amount of land they farmed. This is no longer the case: in the past two decades, increased acreage has accounted for less than one-fifth of the growth in agricultural production in developing countries (see Figure 6.3), and for an even smaller fraction in developed countries. Nonetheless, there is still a great deal of unused arable land—estimates for developing countries range from 500 million to 1.4 billion hectares, compared with about 820 million hectares currently under cultivation.

These estimates can mislead, however. The unused land is not where the people are who need it most, and FAO reckons that only 10 to 15 percent of unused arable land in 1980 might be cultivated by 2000. There is ample cultivable land in the humid and subhumid parts of Latin America and sub-Saharan Africa, but reserves in the Mediterranean area and most of Asia (except Indonesia) are extremely limited. China has reached the limits of its arable land, and a number of other countries are fast approaching this point.

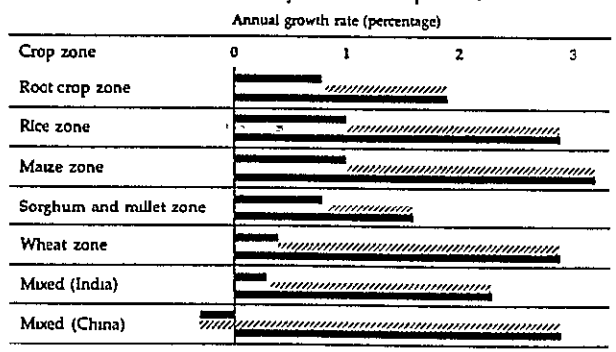
The imbalance between people and land reserves is only one factor limiting the development of more acreage. Disease has discouraged permanent settlement in large parts of the tropics and subtropics. The eradication of

Figure 6.2 Features of major crop zones, 1978



Source: FAO
[a] At 1974–76 world market prices

Figure 6 3 Area expansion and intensification, by crop zone, 1961–80



Source: FAO
[a] Constant 1974–76 world market prices

malaria in the 1950s opened extensive new areas for cultivation, especially in Asia. Today, the main diseases constraining settlement and cultivation are river blindness (onchocerciasis) and sleeping sickness (trypanosomiasis), which occur primarily in sub-Saharan Africa.

To avoid river blindness, large areas have been left unfarmed in the fertile valleys of the Volta, Niger, Congo, Gambia, and Upper Nile rivers. Efforts to eradicate this disease are supported by West African governments, WHO, FAO, the World Bank, and bilateral donors, but progress is slow. Trypanosomiasis, carried by the tsetse fly, is an even greater obstacle. Its presence prevents livestock-based farming on some 1 billion hectares of high rainfall land in Africa. Insecticides have been tried in several countries, including Nigeria, Cameroon, and Botswana, but their cost and the tsetse fly's resistance underline the need for more research to find effective solutions.

Most expansion of farmland takes place spontaneously, as farmers move into forests and grazing areas. Farmers are also gradually switching to permanent cultivation, especially in Africa, and are reducing fallow periods. In the rare instances of extensive virgin areas with good soil—northwestern Brazil for example—migration is taking place on a large scale It has significantly boosted output in Brazil, Thailand, and the Philippines. Even in recent times, migration has been the major, often the only source of agricultural growth in sub-Saharan Africa

The advantage of spontaneous settlement is that it is cheap and the costs are born by the settlers themselves People do not always have the assets or the incentive to move, however, even in countries where land is available. Some governments have sponsored settlement schemes: for example in Malaysia and in the outer islands of Indonesia. Generally, though, such schemes are expensive. They typically cost $1,000 to $2,000 per hectare for clearing land and providing roads, markets, schools, and health facilities.

In the early stages of migration, farmers move to the most attractive land. Later, as population pressures force them into more marginal areas, their arrival causes erosion and declining soil fertility. Deforestation is a particular problem. Between 1900 and 1965 about half the forest area in developing countries was cleared for agriculture. Although forests still cover half the land in the humid and subhumid tropics, forest cover has been reduced to 10 to 15 percent in the semi-arid tropics and the temperate zone.

Massive deforestation has highlighted the virtues of forests. They regulate the pace at which rainfall runs off, prevent soil erosion, replenish nutrients in the soil, and influence the local climate. These qualities can be retained as long as cultivation is shifting, rather than permanent, and if the commercial extraction of lumber is carefully controlled In countries such as Brazil and the Philippines, serious damage has been caused by the failure to enforce limits on felling trees and clearing forests. The worst damage occurs, however, in cases where forests are treated as unlimited sources of fuelwood. Some four-fifths of all wood cut down in developing countries is used for fuel. The problem is most severe in densely populated hill areas (such as the Andes and the Himalayas) and in semi-arid and and areas, where the desert creeps up as the forest retreats.

If the consequences of deforestation are serious, so are its causes. Millions of people depend on wood for their fuel: in sub-Saharan Africa it provides three-quarters of all the energy used. The solutions lie partly in developing new supplies of energy and partly in more effective conservation of forests Since farmers see no immediate advantage in such conservation, public bodies have the dominant role to play (see Box 6.1).

Box 6.1 Forests and fuelwood: The Sahel's ecological dilemma

Forests play a vital role in the ecological balance as habitats for flora and fauna, anchors for soils, and tamers of climates. In the Sahel, however, forests are endangered by a rapidly growing population's need for forest products for fuelwood and building material.

As a result of progressive deforestation, rural household members have to walk farther and farther to collect fuelwood, in some areas, almost half a rural family's working time can be spent gathering supplies Meanwhile the average urban household, which uses between 3 and 5 cubic meters of wood a year, spends an increasing part of its budget on fuelwood In some Sahelian towns, it often "costs more to heat a pot than to fill it."

If they are to maintain a bare minimum of forest cover, most Sahelian countries will have to halve their fuelwood consumption by the turn of the century. Reductions can be achieved by promoting efficient wood-burning stoves and the use of substitutes for fuelwood, such as commercial fuels or crop and animal residues. Massive afforestation is another strategy, but the technical and sociopolitical constraints are awesome Few Sahelian countries can count on more than 800 millimeters of rainfall a year, and its incidence is erratic Trees are hard to establish in the and zone and grow slowly Most forests are publicly owned, but the long-term benefits of conservation conflict with short-term private needs Government policy, trying to balance individual and community interests, is ambivalent. Few people are interested in conservation or afforestation, and the few forestry programs attempted have generally been disappointing

Following the last drought in the area, the World Bank and other donor agencies have begun to help Sahelian countries finance forestry projects. Most of these pilot and technical assistance projects were initiated in the late 1970s and are based on the use of conventional techniques of forest management and afforestation. They do not initially focus on the rapid expansion of forestry. Instead, they are directed toward improving the training, planning, managerial, and operational capabilities of the institutions that manage forests Several programs include components to train forestry extension staff and to test alternative ways of winning the support of local populations for forest conservation and new planting. Increasing emphasis is being given to planting multipurpose trees that can provide a combination of fuelwood, building poles, and timber. Leguminous tree species, which fix nitrogen and improve soil fertility, are favored in areas where ecological conditions are suitable for their growth

Intensive agricultural development

New land has been a significant source of past growth, but its future role is plainly limited to a few countries. The alternative is to use existing land more efficiently Efforts to do so have been highly successful, the average productivity of cultivated land has been growing at about 2.2 percent a year for the past twenty years (see Figure 6.3). Except in the semi-arid sorghum and millet zone, higher yields account for more than half the growth of output. In the mixed cropping zones of China, agricultural acreage has actually declined while yields have increased by nearly 3 percent a year.

Box 6.2 Downstream effects of irrigation

The direct benefits of investment in agriculture, particularly for irrigation projects, are not hard to identify and measure. Construction jobs are created, agricultural output increases, consumers may benefit from lower food prices, and farm income is likely to rise In addition, however, such projects can have much more widely dispersed but less easily measured benefits.

Careful monitoring of an irrigation project in the Muda region of Malaysia gave the World Bank a chance to look into the indirect, downstream effects of this $240 million program for increasing paddy production, which was approved in 1972. Using a battery of sophisticated analytical tools, the Bank asked:

- Who, besides producers, benefits from the program?
- What is the overall impact on the economy?
- What additional investments may be induced?

The answers to these questions were impressive For every dollar of increased paddy output, about $0.75 of income was also generated in the downstream effects In other words, farmers' increased income from paddy generated demand for goods and services equivalent to 43 percent of total benefits of the scheme. This demand was mainly in such sectors as housing and other construction, commerce, road transport, and hotel and restaurant services—all of which are quite labor-intensive activities in rural Malaysia. Higher earnings in these sectors in turn multiplied jobs and incomes for workers in still other parts of the economy.

There is more to the story, however Rice needs to be milled, and mills have to invest in plant and equipment The Muda project induced an estimated net $56 million of private investment, which in turn had further multiplier effects

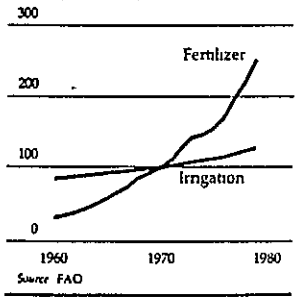
Who received the benefits? Research provides some answers. Participating paddy farmers' incomes rose about 70 percent, but landless farm workers' more modest earnings rose still more (73 percent). Even the incomes of nonfarmers and nonparticipating farmers in the region rose (by 14 percent and 10 percent, respectively) by comparison with what they would have been without the project.

These productivity gains have been achieved largely by improving the availability and reliability of irrigation and increasing the use of new seeds and fertilizer (see Figure 6 4); significant progress has also been made in regions with dependable rainfall.

Irrigation

Irrigation has made the largest contribution to increased agricultural production in much of Asia, North Africa, and the Middle East. In many areas it can double or treble yields during the main growing season, can make a second or even a third crop possible, and can sharply reduce the risk of crop failure. Such programs can also have multiple effects throughout the economy (see Box 6.2). These advantages need to be set against two drawbacks ground and surface water for irrigation is not available in large parts of the world, and the infrastructure is expensive.

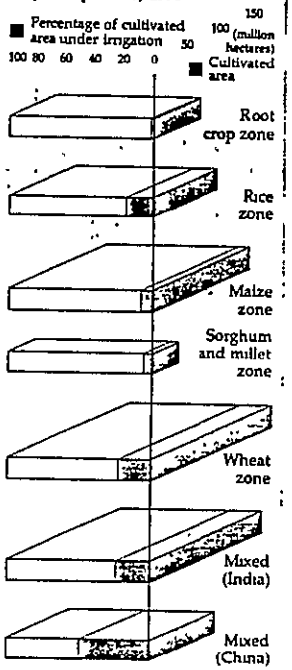
Figure 6.4 Agricultural inputs in developing countries, 1960–79
Index (1970 = 100)



Source FAO

Investment for irrigation has risen dramatically in developing countries, to around $15 billion in 1980. The irrigated area has grown by 2.2 percent a year since 1960. Some 160 million hectares, one-fifth of the harvested land in developing countries, is now irrigated. This land area uses about 60 percent of all fertilizer and produces over 40 percent of all annual crops in the developing world. Between 50 and 60 percent of the increase in agricultural output in the past twenty years has come from new or rehabilitated irrigated areas. China (with 49 million irrigated hectares) and India (with 39 million) account for more than half the developing world's irrigated area (see Figure 6.5).

Figure 6.5 Irrigation in major crop zones, 1978



Source: FAO

Irrigation absorbs a large part of public sector investment, especially in low-income countries. Frequently, low water charges and inadequate taxes on agricultural incomes have made the burden on the government's budget heavier than it needs to be. A relatively modest (50,000-hectare) scheme can cost between $100 million and $200 million. To ensure a reasonable return on that investment, the system has to be carefully designed and organized, and then fully used. Efficiency has become increasingly critical, partly because of actual or threatened water shortages. More important, modern, high-yielding seeds require reliable supplies of water at specified times if they are to fulfill their promise. A timely and reliable water supply also enhances the farmers' willingness to pay water charges.

In India and Sudan, both of which have extensive irrigation experience, large canal schemes with storage reservoirs require an investment of about $2,000 a hectare. Similar schemes in East and West Africa often cost more than $10,000 a hectare, the result of an inexperienced domestic construction industry and dependence on imported materials and equipment. Such costs can be justified in only a few countries—for example, those in the Mediterranean basin—where advanced methods of water management ensure the efficient use of the system and market demand for the high-value crops produced is strong.

Increasing the efficiency of existing irrigation schemes offers considerable scope for faster growth, since yields are well below their potential in many areas and water is wasted. Poor design and construction of the tertiary channels that bring water to farmers' fields help explain the inefficiency of irrigation sytems. Recent studies have demonstrated, however, that in most projects inadequate design and neglect of the main canal system are the major causes of inequitable and wasteful use of water in the fields. Many existing irrigation systems suffer from waterlogging and salinity because of lack of drainage, particularly in northern China, Egypt, northern India, and Pakistan. More than half of the Indus Basin Canal system in Pakistan, some 8 million hectares, is waterlogged and 40 percent is saline.

Shortages of trained staff—partly the result of their being lured away by new engineering ventures—have sometimes prevented improvements. Once built, irrigation schemes are often managed by design and construction engineers who have little training in water management or agriculture. In some countries with strong civil service demarcations, engineers are the only people entitled to work in the irrigation service. Their expertise needs to be joined with that of others, and farmers themselves should be involved in irrigation programs from their inception.

In addition to large public sector irrigation schemes, there has been a rapid expansion of private irrigation. The development of cheap pumps and the introduction of modern seed and fertilizer have brought irrigation within the means of millions of small farmers. In South Asia since 1960, farmers have invested about $15 billion in open wells and tubewells irrigating 30 million hectares. These private schemes, supported by the public sector's provision of long-term credit and rural electrification, comprise as large an area as all public and private irrigation in North Africa, the Middle East, and Latin America.

Elsewhere, tubewell and pump irrigation has grown slowly, particularly in sub-Saharan Africa. Irrigation is not economic in much of sub-Saharan Africa, though it is also constrained by inadequate water surveys and the lack of a supporting infrastructure. In parts of the savannah belt of northern Nigeria, for example, studies indicate that tubewell and pumping schemes would be economically justified. Though more expensive to operate and maintain than canal systems, pumps and tubewells often prove more effective, because they can be managed more easily and the initial investment is much smaller.

Rain-fed areas

While irrigation has many advantages, the fact remains that rain-fed areas constitute 80 percent of the developing world's cultivated land and support nearly two-thirds of its farmers. Yield increases still depend on the subtle interaction between soil, water, seeds, and sunlight, but the process is not as well understood under rain-fed conditions as it is with irrigated land. Local conditions vary so much that finding solutions is often costly, and they can seldom be replicated elsewhere. Even with the current state of knowledge, however, there is scope for growth. New methods of tilling, new crop rotations, increasing use of fertilizers and pesticides, soil conservation and drainage—all have a part to play. Tackling the problems of rain-fed agriculture is an increasingly important challenge in many countries, including some such as Mexico (see Box 6.3) where irrigation has already been extended as far as possible.

Soil erosion and declining fertility are the main threats to rain-fed agriculture in the humid and subhumid tropics. Tackling them requires protecting the soil by continuous crop coverage and minimum tillage, as well as drilling seeds and controlling weeds. This kind of systematic approach is being developed at IITA in Nigeria. (See Glossary and Box 6.4 for names and functions of international agricultural research centers.) In the case of some Latin American countries, highly acidic, infertile soils present a rather different challenge. There, research focuses on reclamation, new crop rotations, and more effective means of fertilizing the soil. In areas with relatively dependable rainfall and moisture-retentive soil, ICRISAT is developing new cultivation methods. These are based on semi-permanent broadbeds and furrows that provide drainage in heavy rains and improve the soil's capacity to retain moisture. Together with pre-

Box 6.3 Rain-fed agriculture: The Mexican experience

In the 1950s and early 1960s, Mexican agriculture had one of the highest growth rates in the world, averaging 4 to 7 percent every year. Performance was largely based on technology improvements closely linked to expanding irrigation. Between 1940 and 1965, about 90 percent of all public investment in agriculture was for irrigation.

Growth slowed markedly in the 1970s. New irrigation became increasingly expensive (and old systems harder to maintain), meanwhile poverty remained endemic among the 87 percent of Mexico's farmers who lacked irrigation. The combination led the Mexican authorities to look for answers in rain-fed farming. Fortunately, Mexico's rain-fed areas have high potential for agricultural production. The Plan Puebla, the first rain-fed development project of its kind, started in 1967, had shown that farmers could triple or quadruple maize yields with new plant varieties and farming methods, and at a lower cost than through investments in irrigation. Production could be diversified into higher-value crops. Moreover, much potentially arable land with adequate rainfall was being used only for extensive livestock grazing and could be put to more intensive use.

The new policy tilt has involved some major changes. First, it was necessary to upgrade the efficiency of extension services and credit provision to farmers in rain-fed areas, and to make access to land easier by improving rural roads. Second, land tenure laws had to be changed and wetland drainage installed to encourage farmers to cultivate little-used land more intensively. And third, guaranteed producer prices and subsidized inputs needed to be offered for crops such as maize and beans typically grown on rain-fed farms.

These new approaches were embodied in a series of programs which received substantial World Bank assistance. In the PIDER program (started in 1973) the objective has been to bring an integrated package of services—extension, research, credit, roads, irrigation, potable water supply, and education—to small, well-defined areas of generally low-income rural communities. As the coordination of services through the federal government became a bottleneck, control of the programs was decentralized from the federal to the state level. In 1979, the government established 118 Rain-fed Districts *(Distritos de Temporal)* throughout the country, on the pattern of the existing Irrigation Districts. This made it possible to have an integrated approach to rain-fed land development while at the same time taking into account local physical conditions, which vary widely.

These efforts have laid a solid base for future structural change and increased and diversified production in Mexico's rain-fed agriculture. Concrete results are apparent in the response to improved production incentives announced two years ago. After a decade of slow growth (2 to 3 percent a year), agricultural production increased by 5.5 percent in 1980 and by 8 percent in 1981, most of it from rain-fed cultivation.

Box 6.4 New frontiers in agricultural science

Modern plant breeding dates from the mid-nineteenth century, when Mendel identified the laws of genetic inheritance. The application of Mendelian techniques, together with the knowledge of plant nutrition discovered by Liebig, have permitted dramatic increases in the productivity of major cereal crops around the world. These have culminated in what has come to be known as the Green Revolution. The next quantum leap has taken place only recently with the discovery of deoxyribonucleic acid (DNA), a complex chemical that is the carrier of the transmitted characteristics of all living things. This has opened up vast new opportunities to manipulate nature. Entirely new organisms can be created by transposing character-transmitting particles of matter, or genes, from one species to another.

The potential of genetic engineering is not yet fully known. New knowledge is being acquired at an unprecedented rate as a result of research around the world by academic and commercial organizations, but this work is still in its infancy; it may be decades before wholly new species of commercial value become available. The genetics of even single-celled organisms such as bacteria are not yet fully understood. Meanwhile, however, immediate gains can be made by exploiting other elements of the fund of new knowledge about biological systems.

Tissue culture—the multiplication of plants through in-vitro micropropagation—holds special promise. Starting in some cases with simple vegetative material, a piece of leaf or an excised root tip, manipulation and hormonal treatment produce a proliferation of callus, an undifferentiated mass of cells. Further treatment makes the callus reorganize and form embryo-like structures which go on to develop into completely new plants. These are genetically identical in every respect with the parent plant. Tissue culturing became commercially viable about twenty years ago, initially for ornamental plants and later for vegetables and fruits such as asparagus and strawberries.

By the late 1970s, tissue culturing had been achieved with many woody species, including temperate fruit crops such as apples and pears, several of the developing world's important perennial crops (such as coffee, rubber, and oil palms), and a number of tropical forest tree species. It is now generally believed that all plant cells are potentially "totipotent," that is, they have the ability, under suitable conditions, to grow into complete plants. Tissue culture permits very much faster multiplication rates than those attainable by seeding or conventional propagation techniques such as budding and grafting. Moreover, the genetically identical material derived from these cultures gives uniformity of yield, quality, and rate of ripening. Tissue culturing can also be used to develop disease resistance and adaptability to specific habitats.

Not all species that can be cultured in the laboratory can yet be propagated on a commercial scale. Tissue cultures could, however, provide a basis for yield improvements in tropical perennial crops comparable with the impact of the Green Revolution on the cultivation of cereals. Clonal oil palms are already being field-tested on plantations in Malaysia. One commercial company expects by the mid-1980s to be marketing clones with a proven capacity for high yields, and there is a possibility of producing several million plants a year by the end of the decade. Productivity is expected to be enhanced by at least 30 percent over that of the best seedling progenies available today. Even more exciting prospects for yield improvement are offered by the possibility of clonal propagation of coconuts. The creation of clones from elite dwarf and tall hybrid populations could well double the highest yields now realized.

A different area of research, and one of less immediate practical application, attempts to help plants meet their nitrogen requirements from the atmosphere through *nitrogen fixation*. At present only leguminous plants of the pea and bean family can do this. The fixation mechanism involves a mutually beneficial, or symbiotic, relationship between the host plant and certain species of bacteria which live in nodules that develop on the plant's roots. The bacteria, deriving shelter and other vital support from the plant, are able to take up or "fix" atmospheric nitrogen. Some of this nitrogen is used by the host plant; some goes to enrich the soil.

Increasing the efficiency of this process in legumes, or finding ways of inducing the same symbiotic relationship between bacteria and nonleguminous plants, could revolutionize plant nutrition. Nitrogen, the most costly of the major plant nutrients when supplied in the form of chemical fertilizers, would become freely available from the atmosphere.

Work on nitrogen fixation is going on at many centers around the world. The International Network of Legume Inoculation Trials seeks new rhizobial bacteria that are superior nitrogen fixers, and aims to propagate and disseminate them worldwide. Farmers who are today remote from supplies and cannot afford to buy nitrogenous fertilizers may in time be able to realize yield increases that are currently beyond their reach.

Most of the scientists who are currently pushing back the frontiers of agricultural research are working in the developed countries. Some of the most exciting applications of the new technology, however, are expected to be in the realms of tropical agriculture.

monsoon sowing, changed crop rotations, high-yielding varieties, and fertilizer, this approach has tripled output in farm experiments.

Though promising, these new efforts will require extensive testing on farms before they can be widely applied. Increases in yields from rain-fed land will therefore be relatively slow and concentrated in regions with better rainfall and soil. But the gains could be considerable. If rain-fed land could increase its yield by 500 kilograms per hectare, the total increase in production would exceed what could be achieved by a rise of two tons per hectare in the yield of all irrigated land.

Some formidable obstacles stand in the way of such achievements. Not least among them is flooding. In many parts of the developing world, "normal" rains cause widespread floods. Standing water often more than 30 centimeters deep makes many paddy fields of Asia unsuitable for high-yielding dwarf varieties of rice. Small-scale flood protection and effective drainage would enable modern rice technology to expand into parts of Bangladesh, Burma, eastern India, and Thailand where it currently cannot be used.

Large-scale drainage and flood control programs are so expensive that it is often difficult to justify them on economic grounds alone. Individual countries can seldom afford them; in a few cases, the solution lies in joint efforts, because the benefits will be shared by more than one country.

Livestock

Though of relatively small economic importance today in many low-income countries, livestock farming could well expand rapidly in the future. It is already doing so in middle-income countries (see Table 6.1). Since animal products are a more expensive source of calories and protein than vegetable products, poor people eat very little of them. As incomes rise, the consumption of meat, milk, eggs, and poultry rises sharply. In Latin America livestock farming accounts for 33 percent of agricultural output; in the Middle East and North Africa, 25 percent, in southern Europe, 31 percent. In the oil-exporting developing countries, it has jumped from 20 to 36 percent of output over the past two decades.

Livestock farming varies widely around the world:

- In developed countries, strong demand for milk and meat, combined with well-organized marketing and processing industries, has commercialized farming to a high degree. Farmers usually specialize in one type of production, whether it be beef feed-lots, cattle ranches, or "factory farming" of milk, pork, beef, and eggs. Animals are bred specially to fit into these farming methods.
- In developing countries, a high proportion of farms combine livestock with crops. Animals perform a variety of roles: they provide draft power and manure for fertilizer; live off scraps and crop residues, and produce milk, wool, meat, and hides for sale or subsistence. They are bred for their durability and adaptability to difficult conditions, rather than for rapid growth.

This situation is now starting to change. In many developing countries, poultry farming and, to a lesser extent, pig production

Table 6.1 Changes in the structure of agricultural output by subsector and region, 1961–65 and 1976–80
(percent)

Region and country group	Cereals		Other staples		Livestock		Other foods		Nonfoods		Agricultural trade as percentage of production: Exports		Imports	
	1961–65	1976–80	1961–65	1976–80	1961–65	1976–81	1961–65	1976–80	1961–65	1976–81	1961–65	1975–79	1961–65	1975–79
Developing regions	31	31	11	10	21	22	27	29	11	9	13	12	6	8
Africa	17	17	26	27	16	18	25	25	16	14	21	15	5	7
Middle East and North Africa	30	26	5	4	22	25	46	40	7	5	16	10	19	34
Latin America	16	17	16	8	31	33	20	31	17	11	20	20	5	7
Southeast Asia	46	44	10	10	15	12	22	26	9	8	14	17	7	9
South Asia	43	45	10	9	14	13	26	27	7	7	4	3	4	4
China[a]	. .	(49)	.	(15)	. .	(18)	. .	(13)	.	(5)	.	(2)	. .	(3)
Southern Europe	28	27	7	5	27	31	35	33	4	4	6	8	7	8
Developed regions	23	25	9	6	46	47	19	20	3	2	10	15	15	17
Market economies	23	25	5	3	49	48	21	22	3	2	14	21	18	22
Nonmarket economies	23	26	17	12	41	44	16	15	3	3	5	4	7	8
High-income oil exporters	25	11	1	2	20	36	53	51	1	(.)	1	1	69	158
Total	26	27	10	8	36	36	22	24	6	5	11	14	11	14

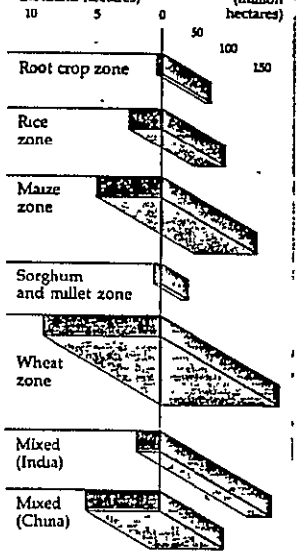
Source: FAO
a. Estimated, excluded from totals.

have expanded rapidly over the past fifteen years and become increasingly intensive The technology involved is readily transferable, but it requires relatively large quantities of feed grain and oilseed meals, which often have to be imported.

These new enterprises are often in competition with traditional livestock farming, which may suffer in consequence. Since productivity is much higher in intensive livestock farming, prices and costs have fallen sharply. Poultry has gone from being the most expensive to the cheapest meat, a major result of the 5 to 10 percent annual growth of poultry production in most developing countries.

Livestock farming in the arid natural grasslands of the developing world continues to face some intractable obstacles to growth. Animals there need a great deal of land; in these areas it is often of poor quality and ownership may be ill defined. In much of the African Sahel, for instance, rangelands are common property. Improving their quality would be in the interest of all; actually investing to do so makes no sense for individual farmers. As a result, improvements are seldom made and farmers often overgraze. Resolving this problem is likely to require such measures as direct public control of herd movements and sizes or legal and institutional changes in the pattern of landownership.

Figure 6 6 Tractors in major crop zones, 1978



Source FAO

Technology

The drive to improve the quality and productivity of farmland has been greatly assisted by the achievements and products of industry Among the most important contributions have been the following.

Machinery

The speed at which farming becomes mechanized depends on the relative scarcities of land and labor, unless governments subsidize mechanization. In most of Asia and other areas with abundant labor, machines are used first for operations where concentrated power or speed are superior to human labor or animal-drawn implements: examples include stationary threshers, mills, and water pumps. Tractors are used for clearing heavy land and also for transport (Figure 6.6). In recent years, power tillers have been used for mechanized puddling of rice fields in, for example, Thailand and the Philippines.

The shift to mechanical power in response to labor shortages and rising real wages is very selective. Irrigation pumps, for example, are used widely in Bangladesh, but tractors are virtually nonexistent; mechanical rice threshers are used in central Thailand, where threshing of the first crop overlaps with the planting of the second, but the more labor-intensive method of buffalo-treading remains common in single-cropped areas.

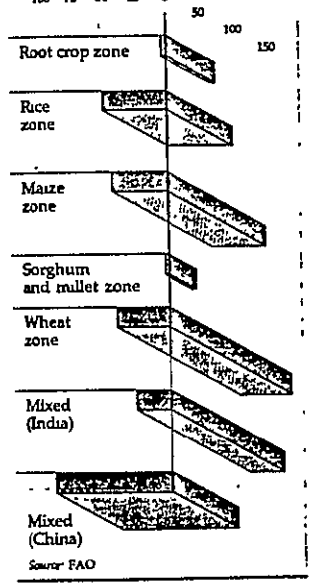
Pesticides and herbicides

Estimates of crop losses because of insects, pests, disease, and weeds vary widely—from as low as 5 to 10 percent to as high as 30 to 40 percent. There is no doubt, though, that the rapidly spreading use of chemicals against insects and insect-borne diseases in recent years has greatly boosted crop production. Pesticides are often crucial for preventing losses of high-yielding crops. At the same time, their undesirable side effects are causes of genuine concern. Pesticides can change insects' immunities, destroy natural enemies, cause outbreaks of secondary pests, and deposit potentially harmful residues.

The alternatives to pesticides also have their drawbacks. One promising possibility is the promotion of wider genetic resistance to disease. This can be combined with crop rotations, efforts to introduce natural enemies that will attack predators and the sources of disease, and more discriminating use of chemicals. This kind of integrated pest management is complicated to administer, however. It requires teams of skilled scientists and a comprehensive organization for protecting crops These requirements are far beyond the administrative capacity of most countries; nonetheless, selected elements of this approach can be highly effective.

Herbicides, which kill weeds, have a primarily labor-saving function. They are particularly valuable where land is abundant and labor for tilling and weeding is scarce enough to limit the area that can be planted. Again, experience is showing how herbicides can be used more sparingly and to greater effect: one example is the zero-tillage system for the subhumid tropics being developed by IITA in Nigeria. The introduction of herbicides needs to be carefully monitored for its effect on both health and employment.

Figure 6.7 Fertilizer use in major crop zones, 1978



Source FAO

Fertilizer

Until the early 1960s, the use of fertilizer in developing countries was limited to a few valuable export crops. With the spread of irrigation and the advent of high-yielding seeds, fertilizer use rose eightfold, reaching 38 million tons in 1979. Half the increase in grain yields since 1950 is a result of greater fertilizer use in combination with irrigation and modern seeds. Most regional differences in the use of fertilizer can be explained by the amount of control farmers can exercise over their water supplies (Figure 6.7). In low-rainfall areas, only 3 kilograms per hectare of fertilizer (measured in terms of plant nutrients) are applied, while high-rainfall areas average 20 kilograms per hectare, with reliable irrigation, about 110 kilograms per hectare are used. Farmers use little fertilizer in drier areas because plants that lack water do not respond, and the risk of crop failure makes farmers reluctant to use it. To some extent this is also the case with some irrigation systems that do not ensure an adequate water supply.

Rising energy costs and increasing concern about the ecological impact of chemical fertilizers have encouraged a renewed search for alternatives to fertilizer use:

- Animal manure and organic wastes are important sources of plant nutrients; they also improve the structure of soil and its ability to retain water. There are economic and practical limits to expanding their use, however. Replacing the chemical fertilizer now in use with animal manure would require a threefold increase in the world's animal population.
- Biological nitrogen fixation through microorganisms has traditionally been achieved by introducing legumes into crop rotations. Chinese and Vietnamese farmers have long grown the water fern Azolla in rice fields; it provides a habitat for blue-green algae that help supply the rice with nitrogen Research into these and other nitrogen-fixing microorganisms is being undertaken (see Box 6.4), but in the short and medium term it is unlikely that they will significantly reduce the use of fertilizer.
- Mycorrhizas are fungi that live in contact with plant roots and transmit nutrients to them Promising results have been achieved in laboratories, but large-scale applications are still some way off.

Chemical fertilizer will therefore remain a major and expanding source of productivity growth in developing countries. There is considerable scope for more efficient usage, in part through the development of new varieties of high-yielding crops that respond even more favorably to fertilizer than do present varieties; the development of rain-fed crops that respond better to fertilizer is also a possibility. The fertilizer industry has responded rapidly to increased demand; despite higher energy costs, ample raw materials exist for the industry's future growth. The most likely constraints on increased fertilizer use in the developing world are shortages of seed and irrigation, and inappropriate government distribution and pricing policies.

Research

The emergence of genetic science in the mid-nineteenth century and the establishment of publicly financed agricultural research centers have fostered the scientific breeding and selection of agricultural products. Plant selection and improvement takes place today in hundreds of national and international centers forming a worldwide network that shares data, planting materials, and results and scours the earth for wild plants that might possess useful characteristics. At the frontier of genetic research, microbiologists are applying still more advanced

technology to develop new or dramatically modified plants (Box 6.4).

Until recently, tropical agricultural research was concentrated on export crops such as sugar, bananas, rubber, cotton, tea, coffee, and oil palms. Major progress in cereals was confined to temperate areas until the early 1960s, when major breakthroughs were made in tropical wheat and rice technology. International research centers played a key role in developing and disseminating this new technology (Box 6.5).

Tropical research on sorghum, millet, and maize started later and advanced more slowly. Outside the tropics, these cereals had been used primarily as animal feed and their taste was inferior; there was little incentive to improve them in tropical areas. Similarly, very little research had been done on pulses (such as chickpeas and cowpeas) and root crops such as cassava, because these were not grown in temperate areas. Whether modern scientific techniques and a high international and national research priority can make up this lost ground remains to be seen.

If the answer is positive, advances in those crops could have a major impact on reducing poverty (see Chapter 7). In sub-Saharan Africa, pulses, roots, and tubers account for 27 percent of agricultural output; by comparison, cereals represent only 17 percent of production. In South and Southeast Asia and China, in contrast, the figures are 9 to 10 percent and 40 to 50 percent, respectively.

Plant breeding in the tropics is complicated by wide local variations within seemingly homogeneous natural conditions, and by the way local varieties have been bred to survive under those conditions rather than to achieve higher yields. To replace existing seeds with higher-yielding ones, new varieties may need to be developed for each small region. To survive, plants also need to build up resistance to local pests and diseases. Varieties of wheat and, to a lesser extent, rice have been developed that can be adapted to many different conditions; other grains are less adaptable. A variety of maize may produce high yields in one valley in the highlands of Mexico, and only a minimal harvest in a neighboring valley, and it may fail completely in central India.

Most traditional cereal strains have been adapted to soils that are short of nutrients. The stem and the leaves, rather than the edible head, use most of the nutrients. When fertilized, growth is largely in the stem and may result in "lodging" (the plant's falling over in wind and rain). Plant breeding in the last three decades has therefore concentrated on developing shorter, sturdier cereal plants whose heads make up a higher percentage of their total weight. The resulting shorter-stemmed plant can support the larger head which nutrients promote. Yields are only one concern of plant breeders: others include growing time, resistance to pests and disease, flavor, and storage qualities.

Despite the proven value of research, developing countries are not yet devoting enough resources to it. A recent study showed that spending on research in fifty-one developing countries had risen significantly over the past decade but was still equivalent to only 0.5 percent of the value of agricultural output in 1980. This is much less than developing countries' spending on agricultural extension services. By contrast, although industrial economies spend about 1 to 2 percent of the value of their agricultural output on research, this represents about four times their expenditure on extension. Given the very high returns to agricultural research, a strong case can be made for investing more in research in developing countries.

The role of international research centers is changing as national systems are built up and take over more of the task of developing new technology. Today, special emphasis is given to training national research workers, and the centers are increasingly functioning as clearinghouses for highly specialized knowledge and genetic material. The centers have also become more involved in developing research methodology, especially for analyzing social and economic obstacles to progress at the individual farm level.

Some small countries and those that lack skilled manpower and cannot afford basic research have special problems. They have to rely more heavily than others on practices and materials developed by the international centers, while devoting most of their own efforts to applied research at experimental stations and on farms. There is considerable scope for broadening regional cooperation in areas such as Central America and sub-Saharan Africa. Unfortunately, most past attempts at regional cooperation have not been very successful.

The Green Revolution

Within little more than a decade, over half the developing world's wheat acreage and one-third of its paddy fields were converted to new high-yielding, semi-dwarf varieties. With good irrigation and the right amount of fertilizers and chemicals, their yields can be two to three times those of traditional varieties (see Box 6.6).

This dramatic change has been labeled the Green Revolution. It began in the mid-1960s with the release of new varieties of wheat from CIMMYT in Mexico, and of rice from IRRI in the Philippines. The new wheat varieties were introduced to Pakistan and India in 1966. Wheat production in India had doubled by 1970–72 to 23.4 million tons. At that point, the plants were affected by a disease known as rust and production stagnated. By the mid-1970s, Indian scientists had developed varieties that not only resisted rust but also matured earlier. Seeds were also being distributed more widely. Production again started to increase, reaching 33 million tons in 1978–80. From being the world's second largest cereal importer in 1966, India had become self-sufficient by the late 1970s.

The new wheat varieties were quickly adopted in many parts of the world. China, Pakistan, and Turkey, among others, achieved significant increases in yields and production. Bangladesh, where wheat was once almost unknown, produced 1.2 million tons by 1980–81.

The first new rice varieties grew best during the dry season under clear skies; they were quickly adopted by the farmers in South and Southeast Asia who could irrigate during the dry season. A couple of years later, the varieties suitable for the monsoon season were released, but they were adopted relatively slowly and selectively because the semi-dwarf plants need reliable supplies of water during the growing season, and cannot be grown in heavily flooded areas. Relatively few paddy farmers in Asia enjoy this degree of control over their water supply. Where favorable conditions exist, however, the short maturity time of the new varieties has permitted double- or even tri-

Box 6.5 The international agricultural research centers

The worldwide system of internationally funded research centers grew out of a crop investment program jointly sponsored by Mexico's Department of Agriculture and the Rockefeller Foundation. In 1943, a team of Mexican and US scientists began a systematic effort to develop improved varieties of maize and wheat. Encouraged by the success of this venture, the Rockefeller and Ford Foundations joined forces in the first truly international agricultural research center, the International Rice Research Institute (IRRI), established in the Philippines in 1960. The Mexican crop programs were reconstituted in 1966 on the IRRI model as the Centro International de Mejoramiento de Maiz y Trigo (CIMMYT).

The Consultative Group on International Research (CGIAR) was established in 1971 as an informal association of countries, multilateral organizations, and private foundations. Its main purpose is to support and expand research which will help solve agricultural problems common to many developing countries and improve food production in the developing world. In addition to the chairman and secretariat, provided by the World Bank, CGIAR has an advisory panel, the Technical Advisory Committee (TAC), whose secretariat is financed jointly by UNDP, the World Bank, and FAO. TAC is made up of thirteen distinguished agricultural and social scientists, drawn about equally from developed and developing countries.

CGIAR supports mainly research and training programs to enhance the production and yield stability of food crops cultivated throughout the developing world. The group also sponsors research on livestock production systems and diseases, the conservation and utilization of plant genetic resources, and food policy. Finally, CGIAR helps countries strengthen their national agricultural research systems.

Thirteen international centers and programs are currently funded through CGIAR. Among the newer centers, the International Institute of Tropical Agriculture (IITA), the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), and the International Center for Agricultural Research in the Dry Areas (ICARDA) are involved in crop research, while the International Livestock Center for Africa (ILCA) and the International Laboratory for Research on Animal Diseases (ILRAD) concentrate on livestock issues. All these centers devote most of their resources to work on such important crops as sorghum, millet, cassava, and legumes, and on improvements in the farming systems, including livestock farming, in which they are produced. Their intent is to develop better varieties and farming systems for resource-poor farmers in the rain-fed areas—a group hitherto unable to benefit from modern rice and wheat technologies. Improving production in the rain-fed tropics is a slow and difficult process, and it is hard to predict the timing of significant increases in yields. National agricultural research programs are also often weak in these areas, the international centers thus currently provide much of the research momentum required to fill the large gaps in technology development.

The impact of the international agricultural research system is not confined to new technology. It has also provided leadership in research philosophy and methodology, which is changing the way research is conducted in developing countries and has demonstrated to policymakers that investment in high-quality agricultural research pays off.

Funding for the international programs increased sixfold between 1972 and 1980. In the last two years donor contributions have grown relatively slowly, however, to a total of US$150 million. Limited increases in funding, combined with exchange rate changes and high rates of inflation, have caused most centers to cut back their activities at a time when the need and demand for their services are increasing rapidly.

Box 6.6 The Green Revolution in Punjab, India

The Indian state of Punjab, on the semi-arid, drought-prone Indo-Gangetic Plain, emerged from the colonial era with extensive irrigation infrastructure and good transportation facilities. Its farming community was prosperous and progressive, but used almost no cash inputs except canal water. Wheat, the most important crop, was grown on 30 percent of the farmland.

In the 1950s and early 1960s, Punjabi farmers began the transformation from traditional to commercial agriculture. They started to apply small amounts of fertilizer to their fields and output rose steadily.

In 1966 the first high-yielding wheat variety, which responded well to fertilizer and irrigation, was released. This innovation unleashed a chain of events that transformed Punjabi agriculture. Farmers quickly realized that it could double their yields. By 1969, they had planted more than two-thirds of their wheat fields with high-yielding varieties; average yields rose to 2.2 tons a hectare compared with 1.4 tons in 1966.

By 1972, just six years after the introduction of the new variety:

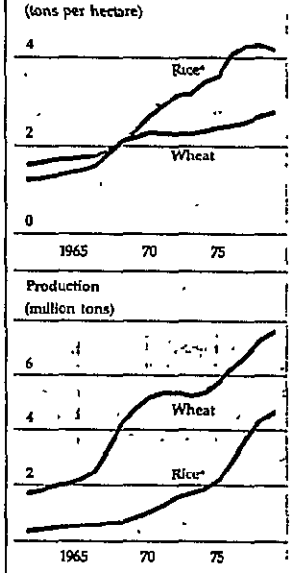
- Farm incomes had doubled, and savings had grown still faster.
- Savings were mainly invested in productive assets. The number of private tubewells and tractors increased sixfold and fourfold, respectively.
- The new wheat proved so profitable that some lower-value crops were replaced. With newly available wellwater, land that had previously lain fallow in the dry season could be cultivated. The wheat-growing area increased by 50 percent.
- Fertilizer use increased sixfold.
- Having done so well with wheat, farmers eagerly planted other high-yielding crop varieties and increased their use of inputs in the early 1970s.

Wheat production failed to rise further in the early 1970s, partly because of disease. Growth resumed after the introduction of disease-resistant varieties in the mid-1970s. By then, other crops had taken over wheat's role as growth leaders. Rice, potatoes, and other nontraditional crops expanded rapidly in both area and yield.

Larger farmers were the first to adopt the new technology, but small farmers and tenants soon took it up. Modern farming practices are now used throughout Punjab. As part of the commercialization of agriculture, crop sharing arrangements for tenants are gradually being replaced by fixed cash rents. With the expansion of farm income, small industry and service establishments have flourished. Many landless farm workers have moved into nonfarm jobs. Income per capita has been growing at an average rate of 3 to 3.5 percent a year for two decades.

A number of factors have contributed to the Punjabi success. The extensive existing canal system and the good groundwater resources, both of which could be exploited at a relatively modest cost, were of special importance. Prices were maintained at levels that gave farmers ample incentives to adopt new practices. Government investment in roads, markets, rural electrification, and other supporting infrastructure enabled farmers to take advantage of new opportunities. Finally, local research led to continuing improvements in varieties of wheat, rice, potatoes, cotton, and other crops.

Agricultural transformation in Punjab, 1961–80



Note: The points plotted are three-year moving averages centered around the year.
a. Paddy (unhulled rice).

ple-cropping as well as higher yields from each crop.

There have been no such revolutionary gains in maize and sorghum, though some progress has been made. As noted earlier, tropical and subtropical maize varieties have been adapted to the particular circumstances of quite small regions. Many breeding stations have produced dramatically improved hybrids and composites, but attempts to grow them in other places have not succeeded. Improved maize varieties have been most widely adopted in Argentina, China, Kenya, and Zimbabwe.

Hybrid sorghums for human consumption were first made available in India in 1964, but it took twelve years to produce them in bulk, to develop their resistance to disease, and to overcome people's reluctance to eat them. Some 4.5 million hectares, one-third of the rain-fed area, are now planted with these hybrids. They also spread in northeastern China in the mid-1960s. In Latin America, hybrid sorghum is chiefly grown for cattle feed on large commercial farms. Improved millets have not been widely adopted by farmers, and few improvements have been made in legumes although active research is under way on these crops.

The results of the development of new grain varieties have been remarkable. In developing countries, cereal yields rose by 2 percent a year between 1961 and 1980: in the case of wheat varieties by 2.7 percent; in sorghum by 2.4 percent; and in maize by 2 percent (see Figure 6.8). Although rice yields increased by only 1.6 percent a year in developing countries as a whole, they rose by more than 3 percent a year in the Philippines and Indonesia, which were best suited to the new varieties.

The Green Revolution has transformed the lives of millions of farmers. It has failed to benefit a much larger number for some or all of the following reasons:

- The technology did not fit their climate and soil.
- National research systems were not available to adapt the international varieties to local conditions.
- Adequate rainfall, irrigation, or flood control was not available.
- Transport and marketing networks were deficient.
- Prices and other incentives were inadequate.

Progress in other tropical crops

The emphasis given to cereals in the developing countries reflects the critical importance of basic foods. Nonetheless, tree crops and nonfood crops are important exports in many developing countries. Moreover, tree crops are frequently grown on land not suited for the cultivation of annual crops. Fruits, vegetables, and vegetable oils are also becoming more significant as incomes rise. Their elasticity of demand in developing countries ranges from 0.5 to 0.9, which means that at median income levels demand for them grows twice as fast as it does for cereals, pulses, and root crops.

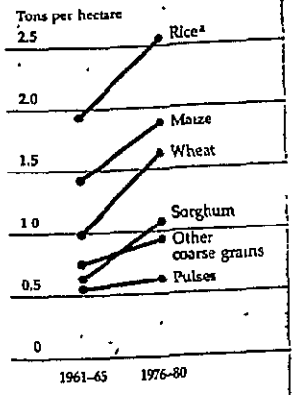
Developing countries account for 95 to 100 percent of the output and export of bananas, tea, coffee, cocoa, and rubber and between 45 and 60 percent of cotton, tea, tobacco, and sugar. In the case of coconuts, over 80 percent come from Asia. Palm oil is produced exclusively in developing countries, though the distribution of production among them has changed greatly. In 1965, 74 percent of output was in Africa, 23 percent in Asia, and 3 percent in Latin America. By 1980, almost 68 percent was produced in Asia, 28 percent in Africa, and 4 percent in Latin America. Although nonfood crops account for a small fraction of the agricultural output of the developing world as a whole, they represent as much as 20 to 35 percent of production in some countries: examples include Colombia, Costa Rica, Ghana, Guatemala, Liberia, Malaysia, Mali, Nicaragua, and Sri Lanka. Exceptionally—for example, in El Salvador and Ivory Coast—they can rise to 40 to 50 percent.

Unlike research on tropical food crops, research on tree crops and sugar has nearly as long and successful a history as that of temperate crops, largely because of the colonial interest in them as exports to developed countries. In several instances, notably sugar, palm oil, rubber, and coconuts, Green Revolutions as significant as those in wheat and rice have taken place, often more than once. Less spectacular but significant improvements in cultivation, fertilization, and harvesting techniques have also been made.

Production and productivity have improved much more rapidly than the growth of demand. Most tree crops have been exported mainly to the developed countries, where incomes and consumption are high and further income increases generate only limited extra demand for tree crops. Industrial substitutes also limit market demand for some crops such as rubber, cotton, and jute. Against these demand constraints, sizable productivity gains have helped reduce costs and prices. The general pattern of demand appears to be improving, as oil exporters and many middle-income countries increase their imports as incomes rise. In addition, higher petroleum prices have shifted the competitive balance somewhat from synthetics back to natural fibers.

Despite the drawbacks of tree crops, acreage for them can be expanded quickly and the technology is already well established. This makes them especially attractive in regions where progress on food crops is slow, particularly sub-Saharan Africa. There, the choice between food and nonfood production is not simple: both need to progress. Over the longer term, the need for local research on food crop improvements is

Figure 6.8 Food grain yields in developing countries, 1961–65 and 1976–80



Source: FAO
a. Paddy (unhulled rice).

clear. In developing improved technologies for crops, however, choices need to be made on the basis of comparative advantage.

Supports for agricultural growth

Land improvement, new farming methods, and more research are all necessary requirements for agricultural growth, but they are not sufficient conditions for its attainment. Numerous complementary services are also needed if farmers are to translate the potential of science into the reality of bigger and better crops. The final section of this chapter examines what this back-up effort involves.

Infrastructure

The existence and expansion of basic infrastructure has contributed significantly to increased agricultural output in Asia and Latin America For example, the Philippines has allocated about 5 percent of agricultural development spending to rural electrification programs, which now serve about 70 percent of the population. On a simpler level, basic roads are essential for getting agriculture moving. In many parts of Africa, farmers are more than a day's walk from the nearest road. Measures to raise their production without transport and communications are of little use, because their crops cannot reach a market and they are cut off from new technology, inputs, and ideas

Improved access usually brings with it an expansion of nonfarm enterprises such as shops, repair services, and grain mills. It also helps change customs, attitudes, and values. For example, a World Bank study of the impact of rural roads in the state of Yucatan in Mexico found that the roads offered an opportunity for enlarging women's role by introducing new ideas, education, medical care, and economic alternatives to maize cultivation. In particular, women married later, had fewer children, and pursued more nondomestic activities.

Feeder roads are often neglected if left to national road transport authorities, which generally prefer the challenge of building major highways. Feeder roads may receive more attention if the responsibility for their planning, construction, and maintenance is devolved to local government or to area development authorities. This requires central government's willingness to expand the revenue-raising powers of local government.

Externally financed projects have been successful in demonstrating that feeder roads can be built quite cheaply. Good examples are the World Bank's first three rural development projects in the northern savannah areas of Nigeria, where 1,700 kilometers of feeder roads were built or improved between 1975 and 1980; and the much smaller cocoa and coffee development project in Togo, in which 200 kilometers of roads linking villages in mountainous terrain were built at less than half the cost tendered by private contractors. In both cases, local artisans were used to do much of the skilled work such as bridge and culvert construction

When rural infrastructure is being improved, giving priority to simple tracks and spot improvements of roads for motorized vehicles enlarges the percentage of rural poor offered opportunities for productive activities by both private and public construction agencies (see Chapter 7). To derive full benefits from investment in roads, improvements often need to be complemented by easier access to credit for the purchase of motorized or nonmotorized vehicles. In addition, transport regulations often hinder the development of rural transportation.

Improving telecommunications has fallen prey to the artificial barrier between the "modern" and "rural" sectors. Telecommunications are not exclusively an urban tool. Agricultural growth can be accelerated if farmers have accurate market information and a fast way of calling for the repair of equipment and delivery of supplies Rural industry is often an early beneficiary of an effective telephone network.

Extension

The adoption of new technology depends on the knowledge, skill, and motivation of farmers, together with a host of other factors which influence the farmers' capacity to achieve output levels approaching those obtained on research stations (Box 6.7). The main task of agricultural extension is to transmit knowledge of better production methods to farmers, and to help them overcome difficulties in employing them. With some important exceptions, the performance of extension services has been disappointing.

The existence of a profitable technology is a precondition for successful extension work. In sub-Saharan Africa (and indeed in many other rain-fed areas), farmers ignore the advice of extension workers on planting dates and cropping when it does not suit their circumstances or promises little obvious reward. Instead, they continue to intercrop and spread out plantings to reduce risk and stretch their limited resources. In this and many other cases, the fault lies with a lack of applied research that takes account of local social and economic conditions (Box 6.8).

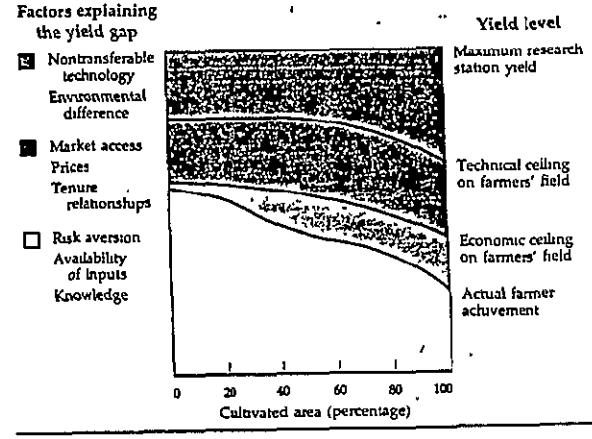
Box 6.7 The yield gap and agricultural extension services

Farmers in developing countries rarely achieve the record yields attained in developed countries or in controlled research Most of this gap in yields is a result of commonsense decisions by farmers or of circumstances outside their control, rather than lack of skill or initiative on their part. In some cases, it may not pay farmers to buy inputs that might help improve yields. In others, the poor quality of the land or a lack of resources may make it impossible for them to use the cultivation practices that maximize yields. The figure illustrates some of the factors that cause yields at research stations and in farmers' fields to differ.

First, the *technical ceiling* for on-farm yields is lower than that for research stations The latter use technologies that are not feasible at the farmers' usual scale of production. Research stations are usually located on choice land and can depend on irrigation if it is needed. The farmers' environment is rarely as kindly

Second, the on-farm *economic ceiling* is often much lower than the on-farm technical ceiling. Farmers' profits are often highest at input levels lower than those necessary for maximum yields, because of diminishing returns on investment in inputs.

Third, farmers' *actual yields* are usually below even economic ceilings This may be because key inputs such as fertilizer, water, and labor are not available when needed, or because volatile output prices and unreliable rainfall reduce expected returns. These factors may force the farmer into a "safety-first" strategy.



Farmers may also not know about optimal combinations of inputs or the best cultivation practices.

The relative magnitude of each part of the yield gap profoundly affects development strategy. Closing a large gap between the different technical ceilings imposed by on-farm and research environments requires either investment—for example, in flood control, land development, or irrigation—or research to develop crop varieties and farming practices better suited to on-farm conditions A large gap between on-farm technical and economic ceilings calls for a review of price policies and improved market access for farmers If actual yields are far below even the economic ceiling, solutions might include strengthening agricultural extension or advisory services, streamlining input supply and credit systems, or creating a crop insurance scheme

Thus, extension services can help narrow the yield gap but cannot close it. Worldwide experience indicates that agricultural extension services are most effective when

- They support a profitable, risk-free or low-risk technology that is unknown to farmers.
- Key inputs such as fertilizer and quality seed are available at the right time
- Farmers have ready access to markets for their additional produce.

In particular, extension services are often biased toward work with men and neglect the very important role of women as farmers in most parts of the world. In some societies women carry out all but the initial land clearing and heavy plowing In many still largely traditional farming systems women have exclusive responsibility for the cultivation of food crops. In these situations, no effort to improve productivity can succeed except by the direct involvement of women in the programs

Other problems with extension reflect an inability of the farmers to respond because input supplies, marketing systems, and other supporting elements are inadequate. Extension is usually most effective when these necessary complements are present.

The rising burden of the recurrent costs of extension services is another limitation on both the growth in coverage and the full utilization of the services Partially in response to problems of cost, and partially to provide a supplementary communication channel (particularly for women), a number of countries have explored the use of radio and other mass media to deliver extension messages These experiences have demonstrated the potential for carrying agricultural information inexpensively to large audiences

Box 6.8 Decisionmaking on the African farm

Cotton planting in northern Uganda should ideally start by mid-April and be completed within two months Test results show a steep decline in yield per hectare the longer planting is delayed. In fact, however, farmers consistently plant three-quarters of their crop in June and July, and spread planting over at least four months Similarly, groundnut growers in the Gambia ignore advice that early planting saves on weeding later. In Nigeria (and throughout Africa) smallholders still intercrop, despite recommendations to plant crops in pure stands to increase yields.

These may sound like examples of farmer reluctance to accept new methods. Closer investigation suggests that this is not the case.

- Hail storms hit northern Uganda at harvesttime; growers consequently spread out the planting season to reduce the risk of loss Extending the season enables farmers to plant other crops—including millet, which is the preferred family food and is used as part payment of cotton-workers' wages After the millet harvest, some plots can be planted late with cotton, time can then be saved on weeding and harvesting. Farmers can thus both reduce the cost of growing cotton and secure their staple food
- Gambian groundnut farmers plant late so as not to compete for labor in millet growing. Although a late crop needs more labor for weeding, there are fewer alternative productive uses of labor time at this relatively slack time of year.
- In Nigeria, a crop mixture gave 60 percent higher gross returns per hectare than pure stands. It also improved returns on labor in peak periods by more than 25 percent, despite higher overall labor input.
- African farmers in these three countries, despite their limited resources and output, make production decisions in much the same way as larger operators. They respond rapidly to changing resource availability, constraints, and incentives and balance available resources to meet multiple (often conflicting) objectives. In fact, considerations which might be of only minor significance on large farms often assume great importance on small ones, owing to resource limitations and the close interrelationships between farm and household decisions

The extent to which radio can induce farmers to adopt sound new technical packages remains, however, to be fully assessed.

In recent years efforts have been made to improve the administrative efficiency and field-level effectiveness of several extension services and to develop better linkages both to the farmers themselves and to research. This is one of the key features of the Training and Visit System, originally supported by the World Bank in India and adapted to conditions in other countries.

The private sector also plays an important role in the diffusion of technology and advice to farmers. Machinery manufacturers, seed companies, and suppliers of fertilizer and pesticides must all refine their assistance and advice if farmers are to buy their products. The long-run interests of manufacturers and dealers are best served by customers who come back year after year. Realizing this fact, companies often undertake applied research and conduct experiments and field demonstrations.

Marketing

Crop marketing activities are often the key to opening up subsistence agriculture. Supplying urban consumers with food, exploiting foreign trade opportunities, specializing according to the comparative advantage of each region, village, and farm—these can take place only if there are intermediaries equipped to finance, buy, sell, transport, process, and store farmers' products and to distribute purchased inputs at the time they are needed. There is a tendency to take these activities for granted. In most tropical developing countries they take place under difficult physical conditions, especially for crop transport and storage, and often in an adverse policy environment. This makes life harder for farmers who want to enter the market.

Despite these problems, farmers in the developing world have generally responded eagerly to market opportunities. Smallholder farmers rapidly adopted the growing of rubber trees in Malaysia and of cocoa, groundnuts, and cotton in West Africa once marketing channels were established in the late nineteenth century. Cocoa, a difficult plant to nurture, had never before been grown by African farmers. Yet in little more than a half century, or only two generations, West Africa's production of cocoa beans reached over 1 million tons a year; it captured 70 percent of the world market and brought farmers more cash per day's work than any other crop ever grown there. More recently, in the Ivory Coast, cocoa production increased from 80,000 to over 400,000 tons in the two decades since 1960, largely because of fair prices and marketing.

Marketing has many facets, as a brief review of World Bank work reveals. In Mexico, under PIDER III, project finance is being used to organize small farmers into associations linked to a central distribution agency; to build local storage facilities; to build and improve retail stores; to develop rural markets, and to conduct a consumer information program through the home extension service. Under the Piaui project in Brazil, a ten-component marketing program is aimed at bringing together poor producers and consumers. In Cameroon, the ZAPI project includes support for a rural distribution network for agricultural supplies, an urban market to handle surplus crops from rural areas, and the improvement of processing and marketing facilities for the export of coffee and cocoa. In the Philippines, the land settlement program is concerned with developing markets for new plantation crops. In Greece, over 6,000 small vegetable farmers have been linked by local marketing corporations to supermarket outlets for their produce in western Europe, as part of a Bank-financed project supporting intensive production of winter vegetables (Box 6.9).

Marketing can be handled by the public or private sector or a mixture of the two, depending on the circumstances of individual countries Because of its political and economic sensitivity, it has often been a public monopoly.

Although the reasons for intervention were sometimes valid at the time public marketing agencies were created, often during or shortly after the colonial period in Africa and Asia, a high price is being paid to keep some of them in place. Serious inefficiencies have characterized the operation of many parastatal marketing agencies Some arise from problems found in almost all parastatals—overmanning, inadequate nonsalary budgets, and the scarcity of good managers. Sometimes official producer prices and consumer prices for food crops are fixed by governments with little regard to the actual costs of collection and distribution, frequently on a uniform national basis. Then the agencies are left to buy, collect, and deliver in the most distant and costly regions and they are not always fully reimbursed for losses incurred in the process.

In food-crop marketing, there are usually parallel marketing channels; the legal and official marketing agency coexists with an often semiclandestine private trading sector. Some governments do not put much trust in the private sector's ability to provide stable supplies of food to urban markets, even when private traders handle the bulk of the trade In such cases, private intermediaries are tolerated as indispensable partners, but the economic environment does not enable them to operate efficiently. The uncertainties associated with the ambiguous position of private trade and traders discourage full-time involvement in food marketing, investment in transport and storage, and a systematic approach to developing an adequate supply network This is starting to change, as governments recognize the value of involving private traders.

State-owned agencies also frequently monopolize the supply of inputs. They often fail to buy and distribute seed, fertilizer, and

Box 6.9 Productivity and small farms: Intensive vegetable production in southern Greece

As the agricultural labor force moves rapidly into the nonfarm economy, farming in Greece is under pressure to increase labor productivity. Small and fragmented landholdings in southern Greece limit opportunities for mechanization. One promising alternative has been to develop high-value cropping systems to supply European fruit and vegetable markets

Over 6,000 small vegetable farmers in the region are currently participating in a program which provides them with equipment to promote more intensive cultivation, and helps them sell their output in the profitable markets of western Europe The program, which is supported by a World Bank loan, is expected eventually to raise the productivity and incomes of 9,000 small-farming families

The key investment is a small greenhouse covered with a single layer of clear plastic and equipped with irrigation and ventilation Winter heating is expensive, however. The new program therefore includes research on heat conservation, use of solar energy for heating, screening of cold-resistant vegetable varieties, and manipulation of their planting dates

The program is also helping to sell Greek vegetables more efficiently in export markets Traditionally, vegetable exporters handle volumes of produce which are too small to support the cost of adequate grading and packaging facilities They also tend to have inadequate market representation and information, and to supply a single product only, often to a single market

Greek exporters (and the small farmers who supply them) have thus been unable to supply the western European supermarket business, which is highly concentrated and represents almost 75 percent of the fresh fruit and vegetable market. Breaking into this market, which relies on direct contracts incorporating predefined quality standards and fixed delivery schedules, requires improvements in the coordination and planning of exports.

To ensure that investment in more intensive vegetable farming equipment and methods will pay off in export sales, four marketing companies, to be owned mainly by farmers, cooperatives, and private exporters, are being established. The companies will coordinate small farmers' output under production and delivery contracts, operate grading and handling facilities, and provide a reliable and timely supply of quality products to supermarket chains in Europe In this way, Greek vegetable farmers will benefit from expanding and assured markets and better prices despite the small average size of their holdings

pesticides at the time farmers need them because funds are not yet available from the national budget. For some inputs such as pesticides and herbicides more countries could replicate the success of Bangladesh and the Republic of Korea in getting agro-chemical manufacturing companies to participate and invest not only in the importation and wholesale distribution of their products, but also in local adaptive research, field trials, and demonstrations to farmers.

The production and distribution of quality seed is another field with broad possibilities for private sector participation. Seed companies in particular often work closely with government agencies in distribution and marketing. Hybrid seeds need to be replaced every year, so an active and widespread distribution chain is essential. The Kenya Seed Company, a mixed enterprise, has sold its Kitale maize hybrid through village shops and has successfully distributed seed to farms of every size in the Kenya Highlands. In ecologically similar areas of neighboring countries, the absence of such a marketing system has meant that the diffusion of maize hybrids is minimal. India's seed program also combines the efforts of the National Seed Corporation, state seed companies, and private companies (Box 6.10).

Box 6.10 The Indian seed industry

Getting quality seeds to 70 million farmers on time is a challenge, but the Indian seed industry is rising to it. Since its infancy two decades ago the industry has grown enormously. It now comprises one national corporation, a dozen state-owned seed corporations, and some 300 private companies The process of growth has been neither smooth nor easy. India's experience illustrates some problems faced by both the private and public sectors when agriculture undergoes rapid transformation.

Before the Green Revolution, most farmers reserved part of their crop for the next year's seed Occasionally they obtained new seed, grown and distributed by state agricultural departments. A few private companies produced vegetable and flower seeds

Following the release of the first hybrid maize varieties in 1961, India's agricultural planners realized that the seed industry needed to be strengthened The National Seeds Corporation was formed in 1963 and started to grow foundation seed. The creation of private seed companies was encouraged, and a number of them were given the opportunity to buy imported seed-processing equipment on a hire-purchase basis

By the mid-1960s, hybrid and high-yielding seed varieties had been released for a wide range of crops Demand for quality seed took off. Because the private seed industry was still embryonic, public sector seed multiplication was stepped up through state and local governments and agricultural departments, state seed corporations were established

Swept along by fast growth, the public seed production system became overextended. Quality declined, and financial losses were incurred Private companies began to have serious misgivings about their future in the Indian seed industry.

In 1975, the state of Maharashtra authorized a few seed companies to produce their own foundation seed This decision has done much to ease the supply of high-quality foundation and certified seed, and to ensure a steady flow to farmers. It has also speeded up the development and popularization of new varieties.

Only recently have dealers, distributors, and farmers become accustomed to the idea of seed marketed through seed companies Initially, the companies tried to promote their products by demonstrations on farms, private retailers and cooperatives were encouraged through consignment arrangements, which left ownership of any unsold seed with the seed companies

Today, seed is being distributed in India by a network of more than 10,000 seed dealers throughout the country. Farmers have become quality-conscious and have developed preferences for brands of demonstrated quality

As private seed enterprises have prospered, they have become committed to genetic research and have developed their own improved hybrids of sorghum, millet, cotton, maize, and some vegetables The search for new varieties has been extended to other crops such as sunflower, safflower, and pigeon peas The industry is an important example of constructive, competitive interaction between the public and private sectors

Credit

Credit is essential for modernization, growth, and equity. Larger farmers are generally able to obtain loans under government credit schemes and from agricultural banks, but small farmers find access to these institutions difficult and rely mostly on informal credit sources. Because the costs and risks of unsecured loans to small farmers are high, local moneylenders often charge much higher interest rates than official credit schemes.

In an attempt to remedy this imbalance, many countries have introduced credit schemes for small farmers. Their record is mixed. Credit often still goes to large farmers or is diverted for nonagricultural purposes. To improve the performance of agricultural credit schemes, certain lessons seem clear:

- Early establishment of rules for repayment (with clearly understood waivers in the event of crop failure) will not only safeguard the financial viability of the lending agency but also help spur farmers to greater efficiency.
- Improved access to credit is of more benefit to small farmers than subsidized interest rates, since the latter in effect ration the amount of credit available. If more farmers are to be served, interest rates and other charges should reflect the true costs of lending and credit recovery. There is sometimes scope for accepting assets such as animals as security for loans.
- Formal credit agencies have overemphasized lending and neglected the provision of other financial services Rural savings schemes are particularly useful for expanding the financial base of lending and for encouraging repayment There is considerable evidence that small farmers do save when offered attractive savings rates.
- To promote loans and savings, agricultural banks could make much more use of rural agencies already in the field. They could also develop closer links with cooperative and group-farmer schemes, as has been done in Malawi, for example.

7 Rural poverty

Absolute poverty blights the lives of hundreds of millions in many countries. They have barely adequate (and often uncertain) diets, and incomes so low that they can spend little for clothing, fuel, shelter, and other necessities.

The dimensions and consequences of absolute poverty have been explored in previous Reports, notably in the discussion of poverty and human development two years ago. The 1980 Report suggested that absolute poverty affected a total of about 780 million people, excluding China and other low-income centrally planned economies such as Viet Nam. China's nationwide food security, along with basic health and education services, may blunt the impact of poverty; nevertheless, it is probable that at least 150 million people there enjoy living standards little better than those of the absolutely poor in other countries. The inclusion of China thus suggests a global total of close to 1 billion people living in absolute poverty.

This chapter examines ways in which agricultural policies and programs can help them. The great majority of the absolute poor—over 90 percent—are rural people who work on farms, or do nonfarm work that depends in part on agriculture. More than half are small farmers who own or lease their land; another 20 percent are members of farming collectives, mainly in China. The remaining one-fifth to one-quarter are landless, and their livelihood is particularly precarious. While often no poorer than the poorest farmers, landless laborers are more likely to see their jobs disappear in a crisis and are less able to fall back on reserves, including the final option of mortgaging or selling their land. Most landless laborers live in low-income market economies with high rural population densities—over 80 percent of them are in Bangladesh, India, and Pakistan, and the rest in areas such as Java, Indonesia, Republic of Korea, Romania, Turkey, Venezuela, and Yugoslavia. If the momentum of growth is maintained, earnings and productivity in agriculture itself should accelerate. Nevertheless, large pockets of absolute poverty may remain in relatively remote areas or where agricultural production is stagnant.

Urban living conditions—notably the squalor of the slums in which most new migrants tend to cluster—often appear to challenge the notion that rural-urban migration reduces poverty. Migrants are indeed usually poor by urban standards, but this reflects the large difference in incomes between the cities and the countryside that encouraged them to migrate in the first place. There is extensive evidence that urban immigrants do improve their incomes, health, and education prospects. Moreover, the wages they remit to those who remain behind are an important source of income for many rural areas. Studies in India, Kenya, Malawi, and Thailand suggest that remittances can often exceed 10 percent of the total incomes of villages where families of migrants live. International remittances from high-wage to low-wage economies can have similar—and sometimes even more dramatic—effects. Many migrants to other countries send back or save over 50 percent of their incomes; in the Yemen Arab Republic, remittances have formed the basis for community-financed village development programs for building roads, schools, and health and water supply facilities.

Poverty and growth

Past experience clearly shows that a combination of economy-wide and agricultural growth is essential for the long-term alleviation of poverty. In particular, new, more productive employment opportunities are needed outside agriculture. The process of structural transformation, which was discussed in Chapter 5, helps to create urban industrial jobs and to diversify the rural economy itself. Such developments have led to spectacular changes in some middle-income countries over the past twenty years. Despite the rapid growth of population and the labor force, agriculture's share of total employment and the absolute size of the agricultural labor force have fallen or will soon begin to do so in countries such as Brazil, Colombia, Indonesia,

The expansion of nonfarm rural income and employment is directly linked to agricultural growth. Estimates suggest that up to of 25 percent of the labor force in rural areas may be primarily engaged in nonagricultural pursuits—which include a range of service and repair work, food processing, handicrafts, leather, textiles, and metalworking, together with construction, commerce, and marketing. Almost all these activities satisfy local demand. Because they generally use simple, labor-intensive techniques and need little in the way of capital or skills, they can expand rapidly in areas of dynamic agricultural growth (although much of the expansion occurs in the market towns that serve the countryside rather than in areas strictly defined as rural). In Thailand, for example, agricultural output grew at over 7 percent a year during a six-year period in the 1970s; the nonfarm income of rural households is estimated to have grown nearly twice as fast, by over 12 percent a year.

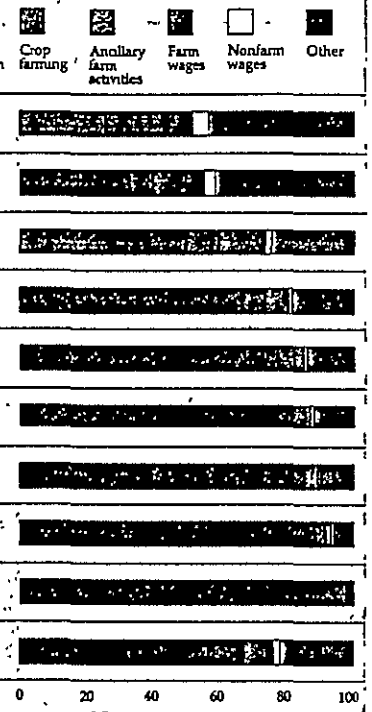
Nonfarm income is particularly important for the very poor. In countries as different as India, Republic of Korea, and Sierra Leone, landless or nearly landless households earn about half their income from nonfarm sources—a proportion that falls to 10 to 20 percent for households with larger land holdings. (The data for India in Figure 7.1 show a typical pattern.) Nonfarm employment is also an important source of secondary earnings for small farmers and the landless in the agricultural slack season.

Over the long run, economic growth reduces the total number of those living in absolute poverty and makes it easier to deal with those who remain. The impact of growth is uneven, however, and the prospect of eventual benefits is of little comfort to those who suffer in the interim. Moreover, growth itself may increase hardship for those who do not share in it. For example, cost-reducing innovations will win new markets and raise production—quite possibly at the expense of those living in areas where natural conditions rule out similar innovations. These other areas are often the poorest to begin with. Commodities facing inelastic world demand are particularly prone to difficulties of this kind: tea or cocoa producers in one country can lose heavily because of technical change occurring half a world away.

Mechanization is another factor often identified as a threat to the livelihood of the poor, particularly the landless. Mechanization generally raises both output and labor productivity, but the mix varies. Under certain conditions, some machines add little or nothing to output while replacing a lot of labor; others may add a lot to output and displace little labor. The machines most likely to reduce farm employment are harvesters, threshers, tractors, and

Figure 7.1 Indian rural household income, by source and by farm size, 1970–71

Cultivated area (hectares)	Percentage of all households	Income per person (rupees)
0	28	540
0–0.4	9	540
0.4–1	10	460
1–2	15	570
2–3	9	670
3–4	8	820
4–6	8	910
6–10	8	1,040
10+	4	1,410
Average		680



Source: National Council of Applied Economic Research, New Delhi, India

milling machines. Labor-displacing mechanization is usually triggered by rising farm wages—which in turn normally reflect improved conditions and expanding job markets. For example, with the growth of nonfarm employment during the Green Revolution, the labor used on land double-cropped with wheat and rice in the Indian Punjab fell by 16 percent. Over three-quarters of the fall (13 percentage points) was accounted for by the use of tractors.

In stagnating, low-income regions, however, labor-displacing mechanization is rare. Rural wage rates are so low that it is not profitable to replace human tillers and harvesters with expensive machines unless the agricultural economy is expanding rapidly. Nevertheless, the pace and profile of mechanization can be radically altered by policies that seem, on the face of it, extraneous. Policies on exchange rates, foreign exchange licensing, subsidized credit, and import duties have encouraged the spread of tractors in Brazil, Egypt, Pakistan, Zaire, and other countries. Where neither agriculture nor other parts of the economy are growing rapidly, the effects of premature mechanization can be disastrous for those who lose their jobs

Initiatives to counter rural poverty

Economic growth has been most rapid in middle-income countries in recent years, notably among those with per capita incomes of $1,000 or more. Absolute poverty is consequently increasingly concentrated among the low-income countries (and among middle-incomes countries that have experienced slow growth). Roughly 40 percent of the poor are in India, Bangladesh, and other South Asian economies. Another 20 percent are Chinese. Low- and middle-income sub-Saharan Africa accounts for about 15 percent, as does East Asia (principally Indonesia and Indochina). Latin America, North Africa, and the Middle East account for only about 3 to 4 percent each.

Policies and programs to accelerate overall growth are clearly crucial for the long-term reduction of poverty. The special role of agriculture in strategies for economy-wide growth was discussed in Chapters 5 and 6. Many of the policy changes advocated—for example, improved producer incentives and higher priority for agricultural research programs—can also help improve the prospects of the rural poor. But programs dealing directly with the problems of the poor are also essential. Although direct measures are of special relevance for the low-income economies, many middle-income countries (including some whose growth performance is otherwise satisfactory) could also achieve still better results if they addressed poverty objectives more directly.

This section discusses four sets of measures to improve the productivity of the poor—human resource development, small-farm programs, agrarian reform, and rural works. Such programs can bring important benefits under widely differing circumstances, but their impact tends to be felt only in the long term. Moreover, some aspects of poverty—for example, difficulties associated with large, fatherless families—are hard to tackle through improved production opportunities alone. The final section in the chapter therefore deals with government efforts to maintain food security and to subsidize food for those in greatest need.

Box 7.1 Farmer education, farm efficiency, and nutrition in Nepal

Nepal's Terai region, in the lowlands along the Indian border, suffers many of the interrelated manifestations of rural poverty—low agricultural productivity and income, low rates of literacy and school enrollment, a high prevalence of malnutrition, and high rates of disease, mortality, and population growth. The 1980 *World Development Report* concluded that this "seamless web" of factors that entrap families in poverty can perhaps best be broken by providing primary education: men and women with even a little education seem consistently better able to improve agricultural efficiency, to take advantage of health and nutrition information, and to seek methods of family planning. To provide further empirical evidence of these linkages, the World Bank gathered data from 800 farm households in the Terai to assess the extent to which education helped alleviate rural poverty.

A recently introduced and particularly profitable crop in the Terai is wheat, and the study found a strong link between farmer education and efficiency in wheat production, even after controlling for other factors such as the ability, size of holding, or family background of the farmer. There was definite evidence of a threshold (at about six years of education), below which education's impact was insignificant. Among farmers with more than six years of schooling, wheat yields were over 25 percent higher than those with less or none. Competence in arithmetic affected the propensity of a farmer to grow wheat at all. The magnitude of this effect was sufficient to suggest very high economic returns to education as a factor in agricultural production

The same research project also suggested the potentially self-reinforcing character of investments that address any of several important facets of rural poverty—illiteracy, malnutrition, and low agricultural productivity. Data on children indicated that malnutrition was an important cause of impaired learning and nonattendance in school; in the next generation the resulting illiteracy could be expected to impair agricultural productivity, which would in turn exacerbate malnutrition, thereby completing a vicious circle. Nepal's policy of vigorous expansion of primary education would seem, then, to offer promise of raising agricultural productivity and alleviating several dimensions of rural poverty

Human resources

The 1980 *World Development Report* marshaled a considerable body of evidence to show how programs of education, health care, and nutrition can help increase earnings and income among the poor. Evidence continues to accumulate supporting these conclusions. Education is especially important in enhancing mobility and making farmers more receptive to new practices and market opportunities. A recently completed World Bank research project in Nepal (Box 7.1) found strong evidence that education improves a farmer's efficiency, and an earlier Bank study had calculated the rate of return to primary education (solely in terms of its contribution to farmer efficiency) to be between 7 and 11 percent in the Republic of Korea, between 14 and 25 percent in Thailand, and between 25 and 40 percent in Malaysia. These findings from Asia complement findings from elsewhere that consistently show education to increase farmer efficiency whenever modernization and change in the environment require innovative, adaptive responses.

Labor mobility—from one country to another, from rural to urban areas, and from agricultural to nonagricultural activities in rural areas—is often a potent means of escaping from poverty. Mobility, whether geographical or occupational, is generally a result of individuals' decisions, which are based on informal networks of information and experience. Governments can promote mobility—and help limit its potentially adverse side effects—in several ways. Education and training enable poor people to acquire new skills and thereby expand their earnings opportunities. They are particularly valuable in areas where permanent emigration needs to be encouraged because, for example, population growth is running ahead of productive capacity.

Similarly, nonfarm rural enterprise can sometimes be promoted by worker and management training, as well as by improving small businesses' access to credit to help finance expansion, and by investment in infrastructure (such as rural electrification, transport, and communications). Such programs can help small towns become potential growth poles in rural areas. Encouraging people to better themselves where they live can help slow the pace of urbanization and cut the cost of expanding and upgrading urban infrastructure and services.

Women are often the least mobile and therefore can benefit most from programs which foster rural development and employment opportunities close to home. While in some societies young unmarried women are quick to move to new jobs in urban centers, married women, those with children, and the old of both sexes are usually closely tied to the household and farm. Attention should therefore be given to fostering productive on-farm and local employment opportunities for women and to meeting their needs for education and training in programs that support migration from depressed farm areas.

Small-farmer programs

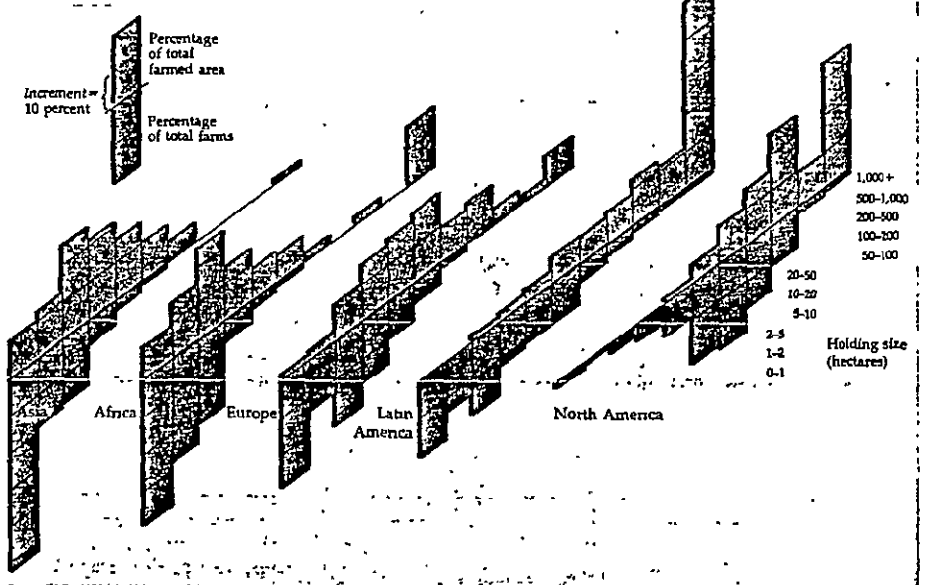
Small farmers are by far the largest proportion of the rural poor and, because of their ties to the land, the least mobile. There are enormous variations in the amount of land they farm, in their status (as sharecroppers, tenants, and owners), and in the kinds of farming they undertake. They have several common characteristics, however, they do most of their own work, have few assets, and usually consume most of what they produce Absolutely poor farmers are concentrated in Asia, where rural population densities are especially high, and in Africa, where little has been done to raise land productivity. Figure 7.2 shows the size structure of farms in different parts of the world.

On the face of it, small family farms may seem inefficient compared with large farms and plantations which use hired labor or machinery. The evidence disproves this Where small and large farms coexist, as in South Asia or Latin America, research shows that small farms usually produce more output per unit of land farmed than do large ones, even when allowance is made for the quality of land. Even in the developed countries, though farm size has grown with mechanization and rural emigration, farms are still typically family-based and hire very little labor.

The resilience and productivity of small family farms throughout the world is striking—especially in the light of characteristics which might be expected to make them less competitive than large farms, such as.

- Small farmers are unable to exploit economies of scale. Their transaction costs are high because their marketed output, purchases of inputs, and use of credit are on a small scale
- Lack of assets limits their

Figure 7.2 Number of farms vs farmed area: comparative distribution, by region and by farm size, selected countries, 1970



Source: FAO, 1970 World Census of Agriculture

ability to borrow money; land is often rented and cannot be used as collateral.

- Small farmers cannot afford to spend as much as large farmers to explore and adopt new techniques. Productivity gains from new techniques usually increase profits most among those who use them first.
- Small farmers tend to be the first to suffer during shortages of fertilizer, seed, and water. They lack the influence of their larger neighbors, whose goodwill is more important to local suppliers.

Offsetting factors are that small farmers benefit from lower labor costs and self-management. The use of hired labor on large farms imposes a transaction cost on both workers and employers. The uncertainties of obtaining work or workers on any given day make it necessary for workers to seek, and employers to be willing to provide, more in compensation than is needed on family farms. The quality of farming is even more important than its cost. Farming is a complicated business that requires not only hard work but also care and attention. The small farmer's motivation is usually strong, especially if he is growing food to feed the family.

Small farmers exploit their advantages (and offset some of their disadvantages) by putting more hours of work into each hectare than large farmers do. Although their capital-to-land ratio is often higher than that of large farmers, small farmers usually have lower ratios of nonland capital to labor. Table 7.1 illustrates some of these tendencies in the case of Brazil. The same pattern can be found in many countries, but it is usually more muted.

During the past ten years in particular, governments, supported by international development agencies, have sought to capitalize on the virtues of small farms and to help them overcome their disadvantages. Some of this work is complex and requires more or less simultaneous action on several fronts. In other cases, growth may be held back by a single bottleneck, and a less complex solution is then possible. For example, the lack of roads in remote areas may limit or wholly prevent reliable, cheap delivery of commercial supplies, profitable penetration of markets, specialized production, and effective deployment of farmer services and research. Throughout the world road building has been the foundation of rural development schemes. Small-farm irrigation programs, primarily to improve water availability and control, are also of special importance.

Other programs include efforts to direct part of the flow of farm credit to small farmers (sometimes cooperative group guarantees are used as collateral—an approach pioneered in Malawi's Lilongwe land development program). Programs to assist smallholder production of plantation crops have involved supervised credit, technical services, and assured market access. Efforts of this kind have been particularly successful in Kenya (tea and coffee growers) and in Asia (rubber and oil palm schemes in Indonesia and Malaysia).

More complex programs are often designed for an intensive development effort in low-income areas or regions. The PIDER program in Mexico is an example. started in 1973, it channels some $450 million annually to about 120 carefully chosen low-income areas estimated to include about half of Mexico's 12 million rural poor. The money finances a wide variety of agricultural investments plus social and economic infrastructure. A national scheme of a different type, centered on the production of one commodity, is India's dairy development program which uses producer cooperatives (see Box 7.2).

In their early days, some multipurpose programs tended to be too complicated to implement successfully, especially in countries with limited administrative and management skills. In some cases, the necessary managerial and financial support could be provided only with international assistance; replication in other, equally deserving areas proved not to be possible. Inadequate preparation—a weakness not confined

Table 7.1 Farm structure in Northeast Brazil, 1974

Farm size (ha)	Average holding (haifarm)	Average land value (cr$/ha)	Labor input (yr/ha)	Capital input (cr$/ha)	Capital/labor ratio (cr$/worker)	Gross output (cr$/ha)
0–9.9	4	1,266	0.247	1,203	4,870	769
10–49.9	27	1,054	0.075	529	7,057	362
50–99.9	72	1,064	0.041	405	9,872	291
100–199.9	141	1,318	0.028	318	11,341	288
200–499.9	299	785	0.019	243	12,792	192
Over 500	1,180	625	0.012	140	11,625	121

Source: Kutcher and Scandizzo (1982)

Box 7.2 The milk revolution in India

Every day at dawn and dusk, 2 million Indian farmers pick up their milk cans and cycle or walk to the nearest collection center. They are part of the dairy cooperative movement that has swept India since the early 1970s, enabling owners of a few dairy cows to profit from buoyant demand for their perishable product in distant cities.

The movement began on a small scale thirty years ago, when a dairy producers' cooperative was established in the small town of Anand in western India. The Anand cooperative formed the model for a grass-roots movement in most Indian states. Assisted by the World Food Program, the EEC, FAO, and IDA, this movement has grown into an industry comprising more than 10,000 village cooperatives that process 2.5 million liters of milk every day. They sell fresh milk to Bombay, Delhi, and other major cities and supply processed dairy products throughout the country.

The cooperatives are organized in three tiers: village dairy societies, unions of the dairy societies, and a federation of the unions. The whole system is owned by the primary milk producers. Two semi-autonomous government agencies—the National Dairy Development Board and the India Dairy Corporation—provide technical and financial assistance.

The cooperatives form an integrated system for marketing and processing. The local cooperatives buy milk on commission at the collection centers. The milk is immediately brought by truck to the union dairy where it is pasteurized, put into insulated tankers, and shipped to major cities or processed into dried milk, cheese, butter, and other products.

Every member of a cooperative has access to technical assistance. The package includes emergency and weekly veterinary services, artificial insemination, concentrated feeds, and seeds for high-yielding fodder crops.

Giving producers a reliable and profitable outlet for their milk and the technical wherewithal to increase production has helped raise rural income. The movement has even benefited the landless poor who often own one or two cows or buffaloes. In particular, it has enhanced the status and well-being of women, who are the traditional caretakers of livestock and the recipients of income from milk sales.

This cooperative venture has worked when many others have failed. The features which seem to have helped shape its success include the following:

- Its dedicated leadership and well-trained staff subscribe to a common principle of service to rural communities.
- Its organizational system enforces strict accountability.
- Its streamlined marketing system is suited to the commodity's perishable nature.
- Economies of scale at the processing stage encourage collective action.
- Payments are based on fat content and are received by producers within twelve hours.
- A well-publicized and appropriate package of technical services is offered to all members.
- International aid (including food aid) has been used judiciously to help build the dairy industry.

to this type of program—sometimes meant that the "package" of improvements turned out to be incomplete or inappropriate for small farmers

By no means all the difficulties which arose were technical in nature Misunderstandings about the social setting, for example, led to a number of failures in programs for small-farmer credit and cooperative development. Patterns of ownership, tenancy, and land rights can also make it difficult to reach poor farmers; and the benefits of higher production may be diverted to relatively well-off landlords, merchants, and other middlemen.

Other programs help small farmers overcome the hostile physical conditions in which they often have to work. As might be expected, rural poverty tends to be particularly severe in the world's most difficult natural environments—in tropical uplands, in semi-arid regions, and in areas with poor soil (often recently cleared forest land). In such conditions, small-farmer development programs are often held back because they lack the right technical ingredients. The most common crops—pulses, upland rice, sorghum, millet, roots and tubers—have only recently begun to attract research attention. There are powerful arguments for stepping up this effort, given the high returns on past investment in research (see Chapter 6) and the fact that numerous poor people produce and consume these crops as part of their staple diet.

Despite the difficulties of assisting small farmers, the programs seem on the whole to have been remarkably successful. In many instances, farm incomes have been raised significantly and benefits widely spread, handsome returns have accrued to the economy as a whole More programs are now being designed to simplify management and implementation, especially in Africa. This is usually accomplished by concentrating on a lead crop—as in recent cotton programs in West Africa—or on a small number of strongly complementary activities. The Ethiopian "minimum-package" program, as suggested by its title, is confined to seed and fertilizer sales and extension services. Zaire's Kasai Oriental maize program concentrates heavily on one crop plus a few support services that are central to improving productivity among 120,000 farm families.

Agrarian reform

A critical factor in agricultural development is the willingness and ability of farmers to improve their land by leveling, irrigating, and draining it. Farmers with secure tenure have more reason to make such investments than those with less of a stake in the land. Tenure is not an issue affecting small farmers alone, although it tends to bear heavily on them. Insecurity is caused by a variety of factors, including lack of clear title to land, lack of assurance about tenancy arrangements, instability of land rents, and—among landowners—fear of land reform without proper compensation. These questions will become more critical as countries run out of virgin land and growth comes increasingly to depend on making capital improvements to existing land.

Changing the institutional framework to encourage land improvement is generally difficult The measures involved vary widely. They include surveying, adjudicating and recognizing land titles, consolidating small and often widely scattered parcels of land, legislating on inheritance to ensure that farms will be maintained in viable units, and acquiring and distributing land to new owners through land reform. Most land reform programs seek either to create many farms from a few by taking title or tenancy rights and redistributing them, or to unify ownership of many scattered holdings. Land reform has substantially improved rural income distribution and the base for subsequent agricultural progress in several countries; examples include China, Japan, and the Republic of Korea.

Several problems tend to limit the effectiveness of land reform, however. Where the argument for it is most compelling—in densely settled agricultural areas, where landlessness and rents are high—the holdings are usually already very small, which limits the scope for land redistribution. Moreover, often very large numbers of owners would be dispossessed under these conditions, since land is held in small amounts. Many recent studies suggest that in Asia most owners are active in farm management along with their tenants and sharecroppers. There seem to be few cases where tenants lag behind owner-farmers in adopting new techniques or using modern inputs such as fertilizer By and large, studies that adjust for farm size usually find the same levels of output on all types of farms

Land reform has long been recognized as posing a formidable political challenge. The economic challenge of maintaining and improving farm output after land reform is also considerable, typically requiring a more active and diversified range of farm services if the reform is to be successful In many cases, a pilot program, designed to test different approaches, may be a sensible first step. Brazil's Northeast, long a paradigm of tenure issues, is implementing a World Bank-supported program of this kind in two of the poorest states, Maranhao and Piaui.

But land reform is more often preached than practiced—which can be highly damaging since it increases insecurity rather than reduces it. Among landlords, a general fear of reform and, in particular, concern that compensation will be inadequate may discourage them from making the most productive use of their land by leasing small parcels to sharecroppers and renters. Thus reluctance is most common, and most harmful, among large landowners. Discussion of land reform sometimes obscures the broader issue of security of tenure and leads to inaction on all fronts. In some instances, taxing land according to its productive potential, an approach which has received relatively little attention in recent years, may achieve economic and social results similar to those stemming from land redistribution.

Rural public works

Using local resources for building and maintaining rural infrastructure makes a valuable contribution to both development and poverty alleviation. Unskilled labor can be used to construct small irrigation and drainage works and feeder roads, and to level land. Rural public works are important precisely because they can be organized at the community level. On the one hand, they are seldom done well by central government; on the other, they are too large to be done by individual families. Even with full security of tenure and favorable prices, a family farm usually cannot, for example, organize irrigation and drainage canals for a small watershed.

In view of the pressing need for rural infrastructure and the abundance of local labor in many countries, programs often seem surprisingly modest. This is partly because they require high-caliber management and careful design if they are to work well. Project selection, organization of the labor force, design and engineering standards, and financial control can all present considerable difficulties—especially as most programs are decentralized and widely scattered.

Sometimes, too, they are viewed as "make-work" schemes, the supplies and machinery needed to complement local labor may therefore be inadequately funded. Other drawbacks include the fact that public works may sometimes benefit some individuals more than others where land is privately owned and that proper maintenance is difficult to arrange once construction is completed.

These and other problems can be overcome, however The Maharashtra Employment Guarantee Scheme (see Box 7.3) is an example of successful rural public works, so too is Indonesia's Inpres program. Projects of genuine social and economic value are most likely to be identified, planned, and built if rural people are able to play a decisive role in choosing

Box 7.3 Employment Guarantee Scheme, Maharashtra, India

Maharashtra's ten-year-old Employment Guarantee Scheme (EGS) gives unemployed or underemployed rural workers jobs in public works projects or pays them living allowances. Blueprints for projects are kept ready for immediate use at times of slack employment. Every rural adult is guaranteed either manual work near home within fifteen days of registering or a cash allowance of Rs1 a day ($0.12) for time wasted if no job turns up

During the five years ended March 1979, Maharashtra spent Rs2 12 billion on public works. Of this total, 53 percent was for irrigation, 27 percent for land improvement, 13 percent for roads, and 7 percent for forestry and other works. Unlike many other rural work schemes, EGS managed to combine employment generation with productive capital formation.

The table shows that over the five years from 1973 to 1978, Maharashtra's rural unemployment declined by 21 percent, from 1.4 million persons to 1.1 million, despite a 17 percent increase in the population. Its overall unemployment rate fell by 32 percent during this period to 5 2 percent of the work force, compared with a 4 percent overall decrease for the whole country Because agricultural and industrial growth remained sluggish, much of the improvement in Maharashtra's employment can be attributed to EGS

Unemployment in Maharashtra's rural work force (ages 15–59), 1972–73 and 1977–78

Rural work force	*1972–73*	*1977–78*	*Percentage change*
	Unemployment rate		
Males	6 97	5 24	−16 0
Females	8.34	5 20	−37 6
Total	7.65	5 22	−31 8
	Unemployment (millions of persons)		
Males	0 64	0 55	−13 6
Females	0.75	0.55	−27 4
Total	1 40	1.10	−21.1

Table 7.2 Selected government food-distribution programs: Coverage, impact, and cost

Program and country	Commodities involved	Coverage and targeting	Effect on income, consumption, and nutrition	Budget costs (percentage of budget) or revenue	Comments
General subsidy, Egypt					
Open subsidy for wheat, flour; distribution through ration shops for other goods	Wheat and wheat products, maize, beans and lentils, rice, dairy products, sugar, tea, oils, meats	Broad coverage, particularly in urban areas; untargeted	Wheat and flour consumption up about 80 percent (1970–80), malnutrition and infant mortality low for Egypt's per capita income level	As high as 15 percent (1975), 9 to 12 percent, with 5 to 7 percent for bread (1976–81)	Implicit tax of about 20 percent on producers has acted as a disincentive; subsidized foods constitute 22 percent of Egypt's import bill
Subsidy and ration, Pakistan					
Ration books; food distributed through ration shops, quotas vary by supply availability and location	Wheat flour (atta), rationing of sugar, subsidized flour considered inferior, resulting in some self-targeting	Narrow coverage; about one-third of the population, most urban, some rural in food-deficit areas, one shop per 2,000 people, but rural shops open infrequently and do not all provide atta; untargeted	69 percent wheat consumption of low-income groups from ration shops, 9 to 14 percent of caloric consumption of below median-income households from ration system (1976)	6 to 12 percent (late 1970s); 3 to 6 percent (1980s)	Producer prices too low before 1977, limiting production which improved after 23 percent price rise in 1980; some evidence of padded ration rolls
Subsidy and ration, Kerala State, India					
Ration books; food distributed through ration shops	Rice, wheat, cooking oil, sugar	Broad ration shop coverage in both urban and rural areas; largely untargeted	20 percent of caloric consumption from rationed rice for low-income households, 56 percent of total rice consumption from ration shops, 66 percent for low-income population, rationing has been positively linked to child nutritional status	Central government subsidy equivalent to an average 17 percent of state budget (1973–76)	System of procurement favoring local farmers (varying by farm size) has provided price support and improved equity among Kerala producers
Subsidy and ration, Sri Lanka, pre-1979					
Ration books, food distributed through cooperatives	Rice, wheat flour, sugar, milk foods for vulnerable families	Broad ration shop coverage in both urban and rural areas, largely untargeted	About 50 percent of total rice consumption from ration shops, 20 percent of caloric consumption and 14 percent of income from rations (1970); very low malnutrition and child mortality for Sri Lanka's per capita income level	15 to 24 percent (1970s)	Need to distribute rice under ration led to effective system of government procurement, with some benefit to farmers
Coupon system, Sri Lanka after 1979					
Coupons issued on basis of family size and age to all with income of less than Rs300	Choice of 9 major food commodities, rice most important; or coupons can be deposited as savings; kerosene stamps can be used for food purchases	Covers roughly lower-income half of population, urban and rural, well targeted, studies estimate about 10 percent of needy group not covered; about 30 percent covered not needy	30 percent of total rice consumption from ration shops, the 1979–81 calorie and income impact similar to that before 1979; after 1981, evidence of some deterioration in nutrition when coupon value was halved because of inflation	11 to 14 percent (1980–81)	Shift to coupon system coincided with move to full-cost producer pricing, which further increased benefits to farmers; efforts made to target other welfare and employment programs to needy as identified by means test
Coupon system, Colombia					
Coupons issued to vulnerable women and children; targeting through health system and geographical area	Nutrition-fortified foods noodles, biscuits, vegetable mixtures, textured protein foods, inclusion of less expensive staples being considered	Covers half of country geographically, well targeted, 200,000 households reached (1980)	Increased maternal weight in pregnancy and increased birth weight	Less than 1 percent (1980)	Local firms contribute resources for production of nutritious foods

them. Experience also suggests that the commitment of some local resources other than manpower fosters the positive involvement of rural communities in project selection, design, and execution. At the same time, the coordination and administration of programs helps develop the effectiveness of local government. Good financial and technical control of the works is also essential

Food security, distribution, and subsidies

The 1980 *World Development Report* and the FAO's study of future agricultural growth prospects, *Agriculture: Toward 2000*, were both completed when the world economy was more buoyant than it is now. Nevertheless, both concluded that neither poverty nor undernutrition could be eliminated in this century, even under the most favorable assumptions about agricultural development and overall economic growth. The benefits of a sound growth strategy will flow too slowly to meet the income needs of many of today's rural poor.

Governments and international agencies have consequently sponsored various efforts to ameliorate the harshest effects of poverty, including in particular problems associated with malnutrition and food insecurity. These efforts have mainly involved food aid, though they also include general food subsidies and low-cost rations. Vulnerable families and individuals are also being reached, usually through health programs. Some of these efforts are listed in Table 7.2.

Unfortunately, food subsidies and ration schemes are often very expensive, largely because their coverage is very broad. The poor are helped, but so are others who can afford their own food. Political support for these programs is correspondingly broad, making reductions in their scale or scope extremely difficult. There are other disadvantages as well. With price regulation favoring consumers, farmers' incentives are depressed. As a result, the growth of domestic food output is slowed, imports mount, and there is wastage. Food crops are so important in most low-income countries that these distortions can have massive macroeconomic consequences. Subsidies, which in some countries amount to as much as 20 percent of the national budget, can dwarf agricultural investment and even undermine the government's ability to maintain public sector investment as a whole.

Food subsidies can be designed to be relatively cheap, however. Many governments operate tightly structured, targeted programs with entitlements based on means tests or administrative procedures such as health screening. The means test and coupon system introduced in Sri Lanka in 1979 has reduced the number of participants by half and more than halved the costs of the government food ration. Coupon systems, such as those in Sri Lanka and Colombia, can define different target groups by using several criteria—income level, special needs (such as pregnancy), or family size and age composition. The administrative costs of targeting can be reduced by using automatic, self-targeting mechanisms. In countries where the poor are concentrated geographically, targeting by location can be cost-effective. Subsidized food is distributed only to certain communities or is restricted to certain types of shops that are not patronized by the relatively well-off

Targeting by commodity, which involves changing relative prices to encourage consumption of nu-

tritious but unpopular foods, is rarely used, but shows some promise Sorghum was sold at half the price of wheat and rice in ration shops in Bangladesh in 1979. The poor participants, particularly in rural areas, bought more sorghum, increasing the calories in their diet The better-off participants in the capital city, however, preferred to pay double the sorghum price in order to have rice or wheat

Better nutrition has been shown to result from food subsidy and distribution programs in several countries. China operates the largest food storage and distribution system in the world (see Box 7 4), it has eliminated famine, reduced chronic undernutrition, and lowered its child mortality rate to a level comparable to that of some developed countries. In the Indian state of Kerala, and in Sri Lanka, rations are available for both the urban and the rural poor, a feature unusual among food-subsidy programs; these efforts have raised low-income participants' caloric intakes by 20 percent and their incomes by 15 percent.

Programs for the undernourished can also help deal with periodic fluctuations in local food supplies that might otherwise lead to famine. Small changes in output, earnings, or food distribution and prices can have dramatic effects on individual nutrition and on the local economy as a whole Towns and cities may be marginally affected by droughts or crop failures; in the countryside, the effects can multiply quickly. As rural purchasing power declines, limited food supplies are absorbed by areas with higher purchasing power. Food insecurity is more a function of inadequate and uncertain income than of food availability (see Box 7.5). Wars accentuate the problem by disrupting crop schedules, destroying assets, and creating transport and communications bottlenecks.

Governments and international relief agencies deal with famines by distributing food directly Their recent efforts have generally been effective and reduced the incidence of famines. When famines do occur, they result as much from failure to acknowledge and respond to the situation quickly as from program inadequacies. Any famine is unacceptable, however, and capacity to deal with it before its effects become catastrophic is of paramount importance. This requires:

- An effective early-warning system, together with early acknowledgment and response.
- Mechanisms for emergency procurement, whether through imports, food aid, or priority purchases of domestic supplies from prosperous areas within the country.
- Effective transport networks and distribution channels in the countryside.

Despite the need, many low-income countries lack both logistical and managerial capacity, and do not have the food supplies necessary for effective emergency relief. International support—from private voluntary agencies and official organizations, such as the World Food Program—has attempted to complement national efforts. Given the difficult conditions under which they must operate, international efforts have generally been quite successful. Their efficiency could be enhanced by building up a better response capability within developing countries themselves. Donors are beginning to offer aid for more permanent food-security systems, including improvement of ports and storage facilities and technical assistance for more efficient import procurement. Such improvements should help reduce avoidable undernutrition in future emergencies.

Most rural poverty and food security programs are relatively new and reflect the rising concern with poverty in the 1970s. To deal with the problems, existing institutions and their programs have had to be modified, in some instances new ones have had to be created. Although the programs are trying to tackle much the same problem of rural proverty, the solutions which have been adopted have been very diverse. There is no generally applicable blueprint But experience shows that the ability to learn from mistakes and to make appropriate adjustments are what distinguish successful programs from the rest.

Learning from mistakes includes, above all, reaching a greater understanding of the problems of the poor. This means that programs should be designed and executed so as to encourage the fullest participation of local people. Local people best know their own needs and how they can be met. Cost-effective, sustainable programs that reach large numbers succeed by giving full rein to the considerable energies and dynamism of the poor

Box 7.4 Food security in rural China

China's approach to food security cannot easily be adapted to other settings because some of its features are uniquely Chinese. Most important, food security is built into the collective system, which ensures that production teams, brigades, and other local groups give their members first access to basic necessities. In practice, therefore, although the state ultimately guarantees food security, its direct intervention is minimal.

Within a community, basic necessities are assured mainly through the annual appropriation of collective income Everybody receives a basic ration, even those who have earned a below-average number of "work points" But there is a communal obligation to work, even the elderly usually find some light work to claim a share of the community income. (In practice, provision for the elderly in rural China also seems to rely heavily on the age-old tradition which holds children responsible for the care and support of their parents.) Households in temporary misfortune—for example, because of illness—go into debt to their collective (or, in some instances, buy necessities from it using income from household activities) All collectives are obliged to maintain grain reserves at the brigade and commune levels Many communes also hold reserves on behalf of the state food agency or for livestock feed, and the total is usually enough to offset a bad harvest

These arrangements enable the national Food Ministry to act as a residual supplier and to deal with deficit communities as units, rather than with individual members and households. The administrative savings are probably sizable The ministry also has an overall responsibility for state procurement, processing, storage, and distribution of some 50 million tons of grain every year These responsibilities are carried out through a nationwide network of local facilities (grain management stations) by a total staff—excluding seasonal workers—of over 2 million.

In a normal year, most collectives are required to sell grain to the Food Ministry, or pay taxes on their production If the harvest is poor, procurement quotas and taxes may be waived or reduced: In 1979–80 the Food Ministry reported tax remittances of 2.4 million tons.

If communities are still short of food, the ministry gets involved directly Its relief operations are triggered when it appears that, with grain reserves and income from other crop surplus taken into account, the community will not be able to sustain a distribution of at least 150 kilograms per person a year (200 kilograms per person in rice-producing areas) with the grain measured in unprocessed form

Technically, communities usually borrow to obtain relief grain when they cannot afford to buy it. Some of the poorest areas of China need relief grain most years, however, and their accumulated debt far exceeds current income. Ultimately, need rather than ability to pay (or to repay) is the determining factor.

In addition to chronic problems in the low-income, food-deficit areas, disasters occasionally plague China. For example, in 1980 the provinces of Hebei and Hubei in eastern China were hit by heavy floods in some areas and persistent drought in others Crop losses were close to 20 percent at provincial levels, with much higher rates in some areas. These disasters prompted China's first request to the UN Disaster Relief Organization for emergency aid.

No data have yet been released on the total number of people benefiting under the Food Ministry relief programs But in 1979 about 12 percent of the production teams reportedly distributed less than 150 kilograms of grain per person; a further 10 percent reported distribution of 150 to 180 kilograms per person. Most of the recipients, perhaps 150 million people, would probably qualify for relief by Food Ministry criteria. The Food Ministry reported distribution of about 3 million tons of relief grain in 1979–80 If relief per person averaged 25 kilograms, these data would imply well over 100 million beneficiaries This large number of beneficiaries, juxtaposed with the spartan supplement (the ration supplies about 1,400 calories a day), serves to underscore the point that China today is still a low-income country with a great deal of rural poverty

Box 7.5 Famine comes from income insecurity

Who are the victims of famines? Rarely, it would appear from a study done for the International Labour Organisation, does famine result simply from a reduction in food production and affect all people in the area uniformly In 1943 in Bengal, in 1974 in Bangladesh, in 1973 in Ethiopia those who suffered most from famine were the landless—casual laborers employed in agriculture or providing unskilled or semi-skilled services—and pastoralists who had to trade their emaciated beasts for expensive food grain In short, the vulnerable were those whose "exchange entitlements" were removed or massively devalued by the events preceding the famine

It was not a decline in food availability itself that caused the famines In Bengal in 1943 the food supply was lower than in many years but higher than in 1942 and well within a normal range of fluctuations. In Bangladesh per capita food availability was, if anything, higher in 1974 than in earlier years. In Ethiopia, on the other hand, a drought sharply decreased food supplies in a localized but by no means inaccessible area.

The mechanisms that caused marginal groups to suffer varied. In Bengal a wartime inflation debased the real value of their already low wages, which bought much less food than before. In Ethiopia, low yields caused farmers to dismiss farm servants, not hire laborers, and reduce their demand for other services. Food prices did not rise, but the poor, losing their employment, lost their source of earnings (entitlement) to buy food. Similar problems plagued the Sahel region in the early 1970s. Pastoralists saw their herds diminish while animal prices fell, and more had to be marketed in exchange for food grains In Bangladesh a long period of flooding similarly reduced employment opportunities Simultaneously, food prices rose and thousands starved.

Famines are therefore compatible with adequate food supplies within a country or within large regions In Ethiopia the national supply of food did not decrease. But major groups of the poor, especially the landless, were extremely vulnerable to a sudden reduction in their earnings In such cases, and particularly if prices rise suddenly, these are the people who starve.

8 Conclusions

Continuing progress in agriculture is of vital importance to the developing world for several reasons:

- Close to two-thirds of the population draws its livelihood from agriculture as farmers and farm workers. These groups include the vast majority of the world's poorest people.
- Driven by population and income growth, the demand for food in the developing economies is likely to increase by at least a third over the next decade. If more rapid progress is made in raising the incomes of lower-income groups and in low-income economies, the increase could be much sharper.
- Agricultural exports accounted for 30 percent of the developing countries' total merchandise export earnings in the late 1970s. Agricultural exports are still the main category of exports for over two-thirds of these countries. Export earnings finance imports needed for faster growth, and good export performance enhances access to international capital markets.
- Finally, structural interdependence and complementarity between agriculture and other sectors suggest that weak performance in agriculture will be accompanied by weak growth elsewhere in the economy. This is most important in the low-income, predominantly rural economies, but the evidence reviewed in Chapter 5 suggests the linkages are strong over a wide range of country conditions.

Among the more vivid demonstrations is the experience of most sub-Saharan African countries in the 1970s, where poor agricultural performance contributed heavily to economy-wide deterioration.

There has been impressive progress in agriculture in developing countries over the past three decades. It has been supported by major research efforts applied to food crops in the developing world. The results of this research have already moved from laboratories and experimental plots to millions of farms in dozens of countries. New seeds, combined with irrigation water and fertilizer, have boosted yields and production of staple foods. Dubbed the Green Revolution, this progress is already widely known. It has transformed the lives and prospects of millions, and spurred new research.

For all its achievements, the Green Revolution has not yet occurred in many parts of the world. Agricultural growth has varied widely among the main regions of the developing world, among individual countries within each region, and among areas within each country. In some it has been spectacular, in others nonexistent. When the results are added up they leave no room for complacency, particularly when they are set alongside the rise in population: while agricultural output grew at just under 3 percent a year in the 1960s and 1970s, it barely kept ahead of population growth. Output per capita increased at only 0.4 percent a year. That average conceals sharp differences, because growth ranged from 1.4 percent a year in Southeast Asia and 0.6 percent a year in Latin America to little or nothing in the low-income countries. In South Asia as a whole, the growth of agricultural output just kept pace with population; in Africa, output per capita grew at 0.2 percent a year during the 1960s, but actually declined by 1.4 percent a year in the 1970s.

Agriculture and economic growth

In the middle-income countries the structural transformation from an agrarian to an industrial economy is well advanced. Agricultural progress is helping, and being helped by, growth in the rest of the economy. More and more of these countries are about to reach an important milestone—the beginning of decline in their agricultural labor force, which will usher in the prospect of more rapid increase in the productivity and incomes of their farmers. In the low-income countries, agriculture is an even bigger influence on overall economic growth, because it accounts for a much larger share of GNP. In these countries, a major challenge for the international community and national governments alike is to achieve agricultural growth rates higher than those of the population. This holds out the best hope for both reducing poverty and increasing overall economic growth.

For many years, the causes of agricultural growth were controversial and little understood. That is no longer so. Evidence and experience now support certain key propositions about the role of governments and of farmers themselves in encouraging this growth. Starting with farmers, it can confidently be said that:

- All farmers—small, medium, and large—respond to economic incentives. Far from being "tradition-bound peasants," farmers have shown that they share a rationality that far outweighs differences in their social and ecological conditions. In largely market-oriented economies such as Brazil and Kenya, as well as in centrally planned economies such as China and Hungary, farmers have responded to economic incentives. In some instances, their response exceeded the expectations of policymakers. Farmers in the irrigated areas of South Asia responded dramatically to the new incentives provided by the Green Revolution. In dryland areas of Nigeria, farmers showed that they were more aware of constraints and opportunities than the project staff who were planning new schemes for them.
- Farmers contribute to agricultural investment. All of them, even those farming only a few acres, save a substantial part of any extra income and invest it on their farms. They also use their own and their families' labor to level land, grow trees, dig ditches, and build paddy terraces—activities that create capital to produce more agricultural output in the future. In Pakistan, for example, more water for irrigation comes from privately installed tubewells than from publicly built reservoirs.
- Small farmers can be highly productive. Typically, they produce more from each acre than large farmers do, despite the often considerable disadvantages of their limited access to services, markets, and production inputs such as fertilizer. Programs and policies dealing with these problems thus offer substantial economic benefits, as well as increase employment and incomes among the poor.

Given incentives and the means to take advantage of them, therefore, farmers will expand output. That does not mean that governments and other official agencies should confine themselves solely to fixing those incentives. There are several things that farmers cannot do on their own and that therefore require public action:

- Research and technology need to be developed and adapted to local conditions. The lack of technological improvements suitable for African conditions is a main reason for Africa's poor performance so far.
- Rural development programs have helped overcome obstacles to increased agricultural output and have also benefited the poor. However, rural projects need to minimize their demands on scarce administrative and managerial skills in developing countries. The most effective projects are likely to be simply designed, and to involve local farmers in their conception and execution.
- Major investments in irrigation, transport, and marketing networks are needed.
- Where little agricultural progress has been made, it is sometimes because of an adverse agrarian structure inherited from the past. Northeast Brazil is only one area where landless laborers and small farmers are underemployed, while extensive tracts of land are underutilized on large farms. In several countries, land reform has played a valuable role in raising agricultural output. In all countries, security of tenure is important—without this farmers are reluctant to improve the land and to husband its long-term fertility.

Government intervention in marketing and input supply may be essential at the early stages of development, but it has frequently been counterproductive when allowed to monopolize these functions. Experience suggests that in mixed economies, the private sector can usually be encouraged to take on a major part of these activities, with government primarily exercising a regulatory role.

Policy priorities

The past therefore provides a clear guide for the future: the constraints on agricultural growth do not lie in the behavior of farmers, they are not unwilling to work hard, to adopt profitable innovations, or to invest for the future. Instead, the constraints are to be found in the environment in which farmers operate: the technology available to them, their access to land, the incentives for production and investment, the availability and price of materials such as fertilizer, the provision of irrigation, and possibilities for marketing their output. This section reviews some of the main policy issues in these areas

Technology

Government-supported agricultural research in the industrial countries began in the middle of the nineteenth century. By contrast, systematic research on food crops in the developing world began only during the past three decades. Apart from China, whose research work was indigenous, developing countries have relied on a mixture of international and local efforts. That will continue to be the case. An appropriate strategy involves strengthening and expanding the present network of international research centers to cover more crops and more ecological conditions. The smallest and poorest countries—those with least capacity to conduct agricultural research—are most dependent on the international research effort. In all developing countries, national research needs to expand considerably. Its emphasis will be on adapting new varieties to local conditions and increasing their immunity to diseases and insects.

Many countries, especially in Africa, still lack effective research institutes on the scale they need. Remedying this will require assistance from both multilateral and bilateral donors. In addition, it is imperative that donor countries expand their support for the Consultative Group for International Agricultural Research (CGIAR). The CGIAR's progress has recently been slowed down by the unwillingness of donors to increase their contributions

Incentives to producers

It is primarily the responsibility of governments to ensure that the prices of agricultural products and supplies are not distorted in a way that inhibits the growth of output and incomes. This is not to say that agriculture should not be taxed or that its supplies should be subsidized—quite the contrary. In low-income countries, especially, agriculture provides the main tax base. Farmers must therefore contribute to help finance many government activities—not least the investments in infrastructure and irrigation from which they themselves benefit. For commodities such as tea, coffee, and cocoa—which are produced mainly for export, and for which demand is more sensitive to quality than to price—it makes sound economic sense for governments to impose export taxes.

Thus the issue is not whether to tax agriculture, but how and how much. There are no fixed and simple answers to this question, although experience and research is starting to provide some guidelines on appropriate levels and forms of agricultural taxation. For example, export taxes on tropical beverages have clearly been set too high in a number of African countries, where production has stagnated or even declined, and market shares have been lost to other exporters.

Frequently, it is macroeconomic policies, rather than those that apply narrowly to agriculture, that give rise to inadequate incentives. A common failing is overvalued exchange rates, which reduce the prices that farmers receive for exported crops and, at the same time, make it cheaper to import agricultural products. The exchange rates thus exert pervasive downward pressure on the prices received by farmers. Bringing exchange rates into line with actual conditions in markets is critical for appropriate agricultural pricing

Though they can influence or determine domestic prices, governments of developing countries have little or no control over international prices. Too often these are set artificially low because of the extra output produced by subsidized farmers behind protective barriers in industrial countries. Too often, also, prices fluctuate more than would be expected from supply and demand shifts, because an excessive share of market adjustment is forced on the international market by national policies which insulate domestic markets from it. Removing such distortions would increase the incentives to farmers in developing countries. It would also stimulate more rapid overall economic growth, because so many developing countries still depend heavily on agricultural exports.

As to the prices of agricultural inputs, the bulk of experience cautions against subsidies. Subsidized fertilizer prices may well encourage farmers to adopt fertilizer-using cultivation methods more rapidly than they would otherwise, but that is not a sufficient reason for subsidies. New practices that offer high economic returns are rapidly adopted by farmers, even without subsidies. And once instituted, subsidies are politically difficult to lower or remove. Credit also is often subsidized, in some instances at negative real interest rates. Such a policy may stimulate investment in agriculture, but it is all too often of the wrong kind: subsidized interest rates lower the effective cost of capital goods and lead to labor-displacing investments that are not warranted where labor is plentiful and capital scarce. In any case, subsidized credit seldom reaches small farmers, since it is generally preempted by the larger and more influential ones

Agricultural investment

Continued agricultural progress depends in part on additional public sector investment in agricultural development programs. Their economic returns are high, though they could still be increased. For example, there is considerable evidence that water is wasted because irrigation schemes are badly designed and poorly managed. These weaknesses were discussed in Chapter 6, putting them right is largely the responsibility of national governments.

New transport facilities that reach down to the village level open new markets to farmers and give them access to modern inputs at lower costs. Improved transport has a direct effect: it increases the farm-gate prices of crops and reduces those of inputs because transport costs are reduced. It also has an indirect effect: more traders visit accessible villages than remote ones; thus the influence of local monopolies is reduced and farmers' prices are improved.

Transport infrastructure can be constructed and maintained in a variety of ways. Some require large infusions of expensive foreign equipment, others utilize abundant local labor. China is noted for its success in mobilizing local labor for creating rural public works, but lesser-known, efficient examples come from such diverse cultures as Indonesia, India, the Republic of Korea, and Sri Lanka.

While many countries have proclaimed agriculture and rural development to be the cornerstone of national development plans, it is striking that most developing countries have allocated only about 5 to 10 percent of their government budgets to agriculture in recent years. Even sub-Saharan African countries mostly fall in this range, in spite of the importance of agriculture in their economies. In these countries, however, larger expenditures on education have been necessary to make up for the past and to keep pace with the rapid growth in the number of children.

Little analysis has been done of the aggregate economic returns to government expenditures in agriculture. Project experience indicates, however, that returns to agriculture are, by and large, as high as in other sectors. In some countries, indeed, they are substantially higher. It is hard to avoid the conclusion that the relative priorities of the different sectors need to be reconsidered in low-income countries, if their growth in agricultural output is to be improved.

Industrial countries also have a big contribution to make to agricultural investment in developing countries. In real terms, official assistance to agriculture more than doubled from 1973 to 1978, when it reached about $10.4 billion (in 1979 prices). Since then, it has declined to slightly below $10 billion in 1979 and 1980. Donor governments are conscious that their public spending options are limited. Aid to their domestic agriculture, however, is typically eight- to tenfold greater than their agricultural development assistance.

Prospects

The coming increase in demand for food has profound implications that go well beyond agriculture itself. Currently only about 8 percent of the food eaten in developing countries, and 9 percent of all agricultural products available in those countries, is supplied by imports. Few countries could see these ratios increase rapidly without encountering severe balance of payments problems. To meet the growth in demand for food, they will need to supply the bulk of it themselves

Whether they can meet this challenge is a critical question for the future of hundreds of millions of people. If the past is any guide, policy improvements could achieve dramatic results. The rise in agricultural output over the past two decades has confounded the predictions of widespread famine which were common in the 1950s and 1960s. It has also disproved the Malthusian notion that agricultural growth is subject to iron laws beyond the control of people. If agricultural technologies can be improved, additional resources mobilized, and appropriate policies adopted in industrial and developing countries, then faster agricultural growth will be achieved. Economic development, particularly of the poorer countries, will speed up. And poverty will be reduced.

Bibliographical note

This Report has drawn on a wide range of World Bank work as well as on external research. Selected sources used in each chapter are briefly noted below, and then listed alphabetically by author. The World Bank sources include sector policy papers, ongoing economic analysis and research, and project sector and economic work on individual countries. In addition, a set of background papers is commissioned for each Report; their primary purpose is to synthesize the relevant literature and Bank work. (Thus the sources cited in these papers are not listed separately.) Many of the background papers are issued as World Bank Staff Working Papers, which are available from the Bank's Publications Unit. The views they express are not, however, necessarily those of the World Bank or of this Report.

Selected sources, by chapter

Chapters 2, 3, and 4

These chapters reflect in large part an updating of the extensive discussion of the international economy of last year's *World Development Report*. Thus, many of the references cited there are also relevant for this year's analysis. Chapters 2 and 3 draw heavily on the Bank's data files and on published statistics from other official agencies including the IMF, OECD, GATT, and United Nations organizations. Work on the transitional state of the world economy by Hardy and Kharas complements the detailed analysis in last year's Report. The international product comparisons by Kravis, Heston, and Summers are used in the analysis of the changing pattern of global economic activity. Work done for the 1980 *World Development Report* is the basis for the discussion of human resource development and long-term growth. Prospects for the 1980s build on component analyses by Swamy (remittances), Frank, Havrylyshyn, and Hughes and Waelbroeck (trade) and on modeling work following Cheetham and others and Waelbroeck and associates.

Chapter 5

The analysis of recent agricultural growth is based on country food and agricultural production data provided by the Food and Agriculture Organization of the UN (FAO)—*FAO Production Yearbooks*, *Agriculture: Toward 2000*, and background data developed for these studies—and on World Bank data for total and sectoral GDP growth rates. Tables 5.1 and 6.1 are derived from these sources, with country data arranged to conform to World Bank regional groupings.

The close parallelism between sectoral growth rates in agriculture, industry, and total GDP emerges from an analysis of individual country performance during 1960–80 for all developing countries for which adequate data were available. The analysis of the changing role of agriculture in development—the growth of output, the changing pattern of production and consumption, and the relative decline of the sector in employment and income—is based on country experience during those two decades, earlier development experience (Lewis, Rostow, Kuznets, Bairoch, and Hayami and Ruttan), and studies of structural transformation (Chenery, Clark, Kuznets, and Johnson and Kilby). The development of agricultural trade, particularly the emergence of new markets for developing-country agricultural exports in planned economies and the oil-exporting countries, is based on GATT and FAO trade tapes, World Bank data, and Kharas.

The costs of agricultural support and protection were derived from national sources of the countries and country groups cited; for example, the Commission of the European Communities and US Departments of Agriculture and Commerce. The adjusted nominal protection coefficients in Box 5.3 are derived from World Bank studies of nominal protection coefficients, adjusted by the World Bank's estimated equilibrium exchange rate for each country.

Chapter 6

The World Bank has financed some 800 agricultural and rural development projects in 70 countries. The discussion in Chapter 6 represents a synthesis of the Bank's extensive development experience. Although most of the background material is unpublished, the Bank's Sector Policy Papers dealing with agriculture and rural development and the Proceedings from the Agricultural Sector Symposia give broad overviews of most of the topics dealt with in the chapter.

The delineation of crop zones is based on work initially carried out by IFPRI for a limited number of countries. The coverage was extended to all developing countries primarily with the use of the FAO's Report on the *Agro-Ecological Zones Project*.

The annual reports of CGIAR and the various international research centers, the World Bank's Policy Paper on Agricultural Research, and the working paper edited by Carruthers give an up-to-date picture of agricultural research in developing countries.

Barker and others review the evolution of irrigation in Asia, and Bottrall evaluates the performance of selected irrigation projects from all parts of the developing world. Benor and Harrison give an overview of the principles of agricultural extension with special emphasis on the Training and Visit System.

Chapter 7

Like Chapter 6, this chapter derives far more from Bank operational experience than from published research. The enumeration of the world's rural poor builds on the work of the 1980 *World Development Report*, incorporating, for the first time, estimates on Asian centrally planned economies, based mainly on the Bank's economic work in China.

Material on small-farmer strategies and on agrarian reform stems preponderantly from Bank operational experience, supplemented by Bank-sponsored research in Northeast Brazil (Kutcher and Scandizzo) and worldwide (Berry and Cline). Rural public works discussions are drawn from Burki and others, and the discussion on mobility, from Lipton, Lloyd, Perlman, and Mohan. Important contributions on the landless and rural nonfarm employment were made by Singh, Binswanger, Kifle, Anderson and Leiserson, Chuta and Liedholm, and associated Michigan State University studies. The box on the Maharashtra Employment Guarantee Scheme is based on work by Raj Krishna.

Excellent overviews on nutritional problems and the role of food subsidy programs are found in World Food Council Reports, Reutlinger and Selowsky, Davis, Rogers and others, and Berg. Information on specific subsidy programs is drawn also from numerous economic studies, including those of the Bank, and Scobie; Taylor, Horton, and Raff, Kumar; George, Gavan and Chandrasekara, Isenman (Sri Lanka); Levinson; and Karim and Levinson.

Understanding of causes of famine and local food insecurity draws on Sen, Dando, and Franke. Discussion of programs to alleviate these problems draws on Clay and others, Valdez, Currey, and reports of the World Food Program and FAO.

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Summary. – In light of the adverse conditions in the current international economic environment, this paper reassesses the feasibility of continuing to rely on manufacturing export-led growth as the major development dynamic for most LDCs during the next decade. This paper argues that after the initial stages of industrial development, the emphasis in policy toward agriculture should shift from surplus extraction to surplus creation and to the generation of demand linkages with the rest of the economy. The author compares the relative merits of two alternative open development strategies – export-led industrialization and agricultural-demand-led industrialization (ADLI) – by means of several simulation experiments The experiments are performed with a computable general equilibrium model of a small, low-income, semi-industrial, open economy which is a stylization of South Korea of 1963. They are carried out in an international environment assumed to represent the next decade based on a rate of growth of international demand for imports of about half the 1960–73 rate. The results support the ADLI approach on all counts.

1. INTRODUCTION

Developing countries are currently at a crossroad They are simultaneously facing major short-term adjustment problems to critical foreign exchange shortages and the prospects of a continuation of a less favourable international environment in which to carry out these adjustments

The present plight of the developing countries is the result of both adverse changes in the external environment since 1973 and the policy choices made by the developing countries themselves The two global recessions in the Organization for Economic Cooperation and Development (OECD) countries during the 1970s and the early 1980s induced a slowdown in the volume of world trade which had depressing effects on the prices and export volumes of non-oil developing country exports It lowered the ability of developing countries to import because of both volume and terms of trade effects

Despite these adverse conditions in the international environment, developing countries chose to continue placing primary emphasis on rapid industrialization The implementation of their commitment to this goal required increasing capital goods, technology and food imports from the OECD countries, and the financing of these imports not only from exports but also by increasing external debts and decumulating reserves. As a result, in 1982 the debt-service obligations amounted to 21% of the exports of the average less-developed country (LDC) and were a crushing 53% of exports of Latin America. Reserves of foreign currency for the average LDC stood at a little above three months of imports

The results of the second oil-shock recession hit developing countries particularly hard Between 1980 and 1982, total merchandise LDC exports fell by −0 5%; the average annual rate of growth of manufacturing exports fell from 12.4% in the previous seven years to 4.1%; protectionist sentiment and protectionist legislation were introduced in the OECD countries, thus leading to lower import elasticities out of stagnant incomes; and the access of LDCs to commercial credit to support exports was severely decreased.

These developments, combined with the need to revise downward projections for the growth in world demand for non-fuel merchandise exports from LDCs, call for a reassessment of the feasibility of continuing to rely on manufacturing export-led growth as the major development dynamic for most

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LDCs during the next decade. Most LDCs which are not already newly industrialized countries (NICs) with established export markets are unlikely to be able to break into international markets for non-traditional exports in the next decade. For them, the need to search for an alternative strategy is acute.

In searching for alternative strategies, one should distinguish between an open-development strategy, in which trade is an element of growth, and an export-led strategy in which trade is the major source of growth. The major argument of this paper is that export-led growth is not the only potentially promising open development strategy. A reallocation of investment resources within the economies of LDCs in favour of an open development strategy which is agriculturally driven rather than export driven can lead to superior results under the economic conditions of the coming decade.

Pro-agricultural strategies have usually been associated with self-sufficiency and closed-economy ideologies It should be emphasized that this is not the ideology underlying the present proposal. This is not an argument for a closed development strategy. The last 30 years of development experience have clearly demonstrated the inferiority of import substitution strategies. It is rather a call for a shift in sectoral emphasis for public investment toward agriculture while maintaining or even, if necessary, switching to an open development strategy.

The development strategy advocated in this paper consists of a public investment programme designed to induce a progressive downward shift in the supply curve of the domestic agricultural sector. The argument in favour of this strategy rests both on its linkage effects, in creating a domestic mass market for industrial products through intermediate and final demand linkages, and on its distributional impact, through increasing the supply of wage goods and the incomes of the poorer members of society. The proposed strategy is simultaneously a growth programme, an employment programme since agriculture is considerably more labour intensive than even labour-intensive manufacturing, a basic needs, food security and income distribution programme, and an industrialization programme. It also constitutes a foreign-exchange-saving programme by reducing the need for food imports which, in the 1970s, have accounted for an average of 13% of total LDC imports Finally, the proposed strategy is also a risk-reducing programme since some of the investments required for its implementation (e g. investments in water control and pesticides) reduce weather dependence and environmentally induced fluctuations in agricultural yields and since the strategy substitutes a development dynamic based on the more controllable increases in domestic demand for the less controllable increases in world demand.

Discussions concerning the relative ment of agricultural versus industrial development strategies are not new. They were central to the controversy concerning balanced vs unbalanced growth They were also reflected in the debates surrounding the early five-year plans of India (Mellor, 1976, 1968) and the Soviet Union (Domar, 1957). In the main, the wrong views favouring emphasis on capital-intensive import-substitution industrialization prevailed, fueled by export, primary terms of trade and domestic linkage pessimism. The results were highly dualistic development patterns, slow GNP growth, serious balance-of-payments problems, high capital-output and capital-labour ratios, slow growth in food production and in employment, and deteriorating distributions of income. The response, once these failures became apparent, was to urge a shift by LDCs toward industrial export-led growth and toward 'basic needs' oriented strategies. The adoption of the export-led strategies during the high world-demand growth era of the mid-1960s led to success in GNP growth, in labour absorption, and in industrialization But it was also accompanied by increasing international indebtedness and by rapidly rising food imports As a result, the debate is now starting anew, fueled in part by renewed export pessimism, by increased awareness of the vulnerability to shocks arising from export markets, and by the serious liquidity and foreign-exchange constraints faced by LDCs A body of economists (Streeten, 1982, Mellor, 1976; Singer, 1979, Hirshman, 1981; de Janvry, 1984) is urging the adoption of agrarian, wage-goods strategies

In analysing the prospects for attaining the Lima target, which stipulated that industrial production in developing countries should rise from 7% of 1975 world industrial production to 25% by the year 2000, Hans Singer (1979, p. 27) came to the conclusion that an export-led strategy was unlikely to accomplish this goal Instead, he advocated an alternative approach which he called (not surprisingly) a balanced-growth approach and which I shall call an agricultural-demand-led-industrialization (ADLI) programme He described this strategy as one of basing 'national development on

agriculture as the primary sector and developing industries with strong emphasis on agriculture-industry linkages and interactions'. Paradoxically, the ADLI strategy would stress the raising of agricultural productivity, especially that of medium-scale farmers, as a means of achieving industrialization. It would accomplish the industrialization goal by expanding internal demand for intermediate and consumer goods produced by domestic industry. In arguing for this approach, Singer (1979, p. 27) emphasized the linkage effects of agriculture by writing:

> This is a hopeful approach for a number of reasons. A prosperous farming sector would require a large volume of inputs from the industrial sector: fertilizer, insecticides, weed-killers, water pumps, agricultural tools and equipment of all kinds ranging from hoes and ploughs to trucks and tractors. Much of the increased agricultural production would require industrial processing, or provide the basis for new resource based industries. The development of agriculture will require a good deal of new construction, with implied demand for a wide range of construction materials and equipment. Higher agricultural incomes are spent with progressively more emphasis on industrial consumer goods. Higher incomes from the industrial expansion would in turn provide an expanding market for agriculture, especially food, with the associated multiplier and feedback effects within the agricultural sector itself.

That agriculture can have important linkage effects with manufacturing has been recognized for a long time Most textbook descriptions of the role of agriculture in economic development stress four functions of agriculture; these are the provision of a surplus for investment in manufacturing, a source of labour, a source of food and a source of demand linkages What has not been recognized, however, is that the relative importance of these functions must change dynamically with the economy's development. And the conflict between agriculture as a source of surplus and agriculture as a source of demand for industrial output has not been sufficiently stressed in the non-Marxian literature (Lipton, 1977, is a notable exception).

It is the argument of the present paper that, after the very initial stages of industrial development, the emphasis in policy toward agriculture should shift from surplus extraction to surplus creation and to the generation of demand linkages with the rest of the economy.

The present paper compares the relative merits of two alternative open development strategies — export-led industrialization and ADLI — by means of several simulation experiments The experiments are carried out in an international environment intended to represent the next decade during which the rate of growth of international demand for imports is likely to be about half of what it was during the 1960–73 period.

The experiments are performed with a computable general equilibrium (CGE) model of a small low-income, semi-industrial, open economy which is a stylization of South Korea of 1963. The results support the ADLI approach on all counts. In the assumed environment, the ADLI strategy generates the same rate of industrialization as does export-led growth but leads to a higher rate of labour absorption, a better distribution of income, better balance-of-payments results, less poverty, and a higher rate of growth of per capita gross national product (GNP) than export-led growth There is no single reason for the superiority of the ADLI strategy. These results are attained in part because of the greater increase in total factor productivity, in part because of the larger reduction in unemployment, in part because of the higher increase in exports, and in part because of the resource reallocation effects.

The next section describes the model and the stylized economy. The third section presents the simulation results. The paper concludes with a general discussion.

2. THE MODEL

The CGE model consists of an economy-wide, simultaneous, multisectoral model that solves endogenously not only for quantities but also for prices (for detailed descriptions of the model, see Adelman and Robinson, 1978, and Dervis, de Melo and Robinson, 1983). The version of the model used here was developed by Sherman Robinson and Jeffrey Lewis, in 1982, as part of a World Bank research project. (For a full description, see Kubo *et al.*, 1983.) The core of the model consists of the reconciliation of potential demand and supply imbalances in the factor and commodity markets by price adjustments which simulate the workings of the markets of labour, commodities and foreign exchange The technological and behavioural functions are non-linear and incorporate substitution possibilities among factors in production and among commodities in final demand Imports and domestic production in a given sector are neither perfect substitutes nor complete complements; rather, there is an elasticity of substitution among them which lies between

zero and unity. The model solves for: wages, profits, product prices and the exchange rate, sectoral production, import, export, employment, consumption and investment; the flow of funds, GNP and the balance-of-payments accounts; and for the functional and personal distributions of income.

Production technology is represented by fixed input-output coefficients for intermediate goods and CES functions for labour and capital. In the factor markets, labour demand arises from profit-maximizing behaviour of producers. The supply of labour is disaggregated by skill type. It is assumed fixed within a given period and only its sectoral allocation is allowed to vary. Farmers and service workers are immobile within each period although mobile between periods The model determines market-clearing wages for skilled workers and their sectoral allocation; unskilled wages are fixed, and unemployment is allowed to develop. The existence of such unemployment is not critical to the results, as will be apparent from the sources of growth decomposition given later.

The demand for commodities is responsive to relative price and income variations. The price responsiveness arises both because of the use of LES consumption functions and because of the trade specification which induces price-sensitive substitution among imports and domestic production The incomes of consumers are determined in the factor markets after subtracting taxes. The demand for commodities by sector is determined from these incomes (given the household savings propensities) and from the government consumption function. Relative prices that clear commodity markets are then solved so as to equate demand and supply. The wholesale price level is taken as numeraire and maintained at unity to set the level of absolute prices. The balance of trade determines the net demand for foreign exchange. The exchange rate adjusts so as to maintain a predetermined level of foreign capital inflow in the base run. In the experiments, the exchange rate was fixed to the initial period value, and foreign capital inflow was allowed to adjust. The latter specification was adopted for the experiments in order not to allow a progressive overvaluation of the exchange rate (which characterized the base run) to bias incentives against exports in these experiments

Several macro-closure rules are possible for the model. The one chosen for the ADLI experiment forces investment to adjust directly to the enlarged or diminished supply of domestic plus foreign savings. This closure rule gives maximum intermediate-run sensitivity to balance-of-payments fluctuations arising in international markets. It also makes investment maximally sensitive to the domestic savings rates of households and to changes in the domestic distribution of income Since anticipated drops in domestic savings rates when the functional distribution of income shifts in favour of farmers have been used to argue against agricultural strategies, the closure rule adopted for the present experiments allows a conservative evaluation of the ADLI strategy by biasing the experimental results against it on this count.

3. SIMULATION RESULTS

In 1963, Korea was in a 'pre-takeoff' stage It was a very poor country, whose per capita income was around $80 (1963 dollars), converted at the official (overvalued) exchange rate. It was an open economy with a very large trade deficit, exports were 6% of GDP, and the trade deficit accounted for 16% of GDP. About half of its labour force was employed in agriculture, 30% in manufacturing, and the rest in services It was a consistent food-deficit country, its cereal imports accounted for about a quarter of its total consumption. Thus, the Korea of our study is a poor, open, negative balance of trade, large food-deficit country typical of a large class of low-income LDCs.

Table 1 summarizes the results of the simulation experiments The actual, high-world-demand evolution of the economy is summarized as Experiment I. To derive the counterfactual base run, II, the rate of growth of world demand was cut in half; and the price elasticity of world demand was increased by 20% to simulate increased competition The export demand specification used in both runs I and II assumed a logistic demand curve for exports with an inflection point which shifted over time but at a slower rate in Experiment II than in Experiment I. The results were to decrease the rate of growth of per capita GNP by 15% while cutting the rate of growth of exports by 60% and the rate of growth of manufacturing by 30% The structure of production and of exports became more agriculture-oriented indicating that, under lower rates of growth of world demand, the comparative advantage of agriculture rises — a fact consistent with the proposed strategy Foreign capital inflow rose by 30%, and the exchange rate fell by 35%. Urban unemployment rose from 0 to 14%, but the distribution

improved very slightly as the incomes of the fourth to ninth deciles fell by less than did the incomes of the richest and the poorest.

The export-led growth strategy was simulated by giving 60% export subsidies to exporting sectors In addition, the bias against exports in the low-world-demand base run was removed by a combination of abolishing tariffs and a 10% devaluation Finally, to simulate the productivity-improving effects of exporting which arise from economies of scale and learning, the rate of growth of total factor productivity in the exporting sectors was increased by 50% (from between 1.3 and 2.4% annually to between 1.8 and 3.6%). This strategy increased the rate of export growth by 45% while increasing import growth by only 38%. Nevertheless, the foreign capital inflow increased slightly. Urban unemployment was reduced from 14 to 8%, the rate of growth of wages increased by 80%, and the distribution of income improved substantially because agricultural terms of trade rose and farmer incomes and agricultural wages improved significantly. The rate of growth of GDP increased somewhat, in the terminal year, GDP was 2.5% higher than in the base run.

The ADLI strategy was implemented by shifting the investment structure in favour of agriculture Such a shift appears to be indicated on the basis of the rates of return to capital in the various sectors in the base run (see Table 2) While one cannot be confident about the absolute magnitudes of the rates of return in the base year because of the conceptual and measurement errors inherent in the evaluation of capital stocks, what is more significant is that both the base and the export-led growth runs indicate a rising gap between the rate of return in agriculture and the rate of return in the manufacturing export industries. Indeed, when the investment allocation is allowed to respond to deviations from the average rate of return to capital in the base run, it implements an ADLI strategy more extreme than that implemented in the current ADLI runs (see Table 2, base run II).

For the present ADLI run, the share of agricultural investment in total investment was doubled in the initial period and then gradually brought back to the base-run composition over 15 years Total investment was maintained at its export-led value throughout the ADLI experiment' The results of the comparison of the ADLI with the export-led growth experiments, therefore, indicate the return per won diverted to investment in agriculture under the ADLI experimental conditions

It was assumed that the doubling of investment in agriculture increased the rate of growth of total factor productivity in agriculture by 50% over its base-run rate of growth, from 2% annually in the first 10 years and 1.5% in the last 5 years to 3 and 2.25%, respectively. The assumed ADLI rates of growth of agricultural productivity are relatively modest and merely bring the rate of growth of productivity in agriculture in Korea up to the average for all developing countries during the 1970s.

No trade incentives were given to any sector of the economy in this run; all tariffs and subsidies were removed. In addition, the exchange rate was held fixed at its base-year value. The result is a neutral set of trade incentives as indicated by the domestic resource costs in Table 1.

To simulate the potentially negative productivity effects of not focusing primarily on the export market, the rate of growth of total factor productivity in the manufacturing export sectors was cut in half from the base run, from between 1.3 and 2.4% to between 0 6 and 1.2%. It is doubtful whether these negative effects of not pushing manufacturing exports would materialize in practice were the postulated ADLI strategy to be pursued as assumed. The negative effects on productivity associated with not exporting are usually the result of two effects not present in the current experiment. high rates of protection, which shelter domestic industries from foreign competition, and a scarcity of imported intermediates arising from foreign exchange rationing Nevertheless, this postulate allows conservative evaluation of the ADLI strategy.

To maintain the domestic agricultural terms of trade, a grain trading facility was established which buys up the excess domestic supply at a relative price of unity and then uses the excess supply both for import substitution and for exports. During the experimental conditions, no subsidies are involved in this activity since the improvements in agricultural productivity raise the domestic resource costs of agricultural exports above the domestic resource costs of imports It is, however, possible that, if all countries were to implement ADLI strategies, the world price would fall Then, in the implementation of the strategy, a balance would have to be struck between allowing the domestic agricultural terms of trade to decline (thus generating a smaller rise in farmer incomes) and the magnitude of the implicit subsidy. Since, with the ADLI strategy, farmer incomes rise by 60% over the base (and by 33% over the export-led strategy),

Table 1. *Experiment results*

Terminal year (1978)	High demand	Low demand base	Export promotion (low demand)	ADLI (low demand)
Real gross domestic product*	2706	2305	2397	2666
Merchandise exports*	775	162	208	387
Merchandise imports*	457	392	473	242
Foreign capital inflow*	310	230	248	−120
Domestic savings ratio (%)	19	16	16	16
Foreign savings total (%)	−64	60	38	−30
Gross domestic product ICOR	2.9	3 1	2.6	2 2
Agricultural terms of trade	0.91	0 89	1.05	1 00
International terms of trade	85	85	85	85
Exchange rate†	0 130	0.141	0.120	0 130
Domestic resource costs				
Exports	0.118	0.119	0.122	0 124
Imports	0.146	0 165	0.122	0 124
Tariffs*	92	78	0	0
Subsidies*	0	0	95	0
Total unemployment (%)	0	7.0	4 0	3 0
Structure of value-added (%)				
Primary	29	32	34	44
Consumer manufacturing	19	10	9	11
Producer manufacturing	17	14	18	16
Infrastructure	8	9	9	7
Services	27	35	30	22
Structure of exports (%)				
Primary	1	28	11	83
Consumer manufacturing	80	42	53	9
Intermediate manufacturing	15	25	30	7
Capital goods	4	5	6	1
Share of exports in domestic production (%)				
Primary	3 6	2.6	1.9	6 6
Consumer manufacturing	3.1	3 6	7.5	3 4
Producer manufacturing	1 5	4.2	7.9	3 9
Infrastructure	4 6	4.4	3.4	5 5
Services	6.6	3 6	2 7	3 8
Total share of exports	15.2	3 5	5.0	4 8
Structure of imports (%)				
Primary	20	22	27	1
Consumer manufacturing	10	8	7	10
Intermediate manufacturing	42	42	41	54
Capital goods	28	28	25	35
Growth rates to terminal year (annual %)				
Real gross domestic product	5.8	4 7	5 0	5 7
Agriculture	4 0	3.4	3 5	5 5
Manufacturing	9.1	6 6	7.6	5.3
Construction	6 1	5.2	5 1	4 8
Social overhead	4.7	4 6	4.8	8 3
Services	4 7	4.3	4.4	4 7
Private consumption	3.9	4.7	5.2	5.2
Investment	7.2	6 0	6 0	6 0
Exports	18 0	5 5	8 0	15 5
Imports	7 0	5.3	7.3	5 0

Table 1 (*cont*)

Terminal year (1978)	High demand	Low demand base	Export promotion (low demand)	ADLI (low demand)
Primary	2.4	2.5	2.6	2.8
Consumer manufacturing	4.3	−0.1	−0.1	0.9
Producer manufacturing	7 0	5.1	6.3	5 2
Infrastructure	1 0	1.4	1 2	2.1
Services	3.0	3.0	3 0	2.8
Primary	0 3	−0 1	0.9	2 0
Manufacturing	4 0	4.0	5.0	5 0
Services	2.5	3.5	4 5	2 0
Distribution, terminal year real per capita incomes‡				
Farmers	12	12	13	17
Marginal labour	31	25	27	29
Organized labour	68	44	53	53
Service labour	35	40	38	32
Industrial capital	249	169	194	72
Service capital	78	80	85	52
GINI§	0.487	0 507	0.497	0.415
Share of income (%)				
Bottom 40%	11.9	10 9	11.5	14 8
Next 40%	35 6	34.0	34 1	38 5
Next 20%	52 5	55.1	54 4	46 7
Top 10%	22.3	38 5	38 2	20.1
Mean income of bottom 40%§	12 4	13.1	14.9	18 5
Ratio of top 10% to bottom 40	3.4	3.5	3 2	2.1
Ratio of bottom 40% to mean income	0 54	0.54	0 57	0.59

*In 100,000 won of 1963
†In 1,000 won per US dollar.
‡In 10,000 won of 1963.
§Calculated assuming log normality.

there is plenty of scope for a decline in the terms of trade while still allowing farmer incomes to increase and the linkage effects through industrial demand to materialize.

The results of the ADLI strategy are portrayed in column IV of Table 1. The growth rate of the GNP increases by 0.7 percentage points over the base. The strategy shifts the structure of exports toward agriculture but does not result in a deindustrialization of the economy indicating that the linkage effects of the ADLI strategy through increased consumer and intermediate demand of farmers are working. Exports increase substantially while imports fall leading to a dramatic improvement in the level of foreign capital inflow. Indeed, by the last period, there is a large balance-of-trade surplus Unemployment falls to 6%. The rate of growth of average wages is 26% less than in the export-promotion strategy, despite a dramatic increase in the rate of growth of agricultural wages and unchanged rate of growth of wages in manufacturing, primarily because of a fall in the rate of growth of wages in services The distribution of income becomes significantly more equal because farmers are a very large percentage of the poverty population and their incomes rise by 30%

The results of the ADLI strategy can be analysed in several ways. the sources of growth, the sources of industrial demand, and the sources of improvement in the distribution of income We have just discussed the sources of the improvement in the distribution of income. The source of industrial growth must be found in increases in domestic demand since industrial value added is 18% higher in ADLI

Table 2. *Real rates of return on capital and investment shares*

Real rates of return on capital	1963 level	High demand	Low demand, base I	Low demand, base II (%)	Export led	ADLI
Annual growth rate, 1963-78						
Primary	40 5	0 21	0 62	−0.53	1.43	1 97
Food processing	32.3	−1 52	−2 08	−3.0	−1.64	−0 11
Consumer manufacturing	33 8	−1.16	−4 51	−6 8	−5 03	−2 9
Intermediate goods	33 6	3 35	2 54	−0 30	3 79	3 2
Capital goods	33.7	−0 26	−1 54	−3 0	−0.19	−0.82
Construction	33 4	0.19	0.41	−0.30	0 40	0 89
Social overhead	4 5	−1.31	−0.01	4.17	0.21	−7.51
Services	10 5	1 27	3 60	7 23	3 94	2 69
Average	20 5	0.15	0 43	1.70	1 02	1 41
Investment share, 1963						
Primary	13.0	13.0	13 0	13 0	13.0	26 0
Food processing	2 25	2 25	2 25	2 25	2 25	2.25
Consumer manufacturing	14 85	14.85	14 85	14 85	14 85	12 85
Intermediate goods	6.70	6 70	6 70	6 70	6 70	6 70
Capital goods	3 50	3.50	3.50	3 50	3 50	3 50
Construction	1.70	1.70	1.70	1.70	1.70	1.70
Social overhead	26.0	26.0	26 0	26 0	26 0	22.10
Services	32 0	32 0	32 0	32 0	32 0	25 00
Growth rate of investment share, 1963-78						
Primary	*	0	0	8 0	0	−1 52
Food processing		0	0	1 41	0	0
Consumer manufacturing		0	0	0.15	0	0 97
Intermediate goods		0	0	6 0	0	0
Capital goods		0	0	2 1	0	0
Construction		0	0	4 3	0	0
Social overhead		0	0	−10.0	0	1 12
Services		0	0	−1.0	0	1 66

*Blanks indicate not applicable.

than in the base and the share of exports in manufacturing is somewhat lower. Furthermore, because the large beneficiaries of the ADLI strategy are the rural households whose income is 42% higher under the strategy while urban groups, on the average, just maintain their base period income, there is a strong presumption in favour of the supposition that it is the rural groups who give rise to the industrialization benefits of the strategy.

As to the sources of GDP growth, preliminary calculations based on individual runs changing one feature at a time suggest that the improvement in overall factor productivity accounts for 33% of the increase in the rate of growth of real GDP; the rise in exports accounts for 30%, the increase in employment accounts for 12%; and resource reallocation for the remaining 25%.

4. DISCUSSION

The ADLI strategy consists of building a domestic mass-consumption market by improving the productivity of agriculture and letting farmers share in the fruits of the improved productivity. Even though this strategy is, to some extent, motivated by a certain amount of export pessimism, the ADLI strategy is not to be viewed as an old style import-substitution strategy which operates by biasing the system of incentives in favour of domestic 'infant' industries. The ADLI strategy does not call for changing commercial incentives in favour of import substitution The relevant simulation experiment was performed with a neutral system of commercial incentives But the ADLI strategy

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is also compatible with a system of incentives biased in favour of exports.

The emphasis of the ADLI strategy should be on improving the productivity of small- and medium-scale agriculture rather than of large-scale agriculture even though the experiments did not differentiate farmers by farm size Small- and medium-scale agriculture has larger linkage effects with domestic industry than does large-scale agriculture while having at least as high a productivity level. Large farms often use capital-intensive methods, imported tractors, harvesters, etc. Smaller farms are labour-intensive and use domestic implements and machinery. On the consumption side as well, linkages between domestic consumer goods industries and prosperous middle-class farmers are stronger than with large rich farmers: small farmers have a larger marginal propensity to consume, and a larger marginal share of their consumption is devoted to locally produced textiles, clothing, and footwear and simple consumer durables such as refrigerators, bicycles, sewing machines and simple electronics. Also, they tend to invest heavily in the buildup of human capital, devoting a large share of their incremental income to education, thereby laying the foundations for increasing the future productivity of both industry and agriculture

How is the improve-the-productivity-of-agriculture strategy to be accomplished? This strategy requires improving the physical and institutional infrastructure of agriculture in order to effect shifts in the agricultural production functions In the Southeast Asian subcontinent, the primary requisite is water control Increasing irrigation, improving the management, maintenance and design of existing irrigation systems, and investing in tube wells, hand pumps and irrigation ditch maintenance could all play a role. Other partial steps toward the goal of improving agricultural productivity would include roads and terracing, selective mechanization, technological improvements, easing credit terms for the smallholder, the development of institutions for marketing and for the distribution of improved seed and fertilizer, and developing institutions for the effective dissemination of knowledge. In Korea, there is little scope for irrigation systems; and marketing, extension and credit institutions already exist There, the primary productivity-raising investments would be in terracing, transport, selective mechanization and agricultural research.

Particular attention would have to be paid to the system of incentives facing the farmers A continued stream of technological improvements can only be expected from farmers if they experience continuing improvements in their incomes. Otherwise, they will neither continue to improve productivity nor will they have the wherewithal to provide the industrial linkages which this policy aims at fostering. The appropriate dynamic incentives will not materialize if shifts in domestic terms of trade against agriculture are allowed to negate the income benefits of productivity improvement Therefore, what is required as part of the productivity-improving package is a terms-of-trade policy which allows farmers to improve their incomes while improving output. For example, if we assume an increase in agricultural productivity of 2%, price and income elasticities which are both 0 6, and no increases in income other than those that would be induced by the increases in agricultural productivity, the fall in the terms of trade required to absorb the increase in agricultural output would just negate the income effects of the increase in productivity. If either the income elasticity or the price elasticity is lower, the improvement in productivity will actually reduce the incomes of the farmers Terms of trade must, therefore, be fixed by policy so that the ultimate fall in agricultural prices, taking both price and income effects into account, will be less than the rate of increase in agricultural productivity. Otherwise, the necessary income effects in the farm sector will not materialize, and the ADLI strategy will not be put into effect. The terms of trade policy can, of course, be implemented indirectly through international trade rather than through price controls and subsidies. In most LDCs, an open-economy policy of letting the world market price set the internal terms of trade would suffice.

The incentive effects of the strategy will also not materialize if tenurial conditions in agriculture are sufficiently unfavourable. For example, assume a sharecropping arrangement in which the landlord gets 50% of the crop. With the price and income elasticities of the above example, a 2% increase in productivity, half of which is appropriated by the landlord, will actually reduce the income of the sharecropper by one-half of the productivity increase In this case, either tenancy arrangements or terms-of-trade policies, or both, must be adjusted to more than compensate for the adverse income effects upon the innovator-farmer. Otherwise, the ADLI strategy will turn out not to have been implemented.

There may also be a case for direct

production subsidies to agriculture. The major economic argument for a subsidy is when the social benefits exceed the private benefits. This circumstance will arise when there are pecuniary externalities and lags and institutional constraints on internalizing them. Subsidies should then be given up to the point at which the social benefits just outweigh the social costs. When the ADLI strategy is implemented in an economy with surplus or unemployed labour, the social benefits clearly outweigh the private benefits to the farmers They operate through the industrial output-multiplier of the income and intermediate demand linkages with industry. If this multiplier is about 1 4, for example, a not unreasonable value given marginal budget shares and intermediate input–output coefficients for the farm sector, subsidies up to 40% (including the indirect subsidies through terms of trade support, if any) could be justified on that ground. Of course, the social benefits must be compared with the social costs of withdrawing the resources from subsidies to or investment in industry. The ultimate socially justifiable subsidy to agriculture will, therefore, be much smaller than 40% But the case for a production subsidy when there is surplus labour cannot be ruled out a priori. Again, an appropriate balancing between sharing the sum of direct and indirect benefits of the ADLI strategy between farmers and the urban–industrial complex must be worked out.

Various pessimistic attitudes have dominated the design of development strategy. The initial implementation of import substitution strategies was born out of export pessimism and out of a desire for a more controllable development strategy. The export pessimism proved unjustified for economies that have attained certain levels of industrialization and for countries facing favourable demand conditions for their exports, and the adverse balance-of-payments effects of the import-substitution strategy led to less rather than more control over the growth path of the economy The current stress on the need for export-led growth as the major means of capitalizing on economies of scale, competition, and (more dubiously) capturing allocative efficiency is born partly out of agricultural pessimism on both the output and the savings fronts. Agricultural pessimism on the output side is, also, not warranted. During the decade of the 1970s, agricultural output rose at an average annual rate of 2 3% in low-income economies and 3% in middle-income economies. Between 1960 and 1980, agricultural output in developing countries rose by 70%. If one looks at the performance during the 1970s of those non-oil-developing countries that had maintained or improved their growth rates during the decade 1970–81 over the previous decade (Table 3), one finds that 60% of the low-income economies, 89% of the lower middle-income, and 66% of the upper middle-income economies had rates of agricultural growth which were above average for their respective groups The corresponding figures for the rate of change of export shares were 58% for low income, 40% for lower middle income and 33% for upper middle income Over the whole sample of the countries with improving rates of growth of gross domestic production (GDP), 80% had above average performance in agriculture and only 44% had above average performance in exports. For lower income, lower middle-income, and upper middle-income economies, the rank correlation coefficients between the rate of growth of GDP and agricultural output are 0.5138, 0.9317 and −0 5, respectively; and between those of GDP and the changes in export share, −0.0282, 0 9274 and 1, respectively. Thus, the rank correlation between export share growth and GDP growth is higher for only the upper middle-income countries. Furthermore, in a cross-section study of 68 LDCs for 1970–79, Hwa (1983) found that the contribution of agricultural growth to the economy's overall productivity growth (0 8%) was greater than that of export growth (0 6%).

The 1982 World Bank study of *Agriculture in Developing Countries* confirms the view of agriculture as a potentially dynamic sector The report notes that:

> . . . where prices have not been kept artificially low, and where other conditions for growth have been favourable, farmers have responded by increasing output The responsiveness of farmers to incentives – in contrast to the outmoded and mistaken view that peasants are set in traditional ways – has been observed in societies with diverse social systems and levels of development (pp. 46–47)

The World Bank also found a strong correlation between the rate of growth of agricultural output and the rate of growth of GNP during the last 20 years But, in interpreting that correlation, the World Bank sees the agricultural sector primarily as a responding sector rather than as a potentially dynamic driving force for economic growth and industrialization (Hwa, 1983, is an exception) The study says 'the parallels between agricultural and GDP

Table 3. *Selected characteristics of countries whose growth did not deteriorate during the 1970s*

Countries	Average annual growth rate* Gross domestic product 1960–70	1970–81	Agriculture (%) 1970–81	Change in the share of gross domestic product represented by exports of goods and non-factor services, 1960–81*
Low-income economies				
Bangladesh	3.7	4.2	2.4	−3
Burma	2.6	4.8	4.7	−11
Afghanistan	2.0	3.9	3.2	
Mali	3.3	4.6	4.0	6
Malawi	4.9	5.6		1
Upper Volta	3.0	3.6	1.4	4
Rwanda	2.7	5.3		0
India	3.4	3.6	1.9	2
Somalia	1.0	3.9		
China	5.2	5.5	2.8	5
Haiti	0.2	3.4	1.1	6
Benin	2.6	3.3		19
Niger	2.9	3.1	−3.0	13
Sudan	1.3	4.1	2.3	−7
Average†	4.6	4.5	2.3	2
Lower middle-income economies				
Lesotho	5.2	8.4	4.3	1
Egypt	4.3	8.1	2.9	14
Philippines	5.1	6.2	4.9	8
Morocco	4.4	5.2		−3
Cameroon	3.7	6.3	3.9	
People's Republic of the Congo	2.3	5.1	2.1	41
Dominican Republic	4.5	6.3	3.2	−6
Colombia	5.1	5.7	4.7	−4
Tunisia	4.7	7.3	4.1	22
Syrian Arab Republic	4.6	10.0	8.2	
Paraguay	4.2	8.8	7.0	−11
Average (non-oil producing)†	5.0	5.6	3.2	8
Upper middle-income economies				
Republic of Korea	8.6	9.1	3.0	36
Malaysia	6.5	7.8	5.2	−1
Algeria	4.3	6.9	3.9	3
Brazil	5.4	8.4	5.2	4
Uruguay	1.2	3.1	1.2	1
Trinidad and Tobago	4.0	5.5	−1.8	8
Average†	6.4	5.6	2.6	5

Source World Bank, *World Development Report, 1983* (Oxford, U.K.. Oxford University Press, 1983), Tables 2 and 5

*Blanks indicate no data available.

†Includes all countries in a given income group, not only those listed.

growth suggest that the factors which affect agricultural performance may be linked to economy-wide social and economic policies' (p. 44).

To bring out the dynamic potential of agricultural expansion-induced industrialization, one should note that if, for example, agriculture is 50% of GNP and manufacturing is 25% and if the industrial-demand multiplier of income originating in agriculture is 1.4,[1] a 3% rate of growth of agricultural incomes would generate demand linkages that would permit an 8.4% rate of growth of industrial output.[2]

The input–output based decomposition calculations of sources of growth started by Chenery and various collaborators in the 1960s lend support to the view that internal demand

changes are an important source of growth. In analysing the sources of industrial growth in Japan from 1914–65, Chenery and Watanabe (1976) found that demand effects accounted for 58%, trade effects for 15%, and technological change for 26% of the growth During this period, Japanese industrial production rose from 17% of GNP to 47%, GNP increased by a factor of 28, and industrial production increased by a factor of 50. The importance of domestic demand effects in generating growth has been confirmed by subsequent studies. Nishimizu and Robinson (1983) analysed the sources of growth from the early 1950s to the early 1970s in South Korea, Turkey, Yugoslavia, and Japan and found that increases in domestic demand accounted for between 63 and 95% of GDP growth while export expansion accounted for between 6 and 38%.

It should be emphasized that the ADLI strategy is not suggested as a strategy for all time and for all places The strategy should be considered primarily by countries which, during a given period, are not anticipating a sufficiently rapidly expanding growth in world demand for their non-traditional exports. Furthermore, the ADLI strategy would appear most promising for countries with potentially large domestic markets and in which there already exists an industrial base with an established supply responsiveness. In practice, this means most middle-income and large low-income countries which are not already NICs with proven export potential.

It may be appropriate to speculate on the political conjuncture which would be favourable to the implementation of the ADLI strategies. Assuming rational self-interest, a comparison of the differences between the functional distributions of income under the export-led and the ADLI strategies in the terminal year should provide a clue. The gainers from the strategy are, in order: farmers (30% higher income under ADLI), and marginal labour (7% income improvement). The losers are: industrial capitalists (63% lower income), service capital (39% less income) and service labour (16% lower income). Thus, an agrarian landlord- and/or farmer-dominated political scene would strongly favour the ADLI strategy. However, the coalition supporting the ADLI strategy could also include some urban workers as well as those industrial interests producing investment and intermediate goods for agriculture and the producers of industrial wage goods for domestic consumption. The opposition would come mainly from industrial capitalists producing industrial export goods inappropriate for domestic consumption and luxury goods and services purchased by high-income urban consumers

The ADLI strategy is recommended primarily as a strategy for the 1980s and early 1990s to allow time for implementing the structural changes which must be introduced in industrial countries Technological change, the growth of the NICs and differential rates of adoption of industrial innovations during the 1960s and 1970s in the various OECD countries have vastly altered the comparative advantage of the industrial countries The OECD countries must adapt to their altered patterns of comparative advantage If the OECD countries succeed in making the appropriate structural changes through industrial policies aimed at creating economic conditions propitious for the expansion of industrial 'winners' rather than by protecting 'losers', the appropriate industrialization strategy for the LDCs in the latter part of the 1990s may well again become one of export-led growth.

Meanwhile, it is important to point out that potentially productive alternatives to export-led growth and export-led industrialization exist, that these alternatives do not consist solely of import substitution, and that the arsenal of policy options currently open to developing countries for adjusting to their current crisis can profitably be enlarged by adding the option of agricultural-demand-led industrialization

NOTES

1. This multiplier is based on the marginal budget share of industrial goods in the expenditures of farmers. It assumes supply responsiveness in the industrial sector.

2. A 3% growth of agricultural income generates a 3 × 1.4 = 4.2% increase in expenditures for industrial products. In an economy in which agricultural output is $50, this means an increase in industrial demand of $2.1 which, when applied to an industrial sector of $25, translates to a growth rate of 8.4% for the latter sector.

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ECONOMIC GROWTH IN THE THIRD WORLD, 1850–1980

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The Functions of Government

In the long tradition of political economy, economists have always taken account of government actions. But the tone of the discussion has changed over the years. In the eighteenth and early nineteenth centuries, government was the enemy. The problem was to liberate private production and exchange from the stranglehold of government controls. This emancipation of the market was in large measure accomplished, and most economists thought that it contributed to acceleration of growth in the now "developed" countries. Even Marx looked to capitalism to transform heavily agricultural economies into modern industrial states. Socialism would arrive only after capitalism had developed a powerful engine of production.

Even after free-market economies were in place, government was of course always in the background. It was expected to protect life and property and to establish a legal framework for economic activity. It usually went ahead pragmatically to encourage development of railroads and other infrastructure. It provided national defense, plus a growing amount of education and other public services, financing these activities by a tax system. These minimal functions of government continue in today's developing countries, and we shall largely take them for granted.

In the late nineteenth century government began to reemerge as a more prominent economic actor. The spread of socialist ideas, the gradual extension of the suffrage, a growing popular belief that economic performance was somehow the responsibility of government, all contributed to this trend. The expansion of government functions took several forms: use of taxation and public expenditure to redistribute income; some expansion of public ownership of industry; an increase in the number of wages and prices subjected to public control; a retreat from the high point of free trade around 1870 and a partial return to mercantilist policies; acceptance of government responsibility for the general level of output and employment after the debacle of the Great Depression.

This trend toward creeping interventionism of the state in economic affairs was considerably accelerated by the two world wars. War is the great socializer. Nations discovered that the private economy could be subjected to detailed public

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control. They discovered also that the tax system could yield revenues much in excess of previous expectations and, as military demands abated, these revenues left room for increased government spending in other directions. In most countries (except for the United States, Canada, and Japan) socialist parties began to alternate in office with conservative parties; and although government functions were sometimes cut back a bit by conservative regimes, the expansionist trend continued.

These changes in the older industrial countries set the stage for economic policy in third-world countries after 1945. In most countries it was accepted with little debate that government is the main instrument for promoting economic development. The old enemy, government, had become the friend and promoter of economic progress. The reasons for this drastic shift from the view held (and practiced) in the older industrial countries during their takeoff periods would form an interesting chapter in the history of economic thought; but I cannot write that chapter here. Rather, I shall examine how well the expanded functions of government are being performed and how fully the record warrants the new faith in government's competence and beneficence.

THE FRAMEWORK OF ECONOMIC INSTITUTIONS

It would be hard to say anything new or interesting about the conventional functions of government—as tax gatherer, infrastructure builder, and supplier of public services—beyond what has been said in earlier chapters. I shall simply take these functions for granted. But I must comment briefly on an important function that is often overlooked: development of an effective framework of economic institutions. I have in mind here a "mixed economy," in which most productive equipment is privately owned and most economic transactions take place in private markets. What economic institutions are needed in such an economy, and how can government midwife their development?

The concept of a competitive, price-guided, market economy is an attractive utopia, one that has been perfected by economists over more than two centuries. Many people fall in love with it and, in so doing, fall into several kinds of error. The results of the market machinery depend partly on initial conditions, notably the distribution of asset ownership, and what constitutes a proper distribution of wealth cannot be decided on economic grounds alone. There is a tendency to understate the imperfection of markets, the importance of public goods and external economies, and other things that may require government action. Finally, there is a tendency to think that the highly developed market institutions that we see in the more-developed countries sprang spontaneously from the brow of Zeus—or of Adam Smith. But in fact they evolved over a long period; and in third-world countries, at the outset of economic growth, they are usually quite underdeveloped. The most basic task of government—assuming that the goal is a (mainly) private economy—is to foster laws, procedures, and organizations that encourage private initiative and enable producers to reap its rewards.

Since agriculture is usually the largest sector, the institutions governing land ownership and use are especially important. Many third-world economies have always had a system of family farming, which permits effective operation of income incentives. This is true in some (not all) Latin American countries, in most of Africa (where land use is allocated to families even when ownership remains tribal), and in most of Southeast Asia. Some other countries in which land ownership was initially quite unequal have undergone land reforms, as in Taiwan, South Korea, Egypt, and Mexico. Though these reforms differ in detail, they typically involve some combination of (1) subdivision of large, often absentee-managed landholdings into smaller, family-sized units; (2) provision for tenants to become farm owners through long-term government financing; and (3) arrangements for giving the remaining tenants greater security of tenure, a larger share of output, better access to credit, and greater economic independence. Such a restructuring, which enables the cultivator to make price-guided production decisions and to reap the rewards of innovation, seems to be a necessary, though not a sufficient, condition for raising productivity in agriculture. In some countries, particularly in Latin America, the distribution of ownership is still quite unequal; and this is a source of lagging output growth as well as political instability.

In the area of industry and trade there is need for a legal and judicial system to protect property, to ensure enforceability of contracts, and to permit modern forms of business organization. There are still countries in which debts are not legally collectable and where in consequence a person can go into business only with family members over whom he has some moral hold. Thus large private enterprises are almost precluded. Development of the corporate form was vital to growth of large-scale industry in the presently developed countries; and spread of this form can be expected to play a similar role in third-world economies.

A further need is creation of a modern financial structure. A developing country does not need instant Wall Street. But it does need a central bank; a system of commercial banks, lending preferably at flexible, market-determined rates; facilities for long-term investment finance, usually including one or more government development banks; a system of savings institutions providing security and an attractive real rate of interest; and a public market for government securities, which can gradually be extended to cover high-grade private securities.

Another important institution is the government's own budget-making machinery. In the economies we are considering here, government usually produces 10–15 percent of national output, and it often accounts for one-third to one-half of gross capital formation. We tend to assume that resources flowing through government channels will be allocated rationally; but this cannot be taken for granted. It is quite possible for the allocation to be whimsical and unstable, following lines of personal influence rather than any economic rationale. The critical factor here is the top political leadership. Bad leadership cannot be remedied by redrawing organization charts. But given reasonable competence and continuity in leadership, one can design budget procedures that will aid rational decision-making.

Rationalization of government's role in the economy is the main function of

the multiyear "development plans" used by many third-world countries in recent decades. While these plans are professed to be global, containing macroeconomic targets for the entire economy, their control power over the private sector is usually quite limited. The "hard" part of a development plan relates to the public sector and is essentially a multiyear budget, covering capital expenditures and often current expenditures as well, which serves as a guide for preparation of annual budgets. Making development plans directs attention to long-run priorities rather than simply to immediate pressures. It requires each department of government to document its budget requests more fully and to relate this year's budget to the preceding and following years. This can scarcely fail to improve resource allocation.

The institutional requirements for economic development by the capitalist route were outlined long ago by John Stuart Mill (1848) in a passage that is still highly relevant:

> The desideratum for such a [less-developed] country, economically considered, is an increase of industry and of the effective desire of accumulation. The means are, first, a better government; more complete security of property; moderate taxes, and freedom from arbitrary exaction under the name of taxes; a more permanent and more advantageous tenure of land, securing to the cultivator as far as possible the undivided benefits of the industry, skill, and economy he may exert. Secondly, improvement of the public intelligence. . . . Third, the introduction of foreign arts, which raise the returns derivable from additional capital . . . and the importation of foreign capital, which renders the increase of production no longer exclusively dependent on the thrift or providence of the inhabitants themselves . . . and by instilling new ideas and breaking the chains of habit . . . tends to create in them new wants, increased ambition, and greater thought for the future. These considerations apply more or less to all the Asiatic populations, and to the less civilized and industrious parts of Europe, as Russia, Turkey, Spain, and Ireland.

Most of what we talk about today—orderly government, land reform, a tax system that does not encroach unduly on incentives, technology transfer, foreign aid, capital accumulation, rising consumer expectations—is encompassed in Mill's meaty paragraph.

In this as in so many other respects, Japan is the model of a successfully developing economy. Between 1868 and 1900 the Japanese government created almost from scratch a new institutional structure that provided a favorable setting for private economic initiative. Major reforms included abolition of the rigid system of five social classes, membership in which was determined by birth and each of which was limited to prescribed economic activities, and substitution of a more fluid class structure open to men of talent from diverse social origins; abolition of barriers to internal movement of goods and people and dissolution of

the restrictive craft guilds; displacement of the feudal lords who, in lieu of their former revenues from agriculture, received allotments of government bonds whose value was later eroded by inflation; replacement of farmers' payments in kind to the feudal lords by a land tax payable in cash to government and simultaneous abolition of the Tokugawa prohibition against the purchase and sale of land; creation of a modern banking system under the National Bank Act of 1872, accompanied by retirement of the many varieties of Tokugawa paper money and their replacement by a single currency; and development of an efficient budgetary system, which for the first time permitted forecasting and control of revenues and expenditures.

POLICIES TOWARD AGRICULTURE

I have already noted the importance of a tenure system that encourages owner-occupied farms of moderate size and, to the extent that tenant farming continues, provides security of tenure and reasonable rent payments. Why does government need to do any more than this? There is abundant evidence that small farmers are shrewd managers, quite responsive to price signals and to demonstrated possibilities for raising their incomes. So why not just leave them alone to operate as they will?

The problem is that, although agricultural production can be organized efficiently on a small scale, it requires a variety of supporting services that must be organized on a larger scale, and indeed must often be organized by government. The most important of these are:

1. Large-scale programs for water supply, drainage, and other land improvements. These usually require concerted action over an area embracing many farms, as well as large capital investment.
2. Infrastructure investments serving agricultural areas, such as farm-to-market roads, warehouses, and other marketing facilities.
3. Farm credit, especially important where improved technology requires larger purchases of fertilizer and other modern inputs, which farmers with small or zero cash reserves have difficulty in financing. Government can promote the formation of credit cooperatives, which have been quite successful in some countries. Government can also encourage extension of commercial bank lending to rural areas—for example, by *not* imposing interest-rate ceilings that make lending unprofitable, discourage saving, and misallocate capital; or it can set up a system of government-operated farm credit banks.
4. Special mention should be made of agricultural research and extension, which has loomed as increasingly important since 1945. New agricultural technology is a public good in the sense that, once developed, it becomes available to all comers. No one farmer can hope to appropriate it or keep it secret. Further, the social return is usually much larger than any private return to the developer. It

is thus necessary for government to assume main responsibility for agricultural research and development. I should note also that improved technology cannot simply be borrowed from the developed countries or from international research centers. Technology always needs to be adapted to specific soil, rainfall, and sunshine conditions within countries, regions, and districts. Effective borrowing and adaptation thus depends on a strong local network of research centers and experiment stations. Evenson and others have done cross-sectional analyses of countries and of individual states within India. These studies suggest a strong relation between agricultural research activity and rates of increase in agricultural productivity. Rates of return to research activity are typically very high, suggesting that research is usually underfinanced.

This catalog is helpful in detecting ways in which a government may go wrong. It may easily go wrong through neglect, through failing to do the things we have specified as important in stimulating farm output. This may happen because large oil or mineral exports make it easy for the time being to finance food imports, with the result that raising domestic food output does not seem very important. Thus it is not surprising that notable cases of agricultural neglect include oil-exporting Venezuela, Algeria, Iraq, and Nigeria and mineral-exporting Chile, Peru, and Zambia. Neglect may also reflect ideological bias, a view that industry is the hope of the future and that agriculture is naturally a backward and inferior sector. The fact that government is often dominated by city people responsive mainly to pressure from urban interests may be a contributing factor. There may even be an element of laziness—it is easier to build a steel mill than to raise agricultural productivity.

A second way in which government may go wrong involves control of farm prices and farm marketings. This is not common practice in Latin America, but it is practiced by most African and some Asian countries.

In these countries basic food crops, as well as major export crops, are typically bought by a government marketing board at a fixed price. The marketing board is also usually responsible for distributing fertilizer, seeds, and other inputs to the farmers, and it sometimes even distributes consumer goods. The system is supposed to "protect" the peasant against the rapacious middleman, who is portrayed as a monopsonistic buyer enforcing an unduly low price at the farm gate. A second argument is that the fixed price protects farmers against the large world-price fluctuations for primary products. The quantities procured by the marketing board are either exported or resold to domestic consumers, often at a subsidized price.

While such a system may protect farmers against exploitation by private traders, the extent of which is usually exaggerated, it facilitates an even more serious exploitation by government. It would be possible in principle to stabilize prices without affecting their average level over the years. But in practice there is an irresistible temptation to use the system as a method of *taxation*, by systematically paying farmers less than world-price levels and less than they would receive in a free domestic market. The size of this tax varies among countries, but it is usually substantial. It is not unusual to find farmers receiving only half to three-quarters of the world price for their produce.

Further, arbitrary setting of *relative* prices for various farm products can lead to substantial misallocation of resources. Farmers are quite responsive to shifts in relative prices, reallocating their land among products so as to maximize private profit. But this allocation may be socially inefficient, that is, it may produce an output bundle inferior in total value to that which would have resulted from farmer response to market-determined prices. In addition to misallocation among major crops, one often finds an abnormal increase in output of "minor" farm products exempted from price control and government procurement. The free prices for these products often rise to very profitable levels, leading farmers to devote more land and labor to them. The effect is not unlike that in China or the Soviet Union, where farmers lavish time on their private plots, whose produce can be sold at uncontrolled prices.

The cumbersome marketing-board system often leads to higher marketing costs and other inefficiencies. Inability to move the crop promptly at harvest time can lead to crop spoilage. Failure to supply inputs at the time they are needed in the production cycle can also reduce production. The much-maligned private middleman would probably do a better job in most cases. Research studies—for example, studies of rice marketing in Thailand and elsewhere—suggest that private markets are usually (not always) competitive, that traders do not have strong monopsony power, and that their profit margins are small.

Agricultural policies are often reinforced by other policies that reduce farm incomes relative to urban incomes. Many countries have maintained an overvalued exchange rate, which reduces the return in domestic currency of all exports, including agricultural exports. At the same time, tariffs and other trade restrictions raise the price to farmers of manufactured goods and agricultural inputs. The combined effect is often a downtrend in the rural-urban terms of trade, which can scarcely encourage farm production.

This depressing effect has been felt most severely in Africa. For all the sub-Saharan African countries, the median annual rate of increase in agricultural output from 1970 to 1979 was only 1.8 percent, well below the rate of population growth. In addition to countries in the Sahel, which were affected by drought, several other countries show an actual drop in agricultural output during the decade. The list includes Mozambique, Ghana, Zimbabwe, Angola, and Nigeria. A World Bank study* attributes this poor showing partly to inadequate income incentives to farmers. In Tanzania, for example, official prices paid to producers have not kept pace with world prices or domestic production costs. The terms of trade for cash-crop farmers fell by almost one-third during the 1970s. The story is

**Accelerated Development in Sub-Saharan Africa* (Washington: The World Bank, 1981)

similar in Ghana. Between 1965 and 1979 cocoa output fell by almost 60 percent, and Ghana's share of the world market dropped from one-third to one-sixth. One reason must be that the price paid by the Cocoa Marketing Board rose only sixfold, whereas the price index for consumer goods was rising 22 times. As a result farmers have been neglecting their cocoa trees, trying to shift into other crops, and smuggling cocoa to neighboring countries offering much higher prices.

But we should not paint the picture blacker than it is. Horror stories about agricultural policy can be matched by perhaps an equal number of favorable cases. Ivory Coast has always been proagriculture and proexport. The president, himself owner of a large farm, requires each of his cabinet members to own 12.5 acres of farmland, and each member of parliament must own 7.5 acres. Mexico, in addition to its major land reform, invested heavily in rural infrastructure from 1930 onward and has also been unusually active in agricultural research and development. In Taiwan, the active agricultural policy initiated by the Japanese has continued into the independence period. In addition to the land reform of the early 1950s, government has pursued a comprehensive development policy involving improvement of rural health and education, development of agricultural research and extension, expansion of irrigation facilities, development of farmers' self-help organizations and government lending institutions, and provision of growing amounts of modern inputs. Malaysia, in addition to a massive program of rubber-tree replanting, has moved energetically to raise domestic food production. Large amounts have been spent on land clearing and settlement, feeder-road construction, irrigation, and rural electrification.

The motivation for these programs is no doubt partly political. The Chinese dominate business activity while the Malays are mainly farmers and also control the government. A pro-Malay policy thus tends to be a proagriculture policy. Other countries that have been favorable to and successful in agriculture are South Korea and Thailand. One could say, of course, that these six countries have had relatively high growth rates and so could afford to devote resources to agriculture. But attention to, and success in, agriculture may also be one reason for the high growth rates.

China should also be included in the list of proagriculture countries. Mao, who began as a peasant leader, always counted on the rural population as his main political base. The tilt of policy toward agriculture has if anything increased since his death, with sizable increases in official prices for major crops and increased latitude for peasants to grow and sell additional produce at market prices.

In addition to these clear success cases, we should note several countries whose policies have been moderately favorable toward agriculture, or at least not markedly unfavorable. This group includes India, Sri Lanka, Pakistan, Egypt, Philippines, and Kenya. There are also several cases of "latter-day conversion," that is, countries that neglected agriculture before the mid-1970s but have now shifted to stimulative policies. In Brazil, for example, agricultural policy was until recently neglectful or actually exploitative. Export taxes, an overvalued exchange

rate, and price ceilings on domestic food products had an adverse affect on farm income. The military regime that took power in 1964 shifted policy in a favorable direction. Agriculture benefited from abolition of export taxes, adoption of a floating exchange rate, and lifting of food-price ceilings. There was also a marked increase in rural credit facilities. The real value of loans increased six times between 1960 and 1975. These policies must be partly responsible for the 5 percent growth rate of agricultural output since 1960.

In Burma, there was a marked policy shift around 1975. A "package program" was introduced for rice that included dissemination of high-yield varieties, increased supplies of fertilizer at a subsidized price, and a doubling of the government purchase price. Controls over private sales to the free market were also relaxed. The program produced a rise of 40 percent in rice output within a few years, and this success led to its being extended to groundnuts, maize, wheat, sesame, cotton, beans, and pulses, most of which have also shown substantial increases in yields and output.

In Indonesia, the Suharto regime after 1966 introduced a "rice intensification program," which by 1979 covered about five million hectares. Between 1968 and 1979 rice yields per hectare rose by 40 percent, and rice output by 53 percent. Food output as a whole grew during the 1970s at 3.6 percent per year, compared with a rate of only 1.7 percent from 1953 to 1966.

These examples suggest that agriculture, far from being an inherently laggard sector, is quite responsive to well-conceived government programs.

TRADE AND EXCHANGE POLICIES

Because of their small economic size, most third-world countries are heavily dependent on foreign trade. This dependence is not forced on them by the more-developed countries. It is inherent in the fact of small output and small purchasing power.

Writers on international economics usually distinguish between "outward-looking" and "inward-looking" trade and exchange policies. The main features of an outward-looking policy are: a realistic and flexible exchange rate; a free market for foreign exchange, rather than government-determined allocations; and efforts to promote exports, including in time exports of manufactured products. The term *outward-looking* connotes a favorable view of trade possibilities and reliance on a growing flow of exports to earn the foreign exchange needed for domestic development.

Inward-looking policies are the opposite of those just described: a fixed exchange rate, which usually becomes increasingly overvalued as a result of domestic inflation; a consequent "scarcity" of foreign exchange, which is then allocated among claimants by a government agency; high and often indiscriminate protection of manufacturing industries, by quantitative restrictions on imports as well as tariff rates, with a view to speeding up import substitution in manufactures;

and a pessimistic view of exports, which are neglected or even penalized through export taxes and the exchange-rate system. This policy package tends to produce sluggish growth of exports, which is then used to justify continuation of the restrictive policies.

The difference between the two is not a simple black-and-white contrast. Both policy sets are matters of *degree*. Inward-looking policies may be highly restrictive or only moderately so. Further, there are protariff as well as antitariff arguments. All the developed countries except Britain were quite protectionist while building up their own industries, and so doctrinaire preaching of free trade to currently developing countries has a hollow ring. The size of the economy makes considerable difference. Strong emphasis on import substitution makes more sense for India or Brazil than for Ivory Coast or Peru.

The fact remains that expert opinion is generally critical of highly inward-looking or import-substituting policies. The adverse effects, of course, vary with the severity of the restrictions imposed and with the stage of industrialization. They apply most strongly after "easy import substitution" in nondurable consumer goods is largely completed and the issue is how rapidly to move into consumer durables, chemicals, metals, machinery, and transport equipment. The adverse effects are usually stressed as follows.

1. The overvalued exchange rate, a hallmark of inward-looking policy, taxes exporters and discourages exports. Because there is excess demand for foreign exchange at the official rate, exchange rationing becomes necessary, and those who receive allocations of exchange get a windfall profit. The antiexport bias usually means also an antiagriculture bias, even when the country has comparative advantage in one or more agricultural goods. This discourages agricultural production. Thus apart from any limitations of foreign demand, export expansion may be slowed from the supply side. Export pessimism, which was urged as a reason for import substitution, can readily become self-fulfilling.
2. A common defect is that protection and other incentives are provided not to a limited number of the most promising "infants" but to any and all branches of manufacturing. Studies of Argentina in the Perón era, for example, show little relation between indicators of comparative advantage for a particular industry and the degree of government support it received. Similar results have been reported by Krueger for Turkey, by Lewis and others for Pakistan, and by Bhagwati and Srinivasan for India. At the extreme, one finds cases of "negative value added"—that is, cases in which the value of inputs exceeds that of outputs when both are valued at world prices. It appears also that the cost of the resources used to save a dollar of foreign exchange by import substitution is often well above the cost of using the same resources to earn a dollar of foreign exchange in export production.
3. Foreign competition is stifled. In some countries a product is put on the "prohibited" list as soon as a domestic source of supply has been created. The domestic monopolies or oligopolies thus created have no incentive to efficiency, and comparative international studies often show that their unit costs are far out of line with those of foreign sources of supply.
4. The way in which foreign-exchange allocation systems are operated tends to produce additional inefficiency. Very common is the "fair shares" principle, in which foreign exchange to buy imported inputs is allocated among firms in an industry in proportion to their installed capacity. This protects firms already established in an industry against newcomers who might be more efficient. It also encourages overbuilding of capacity to obtain larger quotas, and everybody ends up producing below capacity for lack of inputs. This phenomenon helps to explain the paradox that, in countries where capital is supposedly scarce, industrial capital is often seriously underutilized.
5. Systems of quantitative controls, operated by bureaucracies ranging from moderately efficient to quite inefficient, involve uncertainty, delay, excessive paperwork, bribery, and other economic costs. They also tend to favor large producers with good connections over small and unknown producers, regardless of relative efficiency. Thus government's verbal encouragement to small business is negated in practice by the difficulty of finding one's way through the maze of government controls.
6. The supposed aim of reducing import dependence is not necessarily accomplished by inward-looking policies. Some manufacturing industries, especially of the "finishing touches" type, are heavily dependent on imported inputs. So a crash program of import substitution may in the first instance raise import requirements rather than lower them. Even the objective of raising the growth rate of manufacturing output may not be accomplished. Krueger's study of Turkey concluded that a different, balanced strategy with no antiexport bias would have *raised* the manufacturing growth rate by about one-third. It would also have helped the balance of payments by producing more exports and requiring fewer imports than the policies actually followed.

We should not suppose that third-world governments are blind to these problems or that they cannot learn from experience. Some countries in our sample never embarked on highly restrictive trade policies, preferring a generally outward-looking stance. Ivory Coast, Malaysia, and Thailand are prominent examples. In quite a few others there has been a marked shift in policy over time. The doctrine and practice of import substitution peaked in the 1950s. From 1960 onward, one country after another moved in a liberalizing direction. This evolution of policy is important enough to warrant citing a few examples.

A new policy package was introduced around 1961 in Taiwan and around 1965 in South Korea. The main steps taken were: (1) a substantial currency devaluation and substitution of a unified for a multiple exchange rate; (2) liberalization of import quotas and reduction of tariff rates; and (3) a variety of export incentives, with special attention to exports of manufactures. In Taiwan, for

example, these incentives included creation of duty-free processing zones; rebate of customs duties and indirect taxes on imported inputs for export products; reduction of the corporate income tax on export earnings; loans at low interest rates; export insurance; a government institute for market research; and a direct subsidy to some industries, administered through manufacturers' associations.

Taiwan's economic success, of course, has been due to a number of factors, including land reform and progressive agricultural policies. But the shift to outward-looking trade policies has certainly contributed. The response of industrialists to the new policies was strong and rapid. Manufacturing output, exports, and productivity rose at spectacular rates after 1960. Manufactures rapidly came to dominate the export list, replacing primary products, which maintained their volume but fell in percentage terms, a process usually termed "export substitution." The same sequence of events occurred in South Korea after 1965. Hong Kong and Singapore since its separation from Malaysia are also quite open economies. It is striking that, as of 1980, about half of all exports of manufactures from the third world came from this Far Eastern "gang of four."

In the late 1960s Brazil and Colombia moved toward more export-oriented policies. The Colombia policy package included a tax rebate system, refund of import duties on inputs, credit at a low rate of interest (usually slightly negative in real terms), and a movable exchange rate system under which the rate was devalued frequently to reflect differential movement of foreign and domestic prices. In Chile, after replacement of the Allende regime in 1973, there was a wholesale removal of price controls and other government controls over the economy. Tariff and nontariff barriers to imports were reduced dramatically. The exchange rate was massively devalued in 1973, with frequent downward adjustments after that, and exchange controls were eliminated. Under the new regime GDP grew rapidly in the late 1970s, exports rose from 40 percent to 50 percent of GDP, and nontraditional exports did particularly well, with copper falling below half of all exports for the first time.

Pakistan liberalized trade somewhat in the early 1960s, then slid back, then returned to a proexport stance in the mid-1970s. Exports, which had been growing at less than 2 percent a year, grew from 1976 to 1980 at 15.3 percent per year. By 1980 finished manufactures were half of all exports, semimanufactures 30 percent, and primary products only 20 percent. Egypt, after the "opening to the West" in 1974, adopted more liberal policies as regards both foreign trade and private investment. The export/GDP ratio rose from about 14 percent in 1970 to 34 percent in 1980, partly but not entirely due to rising oil revenues. There was a general liberalization of economic policies in Sri Lanka in 1978, when a conservative government was installed after a long period of socialist rule. The new policies included exchange-rate unification and devaluation and a liberalization of import controls. Turkey launched a reform program in January 1980 designed to move toward greater reliance on market forces as against quantitative controls and a more outward-looking policy stance.

Since 1960, in short, the trend has been away from extreme import substitution and toward greater integration into the world economy along lines of comparative advantage. A policy shift in this direction has typically led to a sharp spurt in export growth. Meanwhile countries that have clung to inward-looking policies have experienced slow export growth and a shrinking share of world markets.

PUBLIC OPERATION OF INDUSTRY

In the developed countries railroads, electric power systems, and other public utilities are normally government-owned, though the United States is an exception in this respect. Other sectors are predominantly under private ownership, though there is some government ownership of manufacturing in Britain and France and rather more in Italy. Government enterprises are normally organized as semi-autonomous public corporations whose managers are not subject to day-to-day political intervention by government. They are expected to operate on business principles and to earn enough so that they do not become a burden on the general budget.

In third-world countries, too, government ownership of public utilities is virtually universal. But many governments have gone beyond this into agricultural marketing, banking, mining, and manufacturing. Even in countries with a predominantly capitalist orientation, government is usually the main investment banker. In Brazil, for example, government banks are estimated to provide 70 percent of all investment funds. In a number of countries government has also taken over the commercial banking system. Oil and mineral enterprises are usually government-owned. The historical reason is that before 1940 these enterprises were almost all owned by private foreign companies. Nationalizing them thus seemed the most direct way of asserting the country's control over its natural resources and also of appropriating the large profit streams these enterprises usually yield.

One indicator of the importance of state-owned enterprises in the economy is their investment as a percentage of gross fixed capital formation. In the late 1970s this was 23 percent in Brazil and 23 percent in South Korea, countries with a generally private-enterprise orientation. But it was 33 percent in India, 45 percent in Pakistan, 61 percent in Burma and Zambia, and 68 percent in Algeria.*

The main concern here is with manufacturing, in which practice varies most from country to country and the merit of public ownership is perhaps most debatable. In most countries of our sample the government-owned share of value added in manufacturing is below 20 percent, and often below 10 percent. But it is about 20 percent in India, 25 percent in Ivory Coast, 30 percent in Mexico and Turkey; and it reaches 40 percent in Tanzania, 50 percent in Algeria, 55 percent in Burma, 65 percent in Egypt, and 70 percent in Iraq.

In a dozen or so countries, then, state enterprises and private concerns share

**World Development Report, 1983* (Washington: IBRD, 1983), p. 49

the manufacturing sector. The division is to some extent along product lines, with government tending to dominate in capital goods and intermediates while consumer-goods production is mainly in private hands. The government enterprises are relatively few in number but large in scale. Private enterprises are larger in number but much smaller in average scale. They are also more labor-intensive, and their share of manufacturing employment is well above their share of output. Private businesses are at some disadvantage relative to state enterprises with regard to allocations of credit, foreign exchange, and material inputs. Despite this, the private sector has managed to survive and in some countries shows surprising vigor. The public-private percentages are thus not frozen forever but may be expected to change in response to the evolution of market demand and shifts in public policy.

A number of country studies have tried to appraise the economic performance of state economic enterprises. Several possible criteria are available. Profit performance alone is not conclusive, because marginal-cost pricing may sometimes be socially efficient and may involve financial loss. But when one sees most enterprises losing money most of the time, one is bound to have doubts. In some cases private and state enterprises operate side by side in the same industry, which means that comparative appraisal is possible. It is relevant also to compare unit costs and prices of state enterprises with world price levels, and with unit costs of comparable plants in other countries.

The evidence is somewhat mixed. In South Korea and Ivory Coast, for example, there are some government manufacturing enterprises that seem to operate with reasonable efficiency. These are labor-scarce economies in which there is no incentive for overstaffing; and their governments are stable, pragmatic, and outward-looking. In many other countries, however, observers judge the efficiency of state enterprises to be relatively low. A few examples may be cited.

In India, the private rate of return in public-sector industries is typically low, though this sometimes results from deliberate underpricing, which may have an economic rationale. The social rate of return also appears to be low and declining. Assuming a shadow wage of 60 percent of the market wage, Lal estimates that the average social rate of return to Indian manufacturing in 1968 was 5.4 percent. If the shadow wage is assumed equal to the market wage, the social rate of return drops to −6.1 percent. Bhagwati and Desai are also critical of public-sector performance. Major projects have been launched without a cost-benefit analysis and, where such an analysis was made, government often went ahead with the project despite a low estimated rate of return. So long as the proposed output contributed to some physical target in the five-year plan, all else was forgiven. Long delays in plant completion and serious inflation of costs have been common. Current management has suffered from a variety of ills: use of unqualified generalists from the Indian civil service as top administrators; shortages of technical personnel, due partly to salary scales not competitive with private industry; politi-

cal heckling of administrators, leading to cautious management and lack of innovation; political decision-making on plant location; and union pressure through political channels for overstaffing and overpayment.

In Egypt, observers judge the management of public enterprises to be quite inefficient, partly because of the top-heavy Egyptian bureaucracy. Despite a large expansion of university capacity since 1952, government has maintained its guarantee of a government job for every university graduate. The result is heavy overstaffing in all government operations. Hansen and Marzouk note that in the large textile industry the government enterprises, which have about three-quarters of total employment, are notably inefficient relative to privately owned plants. The ratio of administrative and service employees to actual operatives is 60 percent in the public sector, 20 percent in the private sector. And government wage scales are more than twice as high.

In Iraq, where government has more than 70 percent of industrial employment, the difficulties of industrial management have been severe. There are several levels of bureaucracy above the producing enterprise. There is high turnover of personnel, extending all the way up to cabinet ministers. Many enterprise directors are army officers with little industrial experience. Workers cannot be laid off, and overstaffing is large. So government's heavy investment of oil revenue in manufacturing has yielded disproportionately small returns.

In Tanzania, the evidence of efficiency of public manufacturing enterprises is conflicting. Clark reports their average profit rate in the early 1970s as 13 percent. On the other hand, they were able to finance only about one-quarter of their new investment. More than half of their new capital came from foreign borrowings, and the remainder from government allocations. A World Bank study reports that man-hour output in government manufacturing is only 70 percent as high as that in comparable private enterprises. This suggests that there may be serious overstaffing in government enterprises.

There is similar evidence from Turkey, Zambia, and other countries. The weight of the evidence suggests that the difficulties of government manufacturing enterprises are built in rather than accidental. They result from a combination of too many levels of bureaucracy above the enterprise, poor selection of and inadequate rewards for industrial managers, and failure to shield the enterprise against day-to-day political intervention. Such intervention is pervasive, including pressure for underpricing, for unduly high wage scales, for hiring of unnecessary workers or prohibition of layoffs, for appointment of managers on the basis of connections rather than qualifications. Most serious is the lack of a budget constraint, since deficits can always be made up from the government budget. Enterprise revenues often fail even to cover operating costs, including depreciation allowances, and constitute a continuing drain on the treasury. An IMF study of 64 public corporations in all parts of the world found that, after providing for depreciation, they had on average a net operating *loss* equal to 8 percent of revenue.

This operating deficit, plus all net investment, had to be covered by outside funds, of which about half came from the general government budget.*

A negative verdict on public enterprise does not suggest any immediate remedy. Disillusionment has certainly set in in some countries, and a good deal of rethinking is going on. Selling off public manufacturing concerns to private investors is often not a viable political option, though it has been done on occasion. What government usually could do is to slow down or stop expansion of the public manufacturing sector and leave future increments in capacity largely to private concerns. Thus a 50 percent government share of manufacturing today could readily shrink to 25 percent over two or three decades. Some countries seem presently to be moving in this direction, and others may do so in future.

Private producers, of course, are not necessarily efficient either. Efficiency depends partly on how far they are exposed to the chastening effect of competition. So the argument for privatization is strongest for large economies and for industries of relatively small optimum scale. Even a private monopolist, however, faces a budget constraint; and increases in efficiency are profitable even if not essential.

OTHER TYPES OF MARKET INTERVENTION

In addition to the policy areas already considered, many third-world governments intervene heavily in the pricing of commodities and factors of production. It would be charitable to attribute this to sophisticated reasoning about market failure and the need for offsetting action by government. But it probably stems mainly from political pressures, which operate also in the richer countries. People want larger incomes and lower prices, and any government that depends at all on public favor is likely to respond. I shall comment briefly on consumer-goods pricing, industrial licensing systems, interest-rate policy, and wage policy.

1. *Pricing.* Subsidized pricing of consumer goods is widespread, especially for basic foodstuffs such as rice, wheat, and bread, for passenger transport and other public-utility services, and recently for petroleum products. This distorts demand patterns. In some countries subsidized bread is the cheapest form of animal food and is so used. The subsidies are a heavy drain on the government budget, making it difficult to finance current services and infrastructure development. And the controls are usually evaded to some extent. In Ghana and in Uganda under Amin, attempts at universal price control led to universal evasion, with actual transactions conducted in unofficial or "parallel" markets.

Subsidies are usually justified as a way of protecting the real income of the poorest groups in the population. But the subsidized price is available to everyone, regardless of income level. In recognition of this, the new conservative government of Sri Lanka drastically reduced the long-standing rice subsidy while at the

*Andrew H. Gault and Giuseppe Dutlo, "Financial Performance of Government-Owned Corporations in Less Developed Countries," *IMF Staff Papers*, March 1968, pp. 102–42.

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same time introducing a United States–type food-stamp system applying only to those below a certain income level. Some countries, too, have had the political courage to raise rail and bus fares and other public-utility prices to levels bearing some realistic relation to production costs. Courage is indeed required, for even in such tightly controlled countries as Poland any effort to raise prices toward market-clearing levels can lead to street riots.

2. *Licensing.* In many African and Asian countries, any new industrial enterprise must apply for a government license. Some branches of industry may be reserved for the public sector. But even within the private sector it is argued that investment decisions should conform to an overall national plan. The difficulties arising from such a system, especially well documented in the case of India, are similar to those noted earlier for exchange-allocation systems: uncertainty and delay, the temptation to speed things up or bend the rules through bribery, stifling of initiative, barring of new competitors, a bias toward large as against small producers. The idea that governments know better than private individuals how to use capital effectively was roundly denounced by Adam Smith. His critique of European government decisions in the eighteenth century seems at least equally applicable to third-world governments in the late twentieth century.

3. *Interest Rates.* Interest rates, like controlled consumer prices, have been afflicted by a tendency toward underpricing. Interest-rate ceilings are often so low as to result in a negative real rate. This naturally leads to large excess demand and the allocation of loans, instead of being guided by which projects can afford to pay the market rate, is determined by bank officials whose decisions are bound to be somewhat arbitrary. Low interest rates combined with imported capital goods, which are made artificially cheap by low duties, overvalued exchange rates, and other policies, also produce a capital-intensive bias in investment projects. It is notorious that the manufacturing sectors of third-world countries often create little employment and fail to make effective use of the ample labor supply. This is due partly to underpricing of capital and (as we shall see) overpricing of labor. Low interest rates also discourage private saving, making it harder to raise the national savings rate to an adequate level. Countries that have raised interest rates sharply to reflect the real scarcity of capital in the economy, as South Korea did in the mid-1960s, have been rewarded by a marked increase in saving as well as more effective utilization of capital.

4. *Wages.* In many third-world economies one observes a marked rise of real wages in "modern-sector" activities and a growing rural-urban income gap. This occurs even in the face of ample labor supplies and growing open unemployment. Private employers often raise wages voluntarily, partly to attract and stabilize a labor force of good quality and perhaps also because it seems inequitable that the much higher productivity of labor in "modern" than in traditional activities should be reflected entirely in profit, as it is in the Lewis model. But government often forces the pace through minimum-wage laws and through generous wage scales for government employees. Especially in Africa, government employees

often form one-third to one-half of the modern-sector labor force; and government, under political pressure to be a "good employer," tends to serve as wage leader for the private economy.

Whatever the mechanism, the result is often a wage scale for modern-sector employees well above any market-clearing level. This encourages substitution of capital for labor in industry, thus reducing employment opportunities. At the same time the growing urban-rural income gap stimulates heavy migration, which overcrowds the cities and intensifies both open and concealed unemployment.

The list of possible price distortions is thus a long one. Factor prices are distorted by interest-rate and wage policies. Product prices are distorted by exchange-rate policy, trade restrictions, farm price ceilings, consumer subsidies, and underpricing of power, transport, and other services. The circumstances responsible for each distortion are different, but their effect is cumulative and can be seriously adverse to economic efficiency and growth.

Researchers at the World Bank have estimated an "index of price distortion" for each of 30 countries based on ratings by country specialists.* The countries in our sample with least price distortion were Thailand, South Korea, Malaysia, Philippines, Kenya, and Colombia (Taiwan, no longer included in IBRD tables, would probably also fall in this group). The countries with largest price distortions were Pakistan, Peru, Argentina, Chile, Tanzania, Nigeria, and Ghana.

It is interesting that the average 1970–80 performance of the low-distortion group was superior to that of the high-distortion group in important respects: annual GDP growth rate (6.8 percent *versus* 3.1 percent); domestic savings/income ratio (21.4 percent *versus* 13.8 percent); additional output per unit of investment (27.6 percent *versus* 16.8 percent); and annual growth rate of export volume (6.7 percent *versus* 0.7 percent). Although no simple causal relation can be inferred from these data, the association of market-directed prices and good economic performance seems significant.

CAPITALISM, SOCIALISM, AND ALL THAT

The pure capitalist economy is an abstraction; we shall never see such a thing in reality. Even in the nineteenth century, Europe and North America deviated significantly from the capitalist pattern, and these deviations have increased in the twentieth century. So we speak now of the "mixed economy," an ambiguous term in that the mix of private initiative and government intervention varies considerably from country to country. Broadly, we mean an economy that relies mainly on private ownership of productive assets and on private economic decisions coordinated mainly through a network of markets and prices. But along with this goes a substantial output of public goods, government ownership of public utilities and sometimes of other industries, government programs aimed at redistributing income, a tax system that collects a substantial percentage of national income, and a variety of government regulations over the private economy.

*The technique was to rate each type of distortion in a particular country as low, medium, or high and to assign numerical values of 1 for low, 2 for medium, and 3 for high. An overall average was then computed for the country. The averages range from 1.14 in Malawi and 1.43 in Thailand to 2.71 in Nigeria and 2.86 in Ghana. *World Development Report, 1983* (Washington, DC: IBRD, 1983), pp 57–63.

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Of the 34 countries in our sample that have managed to achieve intensive growth, 22 clearly are mixed economies in this sense. The mix varies, just as it does in more-developed countries. Pakistan, Taiwan, Malaysia, and Thailand are more wholeheartedly committed to private ownership than are Turkey, Iran, or Indonesia. Kenya, Ivory Coast, and Nigeria have a stronger private-enterprise orientation than Ghana or Morocco. Argentina, Colombia, and Venezuela are somewhat more capitalist than Mexico or Brazil.

Seven countries profess a socialist orientation. These are Tanzania, Zambia, Algeria, Egypt, Iraq, India, and Burma. These economies are also mixed in that private production is by no means ruled out. It is usually dominant in agriculture, trade, handicrafts, and small-scale manufacturing. But private industry and profit-making are viewed with suspicion, as needing to be kept under careful control. The socialist tilt shows up in an unusually large public sector that encompasses much of large-scale manufacturing, in a propensity to regulate the private economy in great detail, and sometimes in redistributive income policies.

Three countries have changed direction recently and are thus hard to classify. Peru was rather strongly oriented toward private enterprise in the past, but the military regime that took over in 1968 embarked on widespread nationalization of industry. How much of this will last under restored civilian rule remains to be seen. In Uganda, too, the Idi Amin regime confiscated most private industries, though it failed to operate them effectively. The post-Amin economy is still in shambles, and its future structure remains unclear. Sri Lanka would have been classified as socialist in the Indian pattern up to the late 1970s, but the conservative government that has now won two elections has reversed course on many points. We should perhaps add Zimbabwe to the list of uncertain cases. It was strongly capitalist in the past, with much of its industry foreign-owned. The new African prime minister, Robert Mugabe, professes socialism as a goal; but just how, and how rapidly, he will move in this direction is unclear at this date.

This leaves two countries, Cuba and China, in which government is dominated by a communist party and in which virtually all productive assets are state-owned. In other writings* I have explored the economic performance of this type of regime, and nothing need be added here. Suffice it to say that comprehensive socialization, although it is compatible with intensive growth, provides no firm assurance of such growth. China's moderate growth of per capita income puts it in the middle range of third-world countries, well below the star performers but well

**The Three Worlds of Economics* (New Haven. Yale University Press, 1971); and *Image and Reality in Economic Development* (New Haven: Yale University Press, 1977), chap. 15.

above the other Asian giant, India. On the other hand Cuba's economy was badly mismanaged from 1958 through the early 1970s and, though production has since recovered somewhat, per capita income is probably still below the 1960 level. There is little Western literature on North Korea or Vietnam. One has an impression of high growth in North Korea, low or zero growth in Vietnam, not surprising in view of the chronic warfare in which that country has been engaged since 1940.

Returning to the noncommunist countries, one is struck by the degree of ambiguity and internal contradiction in policies toward private business activity. This is most marked in the professedly socialist countries, but it is by no means absent in others. On one hand there is an implicit reliance on private producers to organize resources and raise national output. But on the other hand their efforts are often checkmated by a querulous or hostile government attitude and a maze of government restrictions. Many years ago an office-mate of mine at Harvard, now a distinguished member of the profession, remarked with the air of one discovering an obscure truth, "You know, capitalists have to be allowed to make money." Many third-world governments are reluctant to acknowledge this necessity.

One can well understand suspicion of foreign multinational corporations. It is possible for a country to gain by permitting multinational investment in its territory, but the terms of each deal need to be carefully specified. One wonders, however, whether this suspicion should be extended to indigenous businessmen, who are not really the monsters of Marxist demonology. They are actually rather timid and peaceable creatures who can be tamed to serve the public interest. Instead of repeating Adam Smith's famous paragraph on this point, let me quote Maynard Keynes (1938) in a letter to President Franklin Roosevelt:

> Businessmen have a different set of delusions from politicians; and need, therefore, different handling. They are, however, much milder than politicians, at the same time allured and terrified by the glare of publicity, easily persuaded to be "patriots," perplexed, bemused, even terrified, yet only too anxious to take a cheerful view, vain perhaps but very unsure of themselves, pathetically responsive to a kind word.
>
> You could do anything you liked with them, if you would treat them (even the big ones), not as wolves and tigers, but as domestic animals by nature, even though they have been badly brought up and not trained as you would wish.
>
> It is a mistake to think that they are more immoral than politicians. If you work them into the surly, obstinate, terrified mood, of which domestic animals, wrongly handled, are so capable, the nation's burdens will not get carried to market; and in the end public opinion will veer their way.

We should recall also that Karl Marx, like Adam Smith, considered capitalism a powerful engine for raising productive capacity. Socialism was to take over only after a modern industrial economy had been created. But disciples are rarely as wise as the master. Latter-day Marxists often turn Marx on his head and

advocate socialist organization *before* capitalism has had an opportunity to do its constructive work.

"Capitalist" has now become an epithet. It is perhaps difficult for third-world governments to respond to the question "Do you sincerely want to be rich?" by openly espousing capitalism. But perhaps they might do so quietly. They might recall that the most thoroughly capitalist of the developed countries, Japan, also has the strongest growth record. Also, of the 20 third-world countries ranked highest in recent income growth (see table 2), almost all have a clear private-enterprise orientation. Except for Algeria and Iraq, which have kept afloat on a flood of oil revenue, countries with a socialist orientation rank lower in the table.

LESSONS FROM HISTORY?

Perhaps not *lessons*, but something more in the nature of *suggestions*. An initial suggestion is that we stop using the term *third world*. Whatever purpose it may serve in political debate, it has no economic merit. The third world is simply a group of countries, as diverse as may be, each of which should be viewed independently, just as we view Australia or France.

A second suggestion relates to the sources of long-term growth. In the United Nations Commission on Trade and Development (UNCTAD) and other international bodies it has been fashionable for many of the lower-income countries to blame their problems on the higher-income countries. They are poor because we have exploited them in the past, and they can flourish only if we will finance them in future. This is largely shadow play. The fact that some countries have grown so much faster than others in the same international environment is in itself a convincing refutation. The trade and aid policies of the developed countries doubtless have some impact; and one can make a good case that these countries, by following policies that are *in their own interest*, can also contribute to third-world growth. But when we ask *why* a particular country has grown more or less rapidly, we come back invariably to internal factors: the resource base, the structure of economic institutions, the stability and competence of government, the wisdom of policy measures. In large measure a country grows by internal effort, which outsiders can encourage but not replace.

A third suggestion comes dangerously close to advice to third-world governments, which are likely to be unresponsive to outside advice unless it comes from international bankers. Thirty years ago Arthur Lewis noted a tendency for third-world governments to undertake more than they can accomplish:

> The list of governmental functions . . . is even wider in the less developed than in the more developed economies. . . . On the other hand, the governments of the less developed countries are at the same time less capable of taking on a wide range of functions than are the governments of the more

> developed. Their administrations tend to be more corrupt and less efficient, and a smaller part of the national income can be spared for government activity. This is another of the paradoxes of economic growth. Just as poor countries need to save more than rich countries, but cannot afford as much, so also poor countries need more and better government activity than rich ones, but are apt to get less and worse. In fact, one cannot usefully consider in an abstract way what functions a government ought to exercise without taking into account the capabilities of the government in question. It is very easy to overload the governments of less developed economies, and it is quite clear that it is better for them to confine themselves to what they can manage than for them to take on an excessive range.*

Experience since Lewis wrote underscores the wisdom of his comment. Most third-world governments are trying to do too much with too little. The range of their administrative controls over the economy is wider than in the developed countries, while at the same time their civil-service staffs are weaker. The common result, in addition to confusion, delay, and waste, is that the paper controls are not enforced effectively and do not have the intended effect. In the worst cases, such as Uganda, Ghana, and Zaire, the control system dissolves in a welter of smuggling, bribery, and evasion. There is need for a clearer recognition that administrative capacity is a scarce resource, which can be enlarged only gradually and which meanwhile needs to be husbanded and focused on high-priority objectives. The best government decision is often a decision to do nothing.

Governments might well restrain their urge to control everything in the economy and consider the advantages of greater reliance on private initiative. The payoff to private initiative is especially large in agriculture, to which most governments pay less attention than they should. But it is large also in trade, road transport, service industries, and manufacturing. The gradual growth of an industrial and commercial middle class, which was the essence of nineteenth-century development, still has much to contribute in the twentieth century and beyond.

*W. Arthur Lewis, *The Theory of Economic Growth* (Homewood, IL: Richard D. Irwin, 1955), p. 382.

AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: **Macroeconomic Policies and the Agricultural Sector**
Date: Monday, June 2
Lead Instructor: Fletcher
Session #: 2
Co-Trainer(s):
Time: 10:30-12:00 pm

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OBJECTIVE(S): At the end of this session participants will be able to:

- o Understand how macro policies and prices affect the food and agricultural sector.
- o Learn how to utilize measures of protection and rural-urban terms of trade to characterize macro policies affecting agriculture.
- o Develop skills in evaluating marco policies and analyzing their impacts on agricultural growth and equity.

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ABSTRACT:

- o The Macro Economy and the Food and Agriculture Sector
  - * prices and agriculture
  - * policy distortions and economic growth and equity
  - * rural-urban terms of trade
  - * measures of protection and comparative advantage
- o Evaluating Impacts of Macro Policies Using Border Prices and Social Opportunity Costs
  - * trade and subsidy policies benefitting producers
  - * trade and subsidy policies benefitting consumers

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READINGS: Required/Optional

- o Timmer, C.P., Falcon, W.P. and Pearson, S.R., "Macroeconomic Policies and the Food System," Food Policy Analysis, Published for the World Bank, The John Hopkins University Press, Baltimore and London, 1983, pp. 215-59. X /___
- o World Bank, "Pricing for Efficiency," Chapt. 6 in World Development Report 1983, Washington, 1983, pp. 57-63. X /___

Day One; Session Two; 10:30 a.m.-12:00 noon

Macroeconomic Policies and the Agricultural Sector

Outline

I. Policy Distortions and Economic Growth and Equity
   A. Measuring Price Distortions due to Policies
   B. Price Distortions and Economic Performance
   C. Prices and Aggregate Agricultural Output

II. Rural-Urban Terms-of-Trade
   A. Measures of Terms-of-Trade
      1. Barter
      2. Income
      3. Factorial
   B. Implications of Terms-of-Trade
      1. Resource allocation and output growth
      2. Agricultural income

III. Measures of Protection and Comparative Advantage
   A. Protection
      1. Nominal rate of protection
      2. Effective rate of protection
      3. Producer and consumer taxes and subsidies
      4. Policy bias and resource pulls
   B. From Protection to Comparative Advantage
      1. Domestic resource cost
      2. Net economic benefit
   C. Uses and Limitations of the Measures in Practical Applications

Levels of Distortion Against Agriculture

		EX	PM	DA	RI	RW	IN	PT	DI
1.	Ethiopia	2	3	2	1	1	1	3	1.86
2.	Kenya	1	3	1	2	2	2	1	1.71
3.	Malawi	1	1	1	2	1	1	1	1.14
4.	Tanzania	1	3	3	3	3	2	3	2.57
5.	Cameroon	1	1	3	2	2	1	1	1.57
6.	Ghana	3	3	3	3	2	3	3	2.86
7.	Ivory Coast	1	2	2	2	3	2	3	2.14
8.	Nigeria	3	2	3	3	2	3	3	2.71
9.	Senegal	2	2	3	2	2	2	3	2.29
10.	Korea	1	1	3	2	1	2	1	1.57
11.	Indonesia	2	2	1	2	1	2	3	1.86
12.	Malaysia	1	1	2	2	2	1	2	1.57
13.	Philippines	1	2	2	2	1	1	2	1.57
14.	Thailand	1	2	1	1	1	1	3	1.43
15.	Bangladesh	1	3	2	3	3	3	3	2.57
16.	India	1	3	2	2	2	1	2	1.86
17.	Pakistan	2	3	2	2	3	2	2	2.29
18.	Sri Lanka	1	2	1	2	3	2	2	1.86
19.	Egypt	1	3	2	2	3	2	2	2.14
20.	Tunisia	1	2	2	2	1	1	2	1.57
21.	Turkey	1	2	2	3	2	3	2	2.14
22.	Yugoslavia	2	1	1	3	1	2	2	1.71
23.	Argentina	3	2	2	3	1	3	3	2.43
24.	Brazil	1	2	3	3	1	2	1	1.86
25.	Chile	3	1	1	3	3	3	3	2.43
26.	Colombia	1	2	2	2	1	2	2	1.71
27.	Jamaica	2	2	1	3	3	3	2	2.29
28.	Mexico	1	1	1	3	2	3	2	1.86
29.	Uruguay	3	3	3	3	1	2	1	2.29
30.	Bolivia	3	2	3	3	1	3	1	2.29
31.	Peru	1	3	3	3	2	2	2	2.29

Notes:

Distortion Indicators: 1 low, 2 medium, 3 high

EX Exchange rates structured against the agricultural sector
PM Protection of the manufacturing sector
DA Price distortions affecting agriculture
RI Rate of interest in financial markets (rates below the market rate)
RW Wage rate baised against the rural sector
IN Rate of inflation
PT Public services
DI Distortion effect average

Source: World Bank paper on "Price Distortions".

Table 15 Distortion Indices and Various Components of Growth during the 1970s

	Distortion Index (D)	Simple Group Average	Annual GDP growth rate (%) (Y)	Simple group Average	Ave. domestic saving income ratio (%) (DS)	Simple group average	Ave. return on investment (%) (G)	Simple group average	Annual growth rate of Agric. (%) (A)	Simple group average	Annual growth rate of Industry (%) (I)	Simple group average	Annual growth rate of export volume (%) (EX)	Simple group average	% of income going to bottom 40% (E)	Simple group average
Malawi	1.14		6.3		14		25.3		4.1		7.0		5.7		24.5	
Thailand	1.43		7.2		21		27.6		4.7		10.0		11.8		15.2	
Cameroon	1.57		5.6		18		26.3		3.8		8.6		2.5		-	
Korea	1.57		9.5		22		31.1		3.2		15.4		23.0		16.9	
Malaysia	1.57	1.56	7.8	6.8	20	21.4	32.6	27.6	5.1	4.4	9.7	9.1	7.4	6.7	10.6	14.9
Philippines	1.57		6.3		24		23.1		4.9		8.7		7.0		14.2	
Tunisia	1.57		7.5		27		31.4		4.9		9.0		4.8		15.0	
Kenya	1.71		6.5		19		32.7		5.4		10.2		-1.0		8.9	
Yugoslavia	1.71		5.8		27		18.4		2.8		7.1		3.9		18.7	
Colombia	1.71		5.9		22		27.4		4.9		4.9		1.9		10.1	
Ethiopia	1.86		2.0		8		30.7		0.7		1.4		-1.7		-	
Indonesia	1.86		7.6		22		40.1		3.8		11.1		8.7		14.4	
India	1.86		3.6		20		15.6		1.9		4.5		3.7		16.2	
Sri Lanka	1.86		4.1		13		22.2		2.8		4.0		-2.4		19.2	
Brazil	1.86	1.95	8.4	5.7	22	17.8	35.5	26.9	4.9	2.9	9.3	6.8	7.5	3.9	7.0	14.0
Mexico	1.86		5.2		22		23.4		2.3		6.6		13.4		9.9	
Ivory Coast	2.14		6.7		24		25.5		3.4		10.5		4.6		20.0	
Egypt	2.14		7.4		12		24.2		2.7		6.8		-0.7		14.1	
Turkey	2.14		5.9		17		24.5		3.4		6.6		1.7		11.4	
Senegal	2.29		2.5		8		12.8		3.7		3.7		1.2		9.4	
Pakistan	2.29		4.7		7		28.1		2.3		5.2		1.2		20.2	
Jamaica	2.29		-1.1		16		(0)		0.7		-3.5		-6.8		8.2	
Uruguay	2.29		3.5		14		20.9		0.2		5.2		4.8		16.6	
Bolivia	2.29		4.8		20		22.7		3.1		4.3		-1.6		13.0	
Peru	2.29	2.44	3.0	3.1	21	13.8	21.5	16.8	0.0	1.8	3.7	3.2	3.9	.7	7.0	13.6
Argentina	2.43		2.2		22		10.7		2.6		1.8		9.3		14.1	
Chile	2.43		2.4		14		15.1		2.3		0.2		10.9		13.4	
Tanzania	2.57		4.9		12		23.9		4.9		1.9		-7.3		16.0	
Bangladesh	2.57		3.9		2		22.3		2.2		9.5		-1.9		18.2	
Nigeria	2.71		6.5		21		23.8		0.8		8.1		2.6		-	
Ghana	2.86		-0.1		9		(0)		-1.2		-1.2		-8.4		-	
Overall average	2.01		5.0		17.4		23.2		3.0		6.1		3.6		14.2	

Source: World Development Report, 1982; and World Bank Data Bank.

Table 16 Cross-classification by Growth and Price Distortions

Annual rate of growth of GDP in 1970s (%)	Distortion Index: Below 1.8	1.8-2.2	Above 2.2	Row average
6 percent and above	Korea (9.5) Malaysia (7.8) Tunisia (7.5) Thailand (7.2) Kenya (6.5) Malawi (6.3) Philippines (6.3)	Brazil (8.4) Indonesia (7.6) Egypt (7.4) Ivory Coast (6.7)	Nigeria (6.5)	(1.77)
4 to 6 percent	Colombia (5.9) Yugoslavia (5.8) Cameroon (5.6)	Turkey (5.9) Mexico (5.2) Sri Lanka (4.1)	Tanzania (4.9) Bolivia (4.8) Pakistan (4.7)	(2.0)
4 percent and below		India (3.6) Ethiopia (2.0)	Bangladesh (3.9) Uruguay (3.5) Peru (3.0) Senegal (2.5) Chile (2.4) Argentina (2.2) Ghana (-0.1) Jamaica (-1.1)	(2.32)
Column average	(6.8)	(5.7)	(3.1)	(5.0),(2.01)

Note: Figures noted against the countries are those annual of GDP growth.

Source: Based on Table 15.

GROWTH, PRICE POLICY, AND EQUITY

Japan (1881 to 1919)

$$Q_t = \text{constant} - 132.80\ P_{t-1} + 30.52^{***}\ T + 0.17\ Q_{t-1}$$

(t)		(-0.53)	(4.77)	(0.97)
(e)		[-0.05]		

$R^2 = 0.90$

India (1952/53 to 1974/75)

$$Q_t = \text{constant} + 0.14^{*}\ P_{t-1} + 0.49^{***}\ W_t + 3.08^{**}\ Z_t + 0.45^{**}\ Q_{t-1}$$

(t)	(1.49)	(4.68)	(2.11)	(2.44)
(e)	[0.18]	[0.54]	[0.68]	

$R^2 = 0.92$

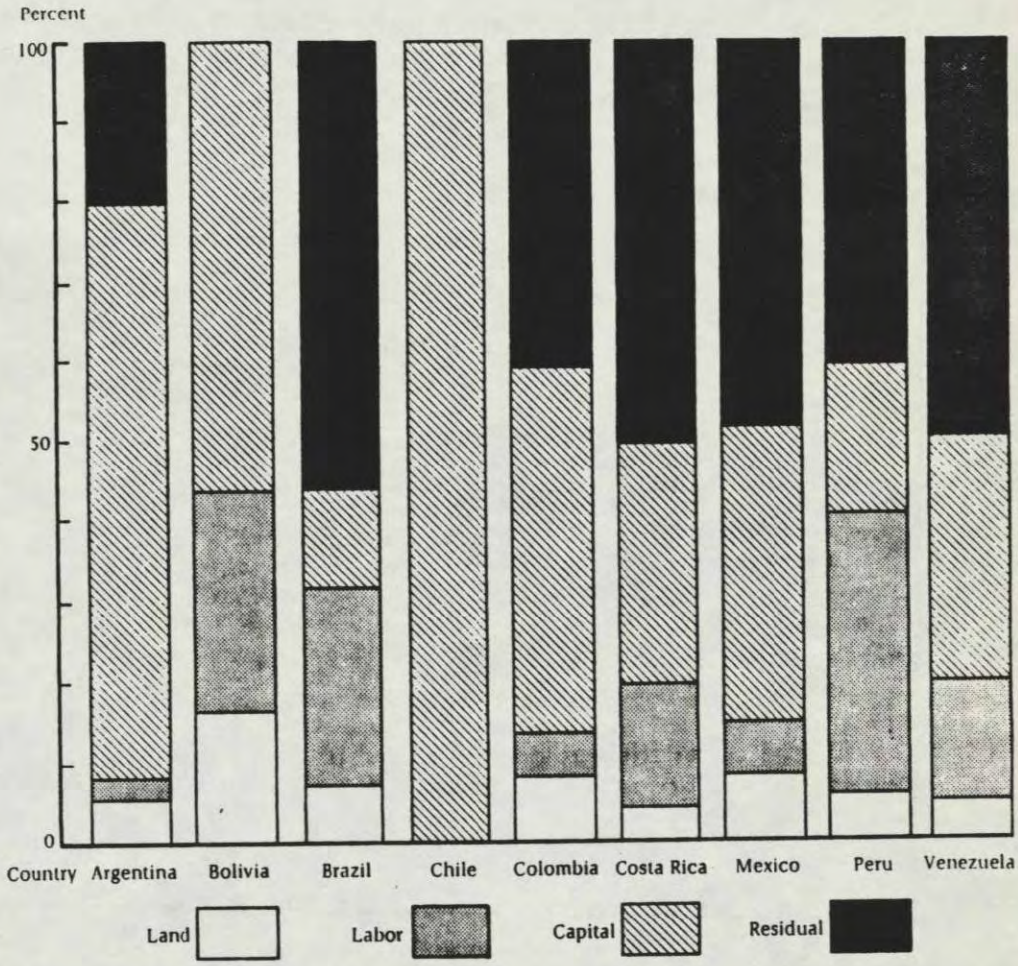
where:

Q = farm output,
P = terms of trade,
T = time-trend,
W = weather index, and
Z = percent of cropland irrigated.

(Figures in the parentheses are t-values of regression coefficients. Figures in square brackets are elasticities at the means of variables, and *, **, and *** mark coefficients significant at the 10, 5, and 1 percent level, respectively.)

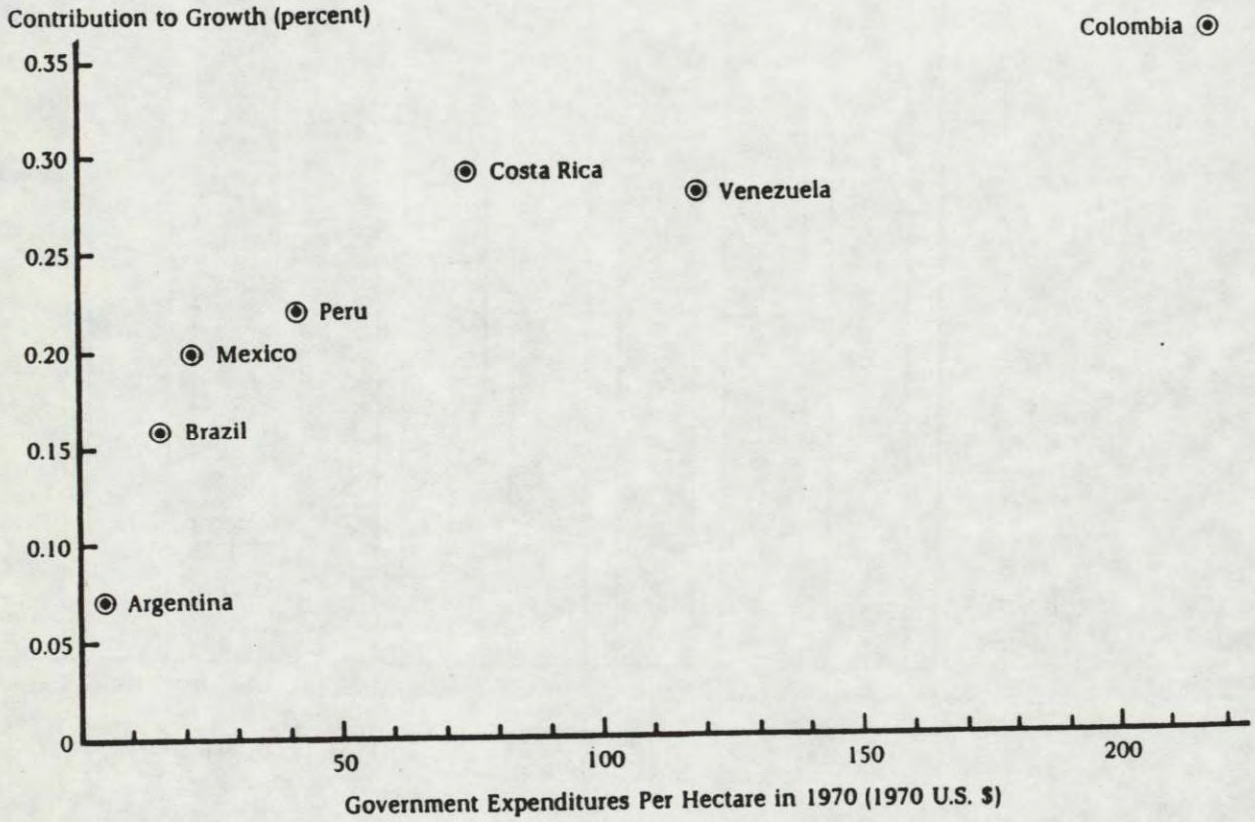
Source: Krishna, Raj. "Some Aspects of Agricultural Growth, Price Policy and Equity in Developing Countries," Food Research Institute Studies, Vol. XVIII, No. 3, 1982, pp. 234-235.

Figure 1—Share of land, labor, and capital in the total output growth of agriculture, 1950-80



Sources: Derived from Appendix 2, Tables 27-35.

Figure 2—Government expenditures per hectare in 1970 and the contribution of government expenditures on agriculture to the rate of growth of agricultural output, 1950-80



Sources: The estimates for the Latin American countries were derived from Appendix 2, Tables 27-35. The data for the United States came from Clifton B. Luttrell, *Down on the Farm with Uncle Sam*. Original Paper 43 (Los Angeles: International Institute for Economic Research, 1983), p. 12. Derived from Appendix 2, Tables 27-35.

Table 1: AGRICULTURAL TERMS OF TRADE IN PAKISTAN, FY60-FY83

Fiscal year	Net Barter Terms of Trade/a	Output Index (FY60=100)	Income Terms of Trade/b	Total Factor Productivity Index (FY60 = 100)	Single Factorial Terms of Trade/c
1960	100	100	100	100	100
1961	106	100	106	91	96
1962	100	109	109	95	104
1963	95	119	113	98	93
1964	101	118	119	99	100
1965	106	128	136	102	108
1966	100	127	127	99	99
1967	108	135	146	103	111
1968	104	157	163	117	122
1969	94	168	158	125	118
1970	95	186	177	140	133
1971	94	174	164	129	121
1972	94	183	172	131	123
1973	100	188	188	129	129
1974	100	196	196	131	131
1975	90	187	168	125	112
1976	87	199	173	130	113
1977	87	203	179	130	114
1978	93	209	194	131	122
1979	99	219	217	128	127
1980	93	239	222	135	126
1981	92	249	232	136	125
1982	100	258	258	n.a.	n.a.
1983/d	100	n.a.	n.a.	n.a.	n.a.

/a Calculated from ratios of GNP deflators, with FY60=100.
/b Net barter terms of trade x quantum index of output.
/c Net barter terms of trade x productivity index.
/d Estimated.

Sources: (1) Statistics Division, Government of Pakistan.
(2) Wizarat, S., "Technical Change in Pakistan's Agriculture: 1953-54 to 1977-78," Research Report No. 120, Pakistan Institute of Development Economics, Feb. 1981.

Effects of Policies on Producers,
Marketing Agencies, and Consumers

	Revenues	Costs		Producer Profits	Marketing Margins	Consumer Expenditures
		Tradeable Inputs	Domestic Factor Inputs			
Market Prices	A	B	C	D	M	P
Social Prices	E	F	G	H	N	Q
Policy Impacts	I	J	K	L	O	R

Table 11: TAXES AND SUBSIDIES IN THE AGRICULTURAL SECTOR, FY75-FY83

(Rs million)

	FY75	FY76	FY77	FY78	FY79	FY80	FY81	FY82/b	FY83/c
Taxes	1,865	1,432	896	814	1,080	1,710	1,606	1,757	1,029
Export Duties:									
Rice	333	241	58	-	-	-	-	-	-
Raw Cotton	535	340	1	-	-	-	500	150	462
Profits of Export Corporations:									
Rice (RECP)	769	591	39	504	789	538	530	377	348
Cotton (CECP)	-	-	662	185	-	-	350	-	-
Land Revenue	228	260	136	125	291	172	226	230	219
Subsidies	515	1,043	728	1,147	2,222	3,084	3,119	2,601	2,359
Fertilizer	326	607	87	617	1,692	2,454	2,457	1,819	1,600
Plant Protection	112	241	421	347	267	218	62	-	-
Tubewells	16	43	48	37	24	22	20	24	24
Wheat Seeds	-	6	6	25	8	29	2	8	8
Net Irrigation Costs/a	61	146	166	121	231	361	578	750	727
Net Taxes /d	1,350	389	168	-333	-1,142	-1,374	-1,513	-844	-1,330

/a Operations and maintenance costs less water charges.
/b Revised estimates.
/c Budget estimates.
/d Taxes less subsidies.

Source: Planning and Development Division.

Table 13: PRODUCER SUBSIDY EQUIVALENTS FOR WHEAT FY74-FY82/a

	FY74	FY75	FY76	FY77	FY78	FY79	FY80	FY81	FY82
Total Production	7629	7674	8691	9144	8367	9950	10805	11473	11420
Marketed Production/b	3357	3376	3824	4023	3681	4378	4754	5048	5025
of which:									
Government Procurement	1342	1253	1236	2376	1842	1086	2376	2955	3989
Open Market Sales	2015	2123	2588	1647	1839	3292	2378	2093	1036
Imports	1288	1164	1167	499	1035	2236	602	304	
Procurement price	22.50	37.00	37.00	37.00	37.00	45.00	46.65	54.12	54.12
Average Wholesale Price	26.27	41.47	38.67	39.73	49.09	50.77	51.14	52.89	62.26
Import Unit Cost, Local Market/c	77.02	63.08	62.69	51.18	59.35	71.66	78.64	80.18	89.58
Value of Marketed Production, Domestic Prices/d	2227	3601	3906	4108	4245	5787	6228	7251	7512
of which:									
Government Procurement	809	1242	1225	2355	1826	1309	2970	4285	5784
Open Market Sales	1418	2359	2681	1753	2419	4478	3258	2966	1728
Value of Marketed Production, Import Prices/e	6927	5706	6423	5516	5853	8405	10016	10844	12060
Price Protection/ Economic Subsidy/f	-4700	-2105	-2517	-1408	-1608	-2618	-3788	-3593	-4548
Direct Producer Subsidies/g	64	200	398	114	387	1023	1494	1582	1300
Total Equivalent Subsidy	-4636	-1905	-2119	-1294	-1221	-1595	-2294	-2011	-3248
Proportional Subsidy:									
Financial	2.9	5.5	10.2	2.8	9.1	17.7	24.0	21.8	17.3
Economic	-211.0	-58.5	-64.4	-34.3	-37.9	-45.2	-60.8	-49.6	-60.5
Equivalent	-208.2	-52.9	-54.2	-31.5	-28.8	-27.6	-36.8	-27.7	-43.2

/a Production in thousand metric tons, prices in rupees per maund, values in million rupees, proportions in percent.
/b Assumed equal to 44% of total production. See Ministry of Food and Agriculture, Government of Pakistan, "A Study of Utilization Patterns of Agricultural Commodities, 1977-78," March 1980.
/c Based on price of U.S. Red Winter, f.o.b. Gulf ports to which was added estimated freight and other costs to local markets in Pakistan. Import price is for last two quarters of fiscal year.
/d Value of government procurement is quantity procured x procurement price. Value of open market sales is quantity of open market sales x average wholesale price.
/e Quantity marketed x import unit cost, local market.
/f Value of marketed production, domestic price - value of marketed production, import price.
/g Assumed equal to 54% of fertilizer subsidy and 40% of net irrigation cost. The former share is based on fertilizer usage and the latter on irrigated acreage.

TIMMER

Macroeconomic Policies and the Food System

Food policy analysts would seem to have enough to worry about with food consumption and nutrition, food production and rural employment generation, domestic food price formation and the efficiency of storage, transportation, and processing, and the effects of international prices on both domestic prices and the opportunity costs of domestic policies. Indeed, "getting the issues right" in all these areas is a large task, and designing effective policies to deal with the issues an even larger one. Few countries are this far along in understanding and implementing consistent policies designed to reach the four basic objectives for the food sector. Certainly much can be done to improve sectoral policies and performance without looking beyond the micro sectors.

Still, that is not enough. In the long run, macroeconomic forces are too pervasive and too powerful for micro sectoral strategies to overcome. When they work at cross-purposes, as they do in many developing countries, an unfavorable macroeconomic environment will ultimately erode even the best plans for consumption, production, or marketing. A simple example that integrates issues from all three sectors into a macro context illustrates why this is so.

Before rice can be eaten, it must first be grown and then processed into the milled rice preferred by consumers. Exactly how the milling is done turns out to be very important because it affects employment, income distribution, the amount of rice available to consumers (or the amount of rice imported or exported), and incentives to producers to grow rice. The range of technology available for milling rice varies enormously—from hand-pounding with a pole in a hollowed log to very sophisticated and expensive multiple-pass milling machines integrated with large-scale drying and storage facilities that provide optimal control over the rice grain from delivery afrer harvest to packaging for consumers.

Rice milling facilities in between these two extremes range from very small,

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capital expense, to larger mills, which become progressively more expensive, more labor-saving, and more technically efficient in converting paddy into milled rice. The choice is not restricted to the extremes although either can be appropriate in particular circumstances. The choice is wide. The opportunity exists to find just the right combination of investment cost, use of labor, and technical efficiency to fit a particular local environment.

What is the appropriate choice of technique in rice milling? The more costly techniques in terms of investment per ton of milling capacity are also more technically efficient. For each ton of rough rice input, the more sophisticated facilities produce higher quality rice with less waste. The smaller and cheaper mills, however, need more labor per ton of capacity and will create more jobs than larger-scale mills. If a private entrepreneur is trying to make a decision about investing in a rice mill, asking which technique is appropriate is similar analytically to asking how farmers should produce their output—the factor-factor decision analyzed in chapter 3 with the isoquant in figure 3-2. When the private sector is making the investment decision in the context of market prices, the technique which is least costly per ton of output will be installed.

Like the fertilizer and rice prices facing the farmer in chapter 3, the relevant prices in the rice miller's decision are not set solely by market forces, but are susceptible to policy influence. The miller's calculations depend on nearly every important macroeconomic variable in a country: foreign exchange rates, interest rates, wage rates, and rice prices. Foreign exchange rates dictate the cost of imported machinery for the rice mill, interest rates determine the cost of the loan to pay for the machinery and the building, wage rates determine the labor costs of running the establishment after it is operational, and rice prices determine the value of the additional milled rice produced from each ton of paddy input by more technically efficient facilities.

When macro policy alters these important prices from their equilibrium values based on existing domestic abundance and scarcity of the factors, the impact on choice of technique can be dramatic. When grain prices are kept low, storage and processing facilities that save grain are not so profitable; few investments are made to save grain, and little management effort is exerted to run the available facilities efficiently. When interest rates are heavily subsidized and wage rates for unskilled labor are raised by legislation, large-scale, capital-intensive mills are installed in the midst of widespread unemployment. If foreign exchange is allocated to preferred investors at a cheap price, they will invest heavily in imported machinery, which tends to be labor-displacing, while other investors outside the allocation process may not even be able to purchase spare parts for their trucks or small-scale mills. Although the example here uses rice mills, the impact of distorted macro prices on domestic investors obviously extends to nearly every sector.

For analysts to determine both the impact of existing macro policies on

imize social profitability, two separate issues must be addressed. First, social profitability analysis of the alternative techniques will indicate which one adds most to the social value of milled rice relative to rough rice. Second, this analysis will include a calculation of the budget allocations needed to translate the desired level of macro prices that reflect social profitability into actual market prices that private investors will use to make decisions. Determining the desired levels for these prices places the issue of appropriate rice milling investments in a larger social context.

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The answer to which technique is appropriate in social as opposed to private terms depends on how society values job creation, the alternative uses of investment funds, and the foreign exchange needed to pay for milling machinery and the rice imported to replace that lost in processing when a less technically efficient mill is chosen. In other words, what is the scarcity value of labor? What is the opportunity cost of capital? What is society's capacity to produce goods for export in order to import?

Empirical analysis of these questions often shows that existing market prices diverge from social opportunity costs. In the terminology of the programming tableau of chapter 3, the shadow prices for labor, capital, and foreign exchange may be different from market values used by private decisionmakers in the economy. Sometimes this happens because of government intervention.

For example, if interest rates are subsidized in the hope of inducing investment in modern plants and equipment, rice millers may buy facilities that are technically sophisticated but difficult to manage in a traditional rural economy where the marketing infrastructure is inadequate to supply the daily input needs of a large modern unit. Then the private interest costs are being distorted by government policy.

Alternatively, if widespread rural unemployment exists, the social cost of employing labor may be much less than the actual market wage for the reasons discussed in chapter 3. Here the failure is in the market mechanism itself, and policymakers may then seek interventions to reduce the profitability of more capital-intensive, labor-saving mills in order to generate more jobs.

Several important tradeoffs are involved in these policy decisions. Keeping wages high will help those with jobs, but may induce firms to choose technologies that use little labor. Forcing interest rates down may prevent owners of capital from receiving large earnings on their savings, but it may force capital into unproductive uses. In addition, closing any gap between social and private prices for important factors of production and commodities usually requires government subsidies. Consequently, finding the socially appropriate policy environment depends on the difficulty of raising funds to pay for these budget subsidies.

These subsidies can be used to narrow the marketing margin and soften the food price dilemma, but at the same time they will also favor investment

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in more technically efficient mills that displace labor. Only technically efficient mills can survive the pressure caused by very narrow margins between paddy and milled rice prices. Price policies that lower domestic rice prices will favor consumers at the expense of producers, but lower rice prices also favor labor-intensive rice mills. These smaller mills waste more rice and generally produce a lower quality of output. Some clear and obvious tradeoffs are apparent in making this choice.

Government policies strongly condition the macro environment in which micro decisions are made by consumers, producers, and marketing agents in the food system. When it is recognized that fiscal and monetary policies are intimately connected to the real values of policy-determined factor prices, it is apparent that macroeconomic policy has a pervasive influence on the structure of incentives and performance in the entire food system. Especially in the long run, macroeconomic policy determines the rate of growth of both urban and rural sectors and also conditions the structure of that growth. In particular, the degree of job creation and the distribution of income (and food consumption) are more a function of macroeconomic policy than of sectoral investments and project design.

A major dilemma exists over this powerful role of the macro economy because short-run income distribution consequences of a policy are frequently the opposite of its long-run effects. Consequently, the food price dilemma which is the focus of much of this book has its parallel in macro policy. Because of the important two-way connections between food policy and macro policy, it is necessary to integrate the food price dilemma into this basic equity-efficiency tradeoff for macro policy, a task for later in the chapter. First, a review of the simple elements of macroeconomics in a food policy context is necessary. Analysts should hope to draw from this review not the skills needed to design better macro policies, but rather the insight and language needed to participate in the debate over macro policy reforms. These reforms have enormous implications for the food sector.

The Macro Economy and Macro Policies

Comprehending the relationship between the food system and the macro economy helps identify the policy issues and range of choices available to policymakers. A distorted set of macro policies—which typically includes rapid inflation, an overvalued exchange rate, subsidized interest rates for preferred creditors, minimum wages for an urban working class elite, and depressed rural incentives—makes rapid growth in agricultural output extremely difficult, while it simultaneously skews the distribution of earned income. Short-run interests of poor people are often protected to some extent by such policies because they tend to make cheap food available through subsidized imports.

When macro policies are badly distorted, their cumulative impact puts pressure on the economy for major policy reforms. As these pressures build, the options available to food policymakers are extremely limited: more investment in irrigation, a better agricultural research and extension program, perhaps a subsidy on fertilizer and modern seeds. These will contribute to agricultural growth, but in the constraining environment of distorted macro policies, such programs will not provide the basis for long-run dynamic growth of rural output and incomes, which is the essential base for a food policy that simultaneously increases food production while reducing hunger.

Consequently, policy analysts need to understand the elements of an effective macro reform and determine its impact on food policy objectives. It is not the mandate or the prerogative of food policy analysts to design and implement such reforms. But the reforms do come eventually because serious macro distortions generate powerful forces for macro policies more consistent with real scarcity values in the economy. Either external creditors—the International Monetary Fund, World Bank, bilateral donor agencies, or the multinational commercial banks—force these painful adjustments when a crisis is reached, or else a country's macro policymakers stay ahead of the situation and design new policies that avert a crisis.

At one level these macro reforms are simple and obvious—remove the distortions in macro prices and change fiscal and monetary policies to slow the rate of inflation. Even without specific concern for the food sector, such a macro reform is likely to raise farm incomes by improving the rural-urban terms of trade. The food price will rise to its international opportunity cost. More broadly, the devaluation that brings foreign exchange rates into equilibrium usually will pump new purchasing power into rural areas, with positive effects on rural employment and improved income distribution. Eventually, scarcity values for labor and capital will induce a new efficiency in resource use which leads to greater employment creation and faster economic growth.

Governments, however, are usually very reluctant to take these steps, for there are major short-run political and welfare consequences. For the reforms to be effective, many price increases will be needed, and overall budget subsidies must be cut. The real incomes of many workers and civil servants will be sharply reduced, and the urban political base of a government can be seriously threatened in the wake of the painful adjustments needed. With regard to food policy, those adjustments hinge critically on the likely reductions in food consumption by poor households caused by the higher food prices that almost inevitably accompany a macro reform. Here lies a major concern of the food policy analyst, for if a macro reform is in the works, those responsible for food policy had best be prepared with a set of food consumption interventions that will prevent the worst manifestations of such a squeeze on the poor.

A more active role is also possible. By carefully laying out the conflict between food consumption and productive efficiency to macro policymakers

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described in chapters 2 and 4—to help poor people across the bridge to long-un economic growth, food policy analysts can make it easier for macro olicymakers to proceed with the needed reforms. The political inertia so ften observed in the face of macro economies run amok is entirely under-tandable. It is an almost inevitable result of the basic food price dilemma tself, as extended to the macro context. An analytically sound food policy ffers macro policymakers a new potential for action. Capturing this oppor-unity requires a dialogue between food policy and macro policy analysts; for his exchange the food policy analyst needs to understand the world from he macro analyst's point of view.

Describing Macro Economies

Macro economies can be described in four quite different, and yet ulti-mately identical, ways: in terms of demand, supply, and income, and in monetary terms. In the demand approach the total of a nation's economic ctivity is disaggregated into the major components of final demand—usually onsumption, private investment, government expenditures, and any excess f exports over imports. When totaled, these components make up a country's ross domestic product, or GDP. When net income transfers to or from abroad re added, the total is gross national product, or GNP. The composition and verall aggregate of demand has provided the main focus of macroeconomic ıeory and policy in market economies since the Keynesian revolution began ı the 1930s.

Just as food cannot be consumed unless it is first produced, aggregate emand cannot be met without a supply of goods and services. The supply ıpproach focuses on the structure by sector of production in an economy. Vhen output from agriculture, industry, services, and government is totaled, ıe result is also GDP, and hence aggregate supply equals aggregate demand. olitical and theoretical attention in developed countries has recently been irected to this "supply side," as declining productivity and "stagflation"—ıe combination of economic stagnation and rapid inflation—have discred-ed much of modern macroeconomics as practiced in the industrialized coun-ies. The supply approach to macroeconomics has a long tradition, however, ıs classical macroeconomic theory focuses attention on the dynamics of long-ın aggregate supply. This concern for expansion of output has obvious elevance to developing countries—a relevance that concern for the adequacy ›f aggregate demand often does not have.

The production of goods and services requires the employment of factors ›f production—labor, capital, land, entrepreneurship and management—hich earn income in return for their services. These incomes provide the herewithal to purchase the goods and services that have been produced. ıcomes thus provide a third way of tallying up national economic activity.

on the components of aggregate final demand, and so total incomes also equal GDP. Aggregate income and its distribution among the basic claimants in the economy are major concerns of macroeconomic analysis.

In socialist economies where rationing is used to distribute many goods and services and where the domestic currency is not convertible into foreign exchange (and hence into imports), the total national economic output is much more difficult to tally. Excess consumer purchasing power, arbitrary accounting prices, and the direct allocation of housing, health services, and even public transportation make Western macroeconomic accounting systems of little use. At the same time, the distribution of incomes is determined primarily by the availability of rationed goods and services, not by money incomes as such. For this reason, the extremes of poverty and wealth often seen in market economies are not so prevalent in those socialist economies that are well managed.

Each of these three ways of describing a macro economy—demand, supply, and income—will be equally valid even in a traditional, subsistence economy where exchange of goods and services takes place only by physical barter. Nearly all economies have found a more efficient mechanism of exchange—the use of money as a medium in which the prices of all goods and services are quoted. Indeed, it is through prices that all the components can be added in a meaningful way. The use of monetary units, however, should not hide the "real" nature of the economy being examined. Even when the real level of activity is constant, the monetary total of economic activity can change because of changes in the general level of prices.

A general increase in prices—inflation—is a monetary phenomenon caused by changes in the amount of money in circulation (or the rate at which it changes hands). The monetary policies that bring about inflation, however, also involve variables that affect the real economy. A complex and poorly understood relationship exists among the money supply, interest rates, inflation, price expectations, investment, and the distribution of income. Money is more than just a convenient medium of exchange. It is also a significant factor with direct influence on the level of macroeconomic activity. The description and analysis of a macro economy in monetary terms is as legitimate and important as its description and analysis in terms of demand, supply, and income.

These various macroeconomic approaches would seem to be of scant concern to food policy analysts. As seen in the rice milling example, however, most governments try to influence the level and distribution of macroeconomic activity with a variety of policy instruments, nearly all of which have powerful direct or indirect effects on the food system as well as on overall economic performance. Some of these effects on the food system are intended, but most are simply accidental fallout. Much of macro policy is designed with little thought given to its ultimate impact on such important food system

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ariables as production, prices, distribution of consumption, and volume of ood imports.

Three main areas of macroeconomic policy will receive attention here: ıe budget, fiscal and monetary policy, and macro prices (foreign exchange ates, interest rates, and wage rates). In addition, macro policy has an indirect ıt powerful impact on food prices specifically and on the overall terms of ade between rural and urban sectors more broadly. The terms of trade will so be considered as an element of macro policy.

The impact of macro policy on the formation of food policy, and on the ood system itself, is summarized in figure 5-1. Although in the figure all the rows connecting macro policy to food policy flow in one direction only, edback effects can be important in particular circumstances. The diagram nphasizes the dual nature of macroeconomic policy: its fiscal and monetary omponent primarily expressed via budgetary policy and subsequent implitions for monetary growth; and its policy component with respect to the ree macro prices—foreign exchange rates, interest rates, and wage rates. nflation plays a central role in conditioning the real levels faced by the icro decisionmakers in an economy of policy-determined, nominal macro ices. In addition, the border policies discussed in chapter 4 are a major terminant of food prices directly and of the rural-urban terms of trade more oadly. Figure 5-1 assembles all the components that comprise a country's od policy.

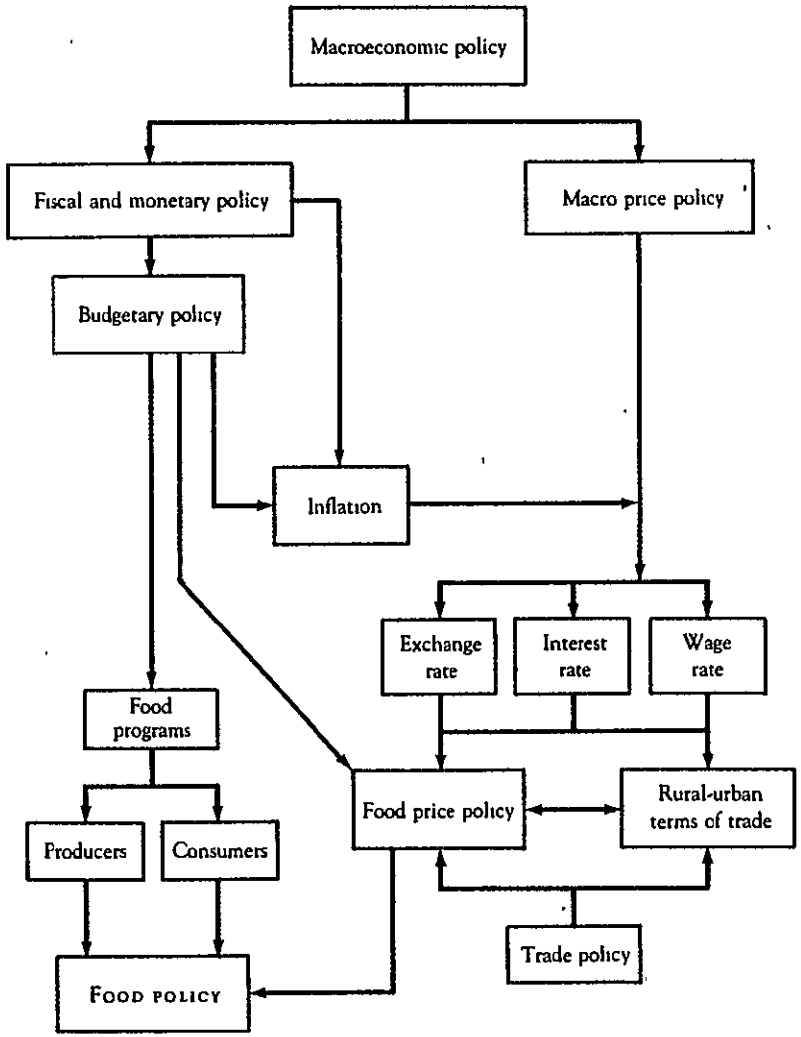
Budget Policy

No government budget anywhere in the world is allocated solely on the asis of economic criteria. The budgetary process involves hearing and judging mpeting claims for budget revenues, and the judgments cannot avoid such ıoneconomic intangibles as national security and political expediency. Most aims on budget revenues are challenged and compromised, and few partic-ants end up entirely happy with the outcome.

Budget allocations to the food sector are no exception, whether for con-umer subsidy programs or agricultural research and extension. Food policy ıalysts cannot take for granted a guaranteed share of the budget for food ograms. Two questions are of chief concern to food policy analysts: how rge should overall budget allocations for the food sector be; and how should sources be allocated to various programs within the food sector, between nsumption and production and between recurrent expenditures and in-stment? Because the implementation of many food price policies, such as ose discussed in chapters 2 and 4, requires budget subsidies, to join the ıdget debate is to join virtually the entire food policy debate. Out of this ebate emerge the nuts and bolts of a country's actual food policy.

Figure 5-2 shows the elements of the budget allocation process important

Figure 5-1. Major Connections between Macroeconomic Policy and Food Policy



for food policy. The size of the government budget is determined by total tax revenues and the size of the deficit (or surplus), which together make up fiscal policy. The total budget is allocated between the food and nonfood sectors (although the distinction is sometimes arbitrary, as with investments in roads or port facilities). As noted above, the basis for making this allocation

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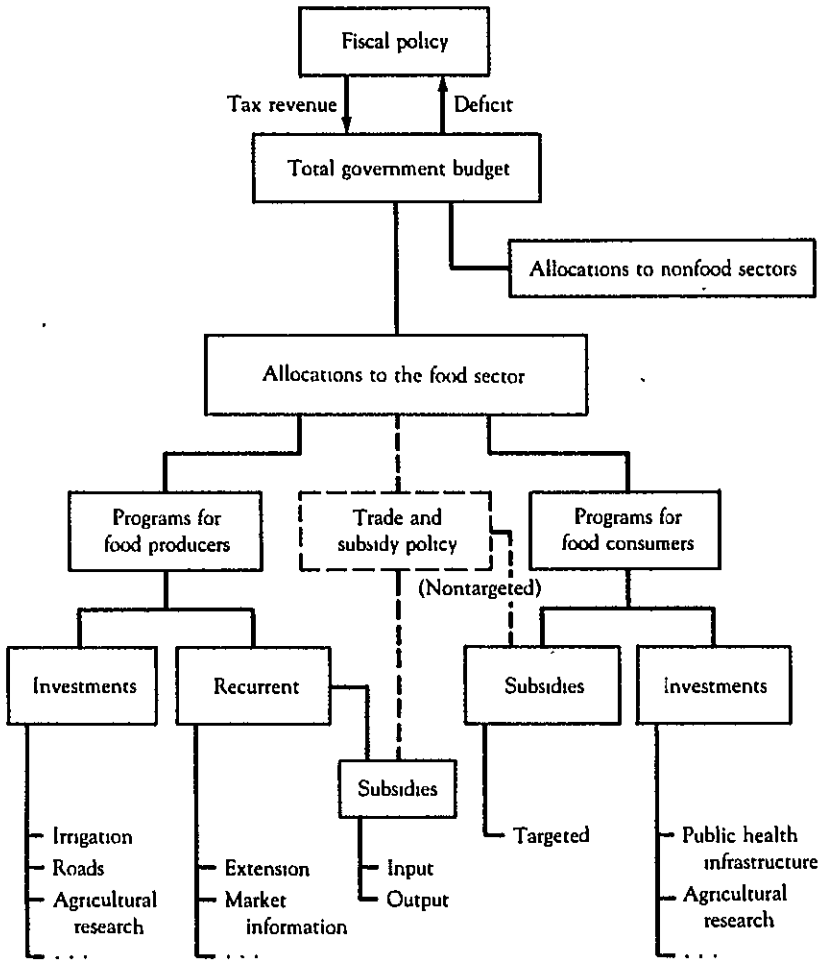


extends well beyond the results of social benefit-cost analysis to include important political and security issues. Allocations to programs for food producers and allocations to programs for food consumers are not necessarily at the expense of each other from a fixed food sector budget. There is some tendency for each major program to compete with all other programs in the budget, not just with other programs within its own sector.

For many countries the major budget allocation to the food sector is for subsidies to producers, consumers, or both. At one time more than half of Sri Lanka's budget was devoted to food subsidies for consumers; in 1981 consumers and producers. These subsidies have the implicit goal of dealing with the welfare consequences of the food price dilemma—an inability to keep farm prices high and food prices low. Often, as in China, this goal is quite explicit.

The relationship between the use of subsidies in effecting income transfers to producers and consumers and the role of subsidies in implementing food price policy is shown by the dotted lines in figure 5-2. As shown in chapter 4, most price policies for basic food grains rely on trade or subsidy instruments to force a wedge between international prices for the commodity and its domestic price to producers, consumers, or both. Trade restrictions on imports or exports produce revenue for the budget. But budget allocations are required for the food subsidies needed to keep domestic prices of imported food below the international price. As noted in chapter 2, unless these consumer subsidies are carefully targeted to particular consumer groups, they inevitably spill over to become part of food price policy. Producer subsidies have similar characteristics. In some countries budget policy, subsidy policy, and food price policy are the same thing.

Budget allocations are also required for recurring expenses, such as salaries and office expenses for an extension service or market information system, or interest on the public debt. Recurring expenses represent government consumption. They may be essential to the day-to-day provision of important government services, but they do not build new productive capacity except in a very indirect way, as when extension agents increase the decisionmaking abilities of the farmers they reach. Then the budget is being invested in human capital.

Budget allocations for investment are intended to build long-run productive capacity directly. Investments in the food sector are usually designed to increase food production—irrigation facilities, rural infrastructure, including electrification and roads, agricultural research, and so on. But important investments can also be made on behalf of food consumers. Because of the relationship among nutritional status, health status, and food intake, government investment in public health infrastructure—sanitation, clean water, rural clinics, and immunization programs—can significantly improve the efficiency of food consumers' expenditures. Equally important in the long run, investments in agricultural research benefit consumers as well as farmers. Improved agricultural technology lowers costs of production, and because agriculture tends to be a competitive industry, lower costs are passed on to consumers quite directly.

Fiscal and Monetary Policy

The overall size of the government budget (relative to the size of the economy) is determined by two factors: the willingness and ability of the

government to tax the domestic economy to produce revenue and the willingness to run and finance budget deficits. Both are the province of fiscal policy and, because deficits typically are financed by increasing the money supply, of monetary policy. The inflationary consequences of rapid increases in the money supply can be quite severe, and most countries attempt to use tax policy to generate as much government revenue as possible. Raising taxes distorts the economy in other ways, however, and these distortions, plus the bureaucratic difficulties of administering complicated tax codes in developing economies, place tight limits on the size of tax revenues.

A fundamental principle of taxation in societies attempting to alleviate poverty and reach a more equal distribution of income is that the burden of taxes should fall proportionately heavier on higher-income citizens. With progressive taxation in many industrialized countries, not only do tax collections rise in proportion to a person's income, but also the legislated tax *rate* rises with income. In fact, effective tax rates actually paid are quite uniform even in rich countries, and few developing countries are able to use progressive taxation because of the difficulty of defining and accurately measuring personal incomes. The tax structures of some poor countries are regressive because the commodities that are the most easily taxed in such countries are those produced or consumed by poor people. Export taxes on smallholder agricultural products, for example, usually have a regressive incidence.

The costs of tax collection include administrative expenses and the costs taxpayers incur in complying with, legally avoiding, or illegally evading the tax laws. Because of the high level of administrative capacity required to enforce taxes, especially on factor income (private and corporate income taxes and land taxes), most developing countries raise large proportions of their revenues from commodity taxes, such as import, export, sales, and excise taxes. These taxes are not necessarily regressive, especially if efforts are made to exempt the commodities most important in the lives of the poor. Failure to make these efforts, however, often means that the tax burden falls predominately on poor people.

A handful of countries have access to significant budget revenues without having to tax their own citizens. Exporters of natural resources with low exploitation costs, especially petroleum, are able to generate large rents paid by foreign consumers. With appropriate government policies designed to capture the profits implicit in the gap between the domestic resource costs of producing the oil or copper and its sale price in world markets, these fortunate countries are able to transfer substantial revenues to the government treasury without domestic efficiency losses, income distribution effects, or the collection costs associated with raising local tax revenues.

These countries are not without macroeconomic problems, however. The large influx of foreign exchange supports an exchange rate and level of imported goods that can seriously reduce output and employment in domestic productive sectors, both agricultural and industrial. These macro problems of wealth are perhaps easier to deal with than the problems of a poor resource base and low tax revenues, and little attention is paid to the problems of countries with foreign exchange surpluses in the rest of this chapter. Significant inflows of foreign aid can also ease the domestic tax burden. Very few countries, however, can look to this solution.

THE MONEY SUPPLY. Given the limitations on raising tax revenues and the equally intense pressures to increase spending, most countries incur significant budget deficits. In principle, the deficit could be covered by borrowing from the domestic private sector or from abroad, but in practice most developing countries with budget problems finance large portions of their deficits through expansionary monetary policy, that is, through central bank purchases of government debt. For this reason fiscal and monetary policies are closely linked in developing countries.

Monetary policy affects the size and rate of expansion of the country's supply of money. Where up to half a country's GDP is produced seasonally in the agricultural sector, an important task of monetary policy is to manage the money supply flexibly to allow enough operating capital to finance seasonal requirements. Money, including cash, savings accounts, and demand deposits (checking accounts), represents purchasing power in an economy. If a government's central bank expands the money supply at about the same rate as the economy-wide growth of physical output of goods and services (or somewhat faster if the economy is still in the process of becoming monetized), the purchasing power of money creates an aggregate demand for goods and services that is just met by the available aggregate supply of physical output, and overall prices do not change. When a government has its central bank print money to finance a large budget deficit, upward pressure on prices results because aggregate demand exceeds aggregate supply. In revenue-poor developing countries, large budget deficits cause rapid growth of the money supply, which usually results in inflation.

INFLATION. Inflation is a continuing increase in the overall level of prices for a country's goods and services, as measured by consumer or wholesale price indices. In every economy's national income accounts, aggregate supply of goods and services produced must equal aggregate demand from the total of expenditures, as shown in the following identity (which holds by definition):

$$\text{Aggregate output} = \text{aggregate expenditures}$$
$$\text{(Origin of income)} = \text{(uses of income)}$$
$$Y = P \cdot Q \equiv C + I + G + X - M$$

where Y = monetary value of national output or income
P = price index covering all goods and services produced

Q = quantity index covering all goods and services produced
C = national consumption expenditures in private sector
I = national investment expenditures in private sector
G = government expenditures on consumption and investment
X = total value of exports
M = total value of imports.

When the government runs a budget deficit and finances it by expanding the money supply, government demand for goods and services (G in the identity above) will rise. This increased demand can call forth increased physical supplies of goods and services (Q) if there are unemployed resources, such as idle labor, unutilized plant capacity, or open land, that can be quickly brought into production. But in developing countries supply bottlenecks rather than inadequate demand tend to be the constraint on rapid increases in output, and so Q does not increase. For the value of aggregate output (Y) to equal the value of aggregate expenditures after G has risen, either imports must increase (with an impact on the foreign exchange rate to be discussed shortly) or the general price level P must rise, thus causing inflation. If the balance of trade is held constant, more money is chasing the same amount of goods and services.

This demand-pull inflation results directly from macro policy and is the main, but not the only, source of inflation. Cost-push inflation occurs if suppliers of inputs, particularly labor unions, are successful in organizing to raise the costs of their services. Large wage settlements are then passed along by firms to consumers in the form of higher product prices. Cost-push inflation may be a significant problem in industrialized countries with strong labor unions, but it is relatively insignificant in developing countries where industrial sectors are small, and unions, if they exist at all, have limited power.

Inflation can also be imported. The prices of goods and services that countries buy from abroad rise along with inflation in the exporting countries. In recent years the prices of imports in developing countries have risen 10 to 15 percent annually, apart from petroleum products whose prices have risen much faster than other imports since 1973. Governments with fixed exchange rates have little effective control over imported inflation.

Macro Prices and the Food Sector

In Western economies most attention to macroeconomic policy has been focused on the budget, fiscal, and monetary issues and on the resulting levels of aggregate output and rates of inflation. Until recently, relatively little attention was devoted to another arena of government macro policy, the formation of prices for factors of production—labor, capital, and land—and the formation of two important terms of trade—between domestic and international goods and between rural and urban goods. These five prices—wage rates, interest rates, land rental rates, foreign exchange rates, and the rural-urban terms of trade (the food parity price)—are significantly influenced by basic macroeconomic policy in an economy.

The rice milling example illustrated the importance of the dual role of these prices in allocating resources efficiently and in determining levels and distribution of incomes. For both reasons, governments in developing countries frequently use macro policy instruments in conscious attempts to influence the levels of these prices. The direct role of government policy in determining three of them—foreign exchange rates, interest rates, and wage rates—makes it appropriate to call them macro prices. Land rental rates and the rural-urban terms of trade are influenced by macro policy in equally powerful but much more complicated ways. They are treated as an indirect result of macro policy, the outcome of a complex interplay among trade and subsidy policies, fiscal and monetary policies, and the other macro price policies.

Macro prices signal the scarcity of the factor of production concerned and, consequently, the incomes flowing to each factor. Because most governments wish to affect income distribution in their societies, they are greatly tempted to use government policy in an effort to set macro prices, rather than allow them to be determined by marker forces. If wage rates can be set high, labor is no longer cheap, and poverty is eliminated. If interest rates can be set low, capital is not scarce, and a country can quickly have a modern industrial sector. If food prices are kept low, food is abundant, and no one will be hungry. Macro prices reflect the most basic conditions of a country's economy. A government that attempts to set these prices to express its urgent desire for a modern, prosperous society is trying to short-circuit the economic development process. It is no wonder that many countries have tried this approach. When it fails—as it must until the productivity base has been built that will support higher standards of living in the long run—the economy is riddled with serious price distortions. Resource allocations skew income distribution while much of the labor power of the work force is left untapped, and the government faces stagnant growth in both agricultural and industrial output. It is not easy to put such an economy back on track.

Some macro prices are easer to influence than others. The foreign exchange rate is most susceptible to government control. Except for cases of significant imbalance between the official rate and what private markets are willing to pay, most central banks are able to make the official rate widely reflected in actual transactions throughout the economy. Interest rates and wage rates are subject to progressively less effective government control. As already noted, the land rental rate and the rural-urban terms of trade are determined by even more complicated mechanisms than the specific macro prices. Macro policy and the food parity price, however, are functionally related to each other and need to be analyzed together. The rural-urban terms of trade cannot

be understood independently of macroeconomic policy. A separate section of this chapter attempts to show the connections.

Foreign Exchange Rates

An exchange rate for a nation's currency establishes its value relative to the currency of another country. For many industrialized countries the price of foreign exchange is determined in international currency markets by the supply of and demand for a country's currency. These are established by the country's balance between imports and exports and international capital flows. Similar fundamental economic forces exist in developing countries, but their exchange rates are typically set by governments rather than determined in markets. Whether a government sets the foreign exchange rate at a level that will more or less clear the market determines whether imports or exports are priced (in domestic currency) at levels that reflect their economic scarcities relative to domestic goods and services that are not traded internationally.

THE EXCHANGE RATE. The exchange rate reflects the rate at which a country must give up its own currency to obtain foreign currency to import goods and services, and it simultaneously determines the value in domestic currency of goods and services that are exported. If the exchange rate between the Indonesian rupiah (Rp) and the U.S. dollar is set at Rp 625/$1, Indonesian importers must pay 625 rupiahs to receive one dollar's worth of imports, and similarly each dollar of export earnings is worth 625 rupiahs when translated into domestic currency.

A developing country typically ties or pegs its currency to that of a major trading partner, usually the U.S. dollar, which exchanges freely with currencies of other trading partners. As long as the rate is pegged, the currency follows the fate of the U.S. dollar in the foreign exchange markets, declining n value in relation to currencies of third countries as the dollar depreciates elative to those currencies and rising in value as the dollar appreciates. The xchange rate between the rupiah and the Japanese yen, for example, is thus determined by dollar versus yen movements as long as the rupiah remains ied to the dollar at a fixed rate.

A government can change the price of its currency in terms of the dollar and hence also of all other currencies) by setting a new official exchange rate. To lower the value of its currency, that is, to devalue, a government simply announces that henceforth more domestic currency will be needed to exchange for one dollar. A change in the rate from Rp 625/$1 to Rp 700/ 1 would be a 12 percent devaluation of the rupiah relative to the dollar 700 − 625)/625]. Changes in the opposite direction, for example, from p 625/$1 to Rp 550/$1 would amount to a 12 percent revaluation [(625 − 50)/625].

OVERVALUED EXCHANGE RATES. Many developing countries choose explicitly or implicitly to maintain overvalued exchange rates. Such rates keep the cost of foreign exchange low and hence imports cheap. They cannot be maintained with free markets for foreign exchange, however, or there would be excess demand for foreign currency to pay for a flood of imported goods. The low rates can be maintained only by currency controls, import tariffs and barriers, and allocations of foreign exchange to preferred importers or for high priority uses (often, unfortunately, military hardware). The presence of such controls and trade barriers shows that a country's currency is overvalued, although by how much is a difficult topic beyond the scope of this analysis.

If a country's exchange rate is overvalued, commodities such as food crops that normally are traded internationally either as imports or as exports are undervalued. Farmers receive less for their crops than they would if the price of foreign exchange were market-determined. Hence overvalued exchange rates act as an implicit tax on agriculture. All consumers of food and other traded goods are thus subsidized indirectly because of the low prices for these items. The government budget is also relieved of part of the direct burden of providing any food subsidies since these are shifted to food producers through lower prices. Consequently, the tendency toward overvalued exchange rates has a strong biasing effect on the food system, favoring urban food consumers and penalizing rural food producers.

Providers of nontraded domestic services, such as marketing agents and civil servants, and of goods that do not enter world trade, such as bulky commodities with high transportation costs, benefit from an overvalued exchange rate. The domestic prices of the nontraded goods and services are relatively high (and profitable) compared with the prices for food and imported goods, which are relatively unprofitable.

Overvalued exchange rates are a major reason the rural-urban terms of trade are so unfavorable for agricultural producers in developing coutries, and they are a major source of the "urban bias" that, according to Michael Lipton, leaves poor people poor. This urban bias has strong political roots in the student–industrial worker–civil servant power base of most governments in the developing world. Bur overvalued exchange rates are usually not the result of an overt and conscious choice of the government, even though the urban political support is welcome. In most cases, overvalued exchange rates are generated without specific policy decisions by differential inflation rates and are sustained to some extent by the prevalence of industrial protection.

If a country begins with a fixed exchange rate that correctly prices its currency relative to foreign currencies, then the demand for foreign exchange is matched by its supply. Domestic inflation, however, places pressure on the country's fixed exchange rate because import demand will increase in the face of lower relative prices for imported goods, export earnings will

decline because of decreased demand for the goods the [illegible] the market for foreign exchange will not clear at the fixed exchange rate without capital inflows.

Because virtually all countries experience some inflation, the relevant comparison is between the domestic rate of inflation and the rate in countries that are major trading partners. If a country experiences an annual rate of inflation in its wholesale price index of 20 percent and if its main trading partners also experience 20 percent inflation during the year, domestic and foreign costs and prices would rise by the same amount, and there would be no pressure on the exchange rate (in the absence of other structural changes in the economy, such as differential productivity growth). If the inflation rate in the principal trading partners is only 8 percent, a figure more in line with recent experience of industrialized countries, the differential rate of inflation is 12 percent (20 percent in the developing country minus 8 percent in its trading partners). The exchange rate thus becomes overvalued by approximately 12 percent, even though no policymaker made any decisions at all about the exchange rate.

Many developing countries are able to maintain overvalued exchange rates because of protective trade policies, often supplemented by exchange controls and restrictions on foreign investment. Most governments impose tariffs or quantitative restrictions on imports in an attempt to promote more rapid industrialization or to raise government revenues. Taxes on exports also raise government revenues while keeping domestic commodity prices low.

Protection is an instrument of industrial policy and of agricultural policy in many industrialized countries as well as developing countries, but it has an important, and often fully intended, impact on exchange rates which is relatively more important for poor countries. Protection raises the domestic market prices of protected goods, which are or could be imported. In the absence of such protection the prices of these goods would drop, demand for them would rise, and more would be imported. Bidding for the foreign exchange to pay for these imports would cause the equilibrium value of foreign exchange to rise. When the government maintains protectionist policies, the domestic currency can be overvalued, although supply of and demand for foreign currency is in balance.

DEVALUATION. Overvalued exchange rates tend to divert the flow of purchasing power to urban areas, usually widening rural-urban income distribution disparities. The depressed rural incentives cause low growth in output and little gain in rural employment. Low food prices provide general subsidies to food consumers, which may protect the welfare of the poor and raise total food intake. But since domestic food production is depressed and foreign exchange is cheap, food imports tend to expand considerably. The strong tendency in developing countries toward overvalued exchange rates thus places heavy burdens on the design of a food policy.

The remedy for overvaluation of an exchange rate is devaluation, which is meant to permit the economy to regain its international competitiveness. Differential inflation distorts the price relationships between tradable goods and services whose prices are determined by international market prices and nontradable domestic goods and services. The latter are termed "nontradable" because transportation costs are so high for certain types of bulky, low-valued goods, such as sweet potatoes, that their prices are determined by local supply and demand conditions rather than by international market prices.

Because of differential inflation the prices of tradable goods in domestic currency are too low to clear the market for foreign exchange. At the fixed exchange rate, too many imports are desired and too few exports are supplied. A devaluation attempts to correct this situation by raising the prices of tradable goods relative to those of nontradable goods. Because the amount of domestic currency earned per unit of foreign currency is increased, producers of tradable goods receive higher prices relative to producers of nontradable goods. It is as if there were only two goods produced in the economy, and the government raised the price of one (tradables) while leaving that of the other (nontradables) initially unaffected. In the example, a 12 percent devaluation results in a 12 percent increase in the price of tradable goods. Consumers switch some of their demand from the previously too cheap tradable goods to the now relatively less expensive nontradable goods. Because their prices have gone up, producers of tradable goods expand output, and because prices of nontradable goods have fallen, their suppliers contract production. Import demand falls, export supplies rise, and demand for nontradable goods increases. A devaluation thus brings about shifts in demand and supply by changing relative prices between tradable and nontradable goods. But the decreased supply of and increased demand for nontradable goods will push their prices up again unless fiscal and monetary policies reduce aggregate demand or changed expectations lead to greater investment and less consumption.

A devaluation by itself, especially if the extent of protection remains unchanged, cannot solve the problem. Differential inflation is the cause of the overvaluation. If domestic inflation is permitted to continue at levels exceeding inflation in the major trading partners, devaluation alone will be followed by a rise in the relative price of nontradable goods because of inflation. This rise will offset the initial price change and thwart the switching of demand from tradable to nontradable goods and of supply in the reverse direction. The exchange rate will again become overvalued (albeit at the new exchange rate). To be successful in the short run, a devaluation must be accompanied by fiscal and monetary policies that reduce inflation by cutting aggregate demand and lowering domestic expenditures. To be successful in the long run, the devaluation must change expectations and generate greater investment by both domestic and foreign firms.

Most governments, however, find it very difficult to adopt more stringent

BEST AVAILABLE

fiscal, monetary, and exchange rate policies. Devaluation is a politically sensitive topic largely because two groups are immediately worse off after a devaluation: owners or workers producing nontradable goods and services or using large amounts of tradable inputs—for example, civil servants and factory workers; and consumers, especially urban residents, who have a high propensity to consume tradable goods. Continued overvaluation subsidizes the real incomes of civil servants and urban residents in the short run and thus is politically popular. But it acts as an implicit tax on agriculture because part of the cost of food subsidies is transferred from the government budget to food producers. A devaluation usually raises food prices and thus shifts the food parity price (the rural-urban terms of trade) in favor of agriculture. Many rural dwellers produce tradable goods with the use of nontraded land and labor and few tradable inputs, and they often consume larger proportions of nontradable goods than do urban residents.

The failure to devalue in order to create better incentives for the rural sector lies not with urban-oriented government policy alone, although this is important. Many painful adjustments must be made by both producers and consumers in an economy when the exchange rate of the domestic currency is devalued. The food consumption adjustments of the very poor can be especially painful, and one important role for food policy analysts is to design programs that protect the short-run welfare of the very poor when a devaluation is needed. It bears repeating that the devaluation offers the long-run prospect of more jobs and faster growth. But the problem both for the government and for the poor is how to survive until then.

Interest Rates

Interest rates reflect two fundamental aspects of all economies. First, interest is the "wage" of capital and reflects its productivity in increasing output. Capital has an opportunity cost and can be rented just like labor and land. It must be compensated for its use at a competitive rate if owners of capital are not to withdraw its services. Second, interest rates reflect an essential time dimension, as owners of capital have the choice of consuming their capital in the present or saving it to reap potentially larger, but later, consumption returns. If capital markets were perfect and riskless, the productivity dimension of interest rates would just match the "liquidity," or time dimension, of interest rates because transactions between different opportunities for productive investments would produce an equilibrium rate of time discount.

In the real world, however, such perfection is seldom achieved. Investments are risky, access to capital markets is uneven, and, especially in developing countries, knowledge of actual investment opportunities and payoffs is highly imperfect. Consequently, the marginal productivity of capital, one determinant of the interest rate, frequently diverges from the rate at which society values future consumption as opposed to present consumption, the alternative determinant of the interest rate. An important goal of financial policy is to make this divergence as small as possible. The following discussion deals primarily with the interest rate as a reflection of the productivity of capital. In well-functioning international capital markets the productivity of capital will approximate its opportunity cost, with appropriate discounts for lenders' risks and borrowers' concerns for the burden of indebtedness. The social rate of time discount is incorporated in the policy perspective.

Capital markets. Many governments are reasonably effective at setting foreign exchange rates and making them widely applicable even if they diverge somewhat from equilibrium levels. As the divergence widens, gray and black markets for foreign currency spring up, and eventually the government loses control of the foreign exchange rate. In such cases most foreign currency is exchanged for domestic currency through unofficial channels at rates that more closely reflect its opportunity costs to importers and exporters. Furtive foreign exchange markets reflect a breakdown of government policy, but when government policy is generally effective, foreign exchange transactions are handled routinely through the banking system.

Capital markets are structured quite differently. Almost everyone in a monetary economy has the opportunity to be either a borrower or a lender, however small, while the great majority of a country's population seldom sees another country's currency. Each time a borrowing-lending agreement is transacted, a miniature capital market has been established. No matter what the central government may want the interest rate in the society to be, such individual capital transactions can and do go on. Consequently, understanding the functioning of a country's capital markets and the role of government policy in setting interest rates in those capital markets is much more complicated than understanding how foreign exchange rates are set.

Government policy with respect to capital markets is significantly affected by three related factors: interest rate formation, the development of financial institutions, and the impact of monetary policy as an outgrowth of budgetary and fiscal policy. Because there are two primary determinants of an interest rate, government policy is frequently caught between the scarcity value of capital in increasing production and a desire to make capital available at a rate that reflects the government's valuation of future consumption relative to current consumption. On the one hand, if a society can keep interest rates low, then future events have greater present value and the welfare of future generations becomes more important. Low interest rates make investment cheaper in a capital stock to bequeath to children and grandchildren, and it makes the conservation of natural resources and investment in social infrastructure with a long expected life easier to justify economically. However, the current generation may not save enough at low actual interest rates to finance those investments.

Keeping interest rates high, on the other hand, reflects the current scarcity and productivity of capital in production, induces greater savings, and comes closer to matching the rate of time discount of private decisionmakers in the economy. Consequently, the first issue for government policy with respect to capital markets is interest rate formation. Naturally, it is difficult to judge what interest rates would be in the absence of policy and how interventions actually alter those rates. Still, the direction in which policy is having an influence is usually readily apparent, and knowing this is an important starting point.

The second concern of government policy is the development of institutions that actually carry out the day-to-day functions of a capital market. In simple economies households with surplus cash can lend to their neighbors who need a temporary addition to their incomes. But the essence of a modernizing economy is its reliance on a network of financial intermediaries that provide convenient and safe places to save money as well as efficient vehicles for accumulating savings for further loans to farms and businesses for real investment to expand the productive capacity of the economy.

In most economies capital markets are better developed in urban centers and wealthier agricultural areas. There the services of financial institutions are widely available. Markets for local securities and bonds provide direct firm financing. Local financial intermediaries, such as insurance companies, banks, and savings and loan companies, provide indirect financing to firms and other investors.

This uneven development of financial institutions is one cause of segmentation of the capital market and a wide range of interest rates, even for similar risks and transaction costs. In addition, segmentation is caused by government regulation itself, especially of major (and visible) financial institutions in the capital or commercial center, as well as by a tendency of governments to subsidize their own banking institutions, thus providing significant cost advantages over private financial institutions. As a result, rural credit markets tend to be informal with very high interest rates, partly because of the high transaction costs and greater risk premiums attached to small loans. The underdeveloped financial institutions, fear of regulation, and resulting segmentation of the capital market inhibit the efficient flow of capital from savers to borrowers within rural areas and between urban and rural areas.

The third factor affecting government policy on interest rates is not unique to developing countries. The role of monetary policy in facilitating fiscal policy and financing government budget deficits is a topic of great concern in developed countries as well. To avoid inflation, the growth in money supply should not be significantly greater than the growth in real output (allowing for changes in willingness to hold money). But "tight money" means that a budget deficit must be financed from private savings (or from abroad), which tends to drive up interest rates as private borrowers compete with the government for the available capital. Recession and unemployment are the result. Alternatively, "monetizing" the budget deficit usually leads to inflation, which lowers the value of holding a monetary debt instrument, such as a bond or savings certificate. Lenders may understandably insist on higher interest rates to compensate for this decline in value. The resulting combination of high interest rates and inflation has come to be known as stagflation.

Capital moves relatively freely internationally as modern communications and a sophisticated global banking system permit billions of dollars to be moved anywhere in the world at a moment's notice. This mobility of capital further complicates the linkage between interest rates and monetary policy. High interest rates in a country attract an inflow of international capital; low interest rates tend to cause a capital outflow. These flows of international capital affect the supply of and demand for foreign currency and thus influence the foreign exchange rate.

Since the equilibrium exchange rate is significantly affected by differential inflation rates among trading partners, the connections among monetary policy and inflation, interest rates and exchange rates, and interest rates and monetary policy become obvious although they are extraordinarily complicated. In the past, when exchange rates were relatively fixed, macro imbalance tended to be reflected in changes in foreign exchange reserves. But with more flexible exchange rates and interest rates, imbalances tend to be reflected by changes in international prices and trade flows and ultimately in the real incomes of producers and consumers. This is especially true of those producers and consumers whose real incomes are very sensitive to prices of traded goods, such as farmers who produce food and consumers who buy it.

Official interest rate. An official interest rate—the level legislated by the government as the maximum rate that can be charged by lenders—often exacerbates capital market segmentation. When the government sets the official rate of interest below the market-clearing rate, only privileged borrowers gain access to cheap, rationed credit. The residual market for credit, largely made up of traditional lenders and borrowers, continues to function, but it becomes a thinner market because of the exit of those able to use officially controlled institutions. Credit rationing and reduced savings result from an interest rate ceiling and cause the interest rate in the residual market to be higher than otherwise.

Official interest rates can be enforced mainly in large, visible financial institutions but only rarely in the traditional, informal lending markets. With an official interest rate ceiling, the segmentation of the capital market is increased because of the even wider differential between institutional and traditional lending rates. Farmers and merchants consequently pay more for credit in traditional markets, and industrialists pay less in financial institutions than they would in the absence of an official interest rate ceiling.

NOMINAL AND REAL INTEREST RATES. Inflation and the interest rate are related because inflation reduces the purchasing power of monetary assets. As prices rise, fewer goods and services can be purchased with a given amount of money. Interest payments are monetary assets that are transferred from borrowers to lenders within some specified time period. Because interest payments have a time dimension, lenders are concerned about inflation, which reduces the purchasing power of the interest payments at the time they receive them as well as the purchasing power of their capital when it is paid back.

Lenders thus consider not only the nominal rate of interest, that established in the borrowing agreement, but also the real rate of interest, the one remaining after adjustments for inflation. Since both the inflation and interest rates are denominated in annual percentages, the real rate of interest can be roughly approximated by subtracting the inflation rate from the nominal rate of interest. If the nominal rate of interest is 18 percent a year and the annual rate of inflation is 16 percent, the real rate of interest is about 2 percent (18 − 16). The precise formula is {[(1 + nominal annual rate of interest) ÷ (1 + the annual rate of inflation)] − 1}. For this example, the precise real rate of interest is 1.7 percent [(1.18/1.16) − 1].

If the annual inflation rate increases to 24 percent in this example and the government keeps the official interest rate at 18 percent a year, the real official rate of interest becomes negative: about −6 percent a year (18 − 24), or precisely −4.8 percent [(1.18/1.24) − 1]. A negative real rate of interest means that savers lose purchasing power by lending their money at the official rate and that borrowers are subsidized in real terms. While borrowers would prefer negative real interest rates, savers tend to put their money in land or commodities, for example, rather than in banks, to hedge against inflation. Inflation tends to cause financial disintermediation—the withering of financial intermediaries, such as banks, savings institutions, and insurance companies—when governments impose ceilings on interest rates.

A positive interest rate requires that the government, through the central bank, maintain the nominal official rate above the rate of inflation. This can be done by controlling inflation, adjusting the nominal official interest rate, or some combination of both. In practice, it is politically difficult to push up the official interest rate. Maintaining a positive real rate of interest is made easier with low rates of inflation.

Evidence accumulated from the development experience of poor countries over the past several decades shows that positive real rates of interest cause faster growth of financial institutions, and the faster growth leads to more rapid increases in national incomes. A positive real interest rate encourages domestic saving and investment, inflows of foreign investment, and thus domestic capital formation. The productivity of this new capital is enhanced

because the credit is allocated to its most productive uses by the market rather than by rationing decisions of financial institutions and government agencies.

FINANCIAL POLICY. As the rice milling example suggested, subsidized interest rates make investment in modern, capital-intensive technology more profitable. It would seem to follow from this that raising interest rates would impede the development process, which depends on the accumulation of capital, and subsidized interest rates would lead to more capital investment and to more rapid economic growth. The flaw in this logic can be understood only by differentiating static and dynamic effects. Since economic development is an inherently dynamic process, the dynamic effects of interest rate policy will be crucial for judging its impact on development.

Figure 5-3 illustrates the alternative effects of two stylized interest rate policies. "Low" interest rates capture the full effects of official interest rate policy that causes negative real rates for privileged borrowers, financial repression, and increased segmentation of the capital market. "High" interest rates are meant to reflect a financial policy that allows market-clearing rates to encourage savings and to channel capital to its most productive uses, thus promoting financial deepening and reduced segmentation of capital markets.

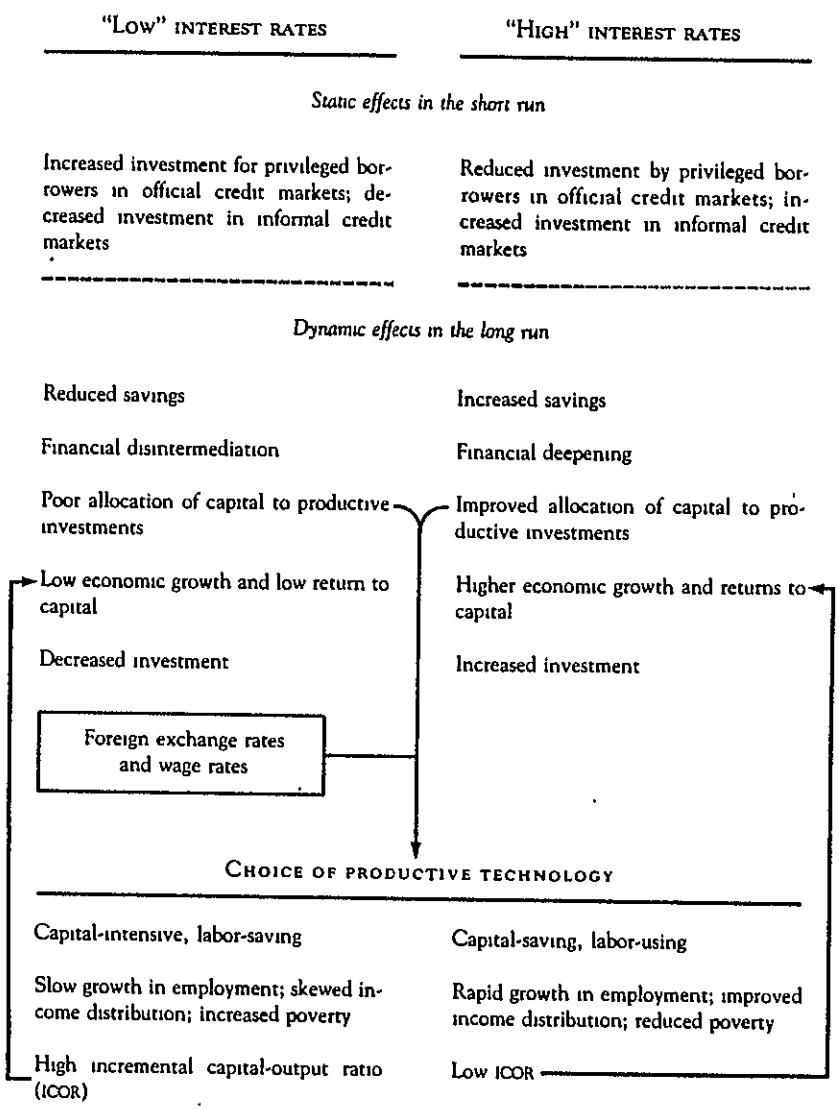
Two related effects drive the conclusion from figure 5-3 that low interest rates lead to low investment, and vice versa. The first relates to the rate of savings and the second to the productivity of the resulting investment of the savings. Both are large topics that cannot be treated in depth here.

Private households in both urban and rural areas usually respond to a change from negative to positive real interest rates by increased savings. On average, more than half the total domestic savings in developing countries comes from the private, noncorporate sector. Hence, the positive supply response of these savings to the real interest rate can be of considerable quantitative significance. A country that wishes to increase its rate of growth must either increase the rate of investment, by generating the savings resources to make this possible, or increase the productivity of the new capital being invested.

Only a limited number of sources are available for increased savings: larger foreign capital inflows, higher public savings from increased taxes or profits from public enterprises, and positive real interest rates to call forth greater private domestic savings. Aid-financed foreign capital inflows are decreasing in per capita terms and as a share of world economic product. The profit-making record of public enterprises in both developed and developing countries is not promising, except for enterprises based on natural resources. Public enterprises frequently absorb more public savings than they generate. Hence, countries looking for increases in the supply of investable funds usually must look to positive real interest rates to encourage their own domestic savers.

At least as important, these positive real interest rates will also directly affect the productivity of the investments made possible by the savings. The

Figure 5-3. Effects of Alternative Financial Policies



efficiency with which capital invested in one year is converted into new output the following year is crudely captured, after the fact, by the gross incremental capital-output ratio, or ICOR. In societies where disinvestment has occurred for many years and the economy needs major rehabilitation to function smoothly, the ICOR can drop as low as 2.0 or even lower. It was 2.1 in Indonesia between 1970 and 1973, when investment in spare parts and repair of bridges, roads, and rolling stock paid extremely high economic returns. More typically the ICOR is between 3 and 4 in developing countries, with 3.5 being an appropriate median. Table 5-1 shows a range of ICORs for a sample of sixty-six developing countries based on World Bank statistics.

Although the ICOR is not a very useful planning tool—it is difficult to measure accurately and is subject to a variety of influences on economic output not attributable to incremental investment—its wide range in developing countries illustrates an extremely important point. The productivity of an investment, or the efficiency with which capital is used in a society, is as important for growth and the alleviation of poverty as the investment rate itself.

Countries cannot simply assume a low ICOR for planning purposes and then have it happen, but they can attempt to create a policy environment that leads to the efficient use of capital. Positive real interest rates, increased domestic savings and financial deepening, and concentration on labor-intensive investments that create many jobs per unit of capital all contribute to a lower ICOR and more rapid growth in economic output. Equally important, because of the labor-intensive focus of such an investment strategy, the earned incomes will tend to be more equally distributed than is likely from a more capital-intensive strategy, even if equal growth were possible from both.

Growth-oriented financial policy requires that a government manage its macro policy to reduce inflation, set its nominal official interest rate higher than the rate of inflation so that the real official rate of interest is positive, and avoid imposing regulations that would unnecessarily constrain the growth of financial institutions. Such financial policy causes financial deepening as the services of financial institutions become more widespread. Financial deepening in turn results in (and is assisted by) more rapid economic development. Conversely, negative real rates of interest and excessive regulation cause financial repression. The outcome typically is financial disintermediation—

Table 5-1. Average Gross Incremental Capital-Output Ratios (ICORs) for Sixty-six Developing Countries, 1968–73

Gross capital-output ratio (ICOR)	*Number of countries*	*Illustrative countries*
1.5–1.99	6	Singapore, Indonesia
2.0–2.49	5	Korea, Mali
2.5–2.99	10	Gabon, Ecuador
3.0–3.49	9	Kenya, Colombia, Pakistan
3.5–3.99	9	Thailand, Mauritius, Zaire
4.0–4.5	5	Jamaica, Tanzania
Above 4.5	22	India, Gambia, Guinea, Chile, Guyana, Zambia

Source. World Bank, *World Tables*, 2d ed. (Baltimore, Md : Johns Hopkins University Press, 1980).

a smaller role for financial institutions—and stagnant or even negative economic growth. The rural sector in particular benefits from an expansion of financial institutions that gradually replace higher-cost, informal sources of credit. Inversely, financial repression and financial disintermediation place a heavy burden on development of the rural sector.

Wage Rates

Returns to labor are the primary source of personal income for the vast majority of the world's households. Incomes generated by the other primary factors of production—capital, land, entrepreneurship and managerial skills—tend to be skewed toward the upper third of the income distribution in most countries. Since the creation of productive new jobs that pay a living wage is the only long-run solution to poverty and hunger, the ability of a government to raise wages above a subsistence floor and to keep them there for the entire population should be a key concern of food policy. As noted earlier, however, the mechanisms by which wage rates are actually set are quite complicated, and the scope for successful government intervention to raise real wage rates in the short run is surprisingly limited. Attempts to set minimum wages often cause repercussions on decisions about investment, technology choice, and job creation which have the opposite effect from those intended. Just as interest rate policy can have perverse dynamic effects which swamp any desirable short-run results, so wage rate policy has the potential to cause serious distortions to the development of the economy and to exacerbate poverty.

Formation of wage rates. Except where labor unions introduce an element of collective bargaining into the process, wage rate formation in most countries takes place in a context of informal markets conditioned by tradition, social norms, and labor supply and demand factors where employers tend to have much more negotiating power than individual workers. Separate but connected markets exist for various skill levels and occupations. In most poor countries the important questions for policy analysts concern the formation of wage rates for workers who perform unskilled tasks. For workers who have no assets other than their own physical capacity, the wages in this market determine how close to survival they will be. When governments are actively concerned about poverty and income distribution, the pressures to legislate a minimum wage for these workers may be great. Understanding how these wages are formed without government policy provides the insight needed to judge the efficacy of minimum wage legislation.

Labor markets tend to be more segmented than capital markets, even for the basic grade of unskilled workers. Part of the segmentation arises from the lower mobility of labor compared with capital. Workers are limited in their willingness and ability to move from one region to another in search of job opportunities, and employers frequently are unwilling to hire workers from other regions or because of their race, religion, or sex. Knowledge about labor availability and job opportunities is spotty and uneven. Because of these labor market imperfections, an equilibrium wage in the absence of government intervention is hard to determine even in urban labor markets.

In rural labor markets wage rate formation is even more complicated than in urban markets. Many labor agreements for rural workers involve land tenure relationships and conditional access to land, payment in kind for specific agricultural tasks, and highly regimented division of labor by sex with wages bearing little relation to actual physical productivity. Even in regions with substantially more workers available than can be used productively for the available rural tasks, wage rates do not drop to an equilibrium that is below a subsistence level. Access to the jobs available tends to be by rationing, luck, or the establishment of patron-client relationships that bind landless workers to individual landowners or to merchants and small-scale rural manufacturers.

Minimum wage legislation. Governments have found it virtually impossible to intervene successfully in such complicated rural labor arrangements without drastic restructuring of tenure relationships and rural asset ownership. Even indirect mechanisms, such as helping to organize unskilled landless laborers into trade unions, have had little effect on changing the real access of such workers to regular, productive jobs in the countryside. To create such jobs, the structure and dynamism of agriculture itself must change, which is a long-run task for development policy, not a short-run task for minimum wage legislation. Direct rural job creation through food-for-work projects or labor-intensive rural works projects have the potential to guarantee jobs at a minimum wage if local management is effective, if engineering design has made the projects useful and productive, and if government finances enable a continuing commitment to the program.

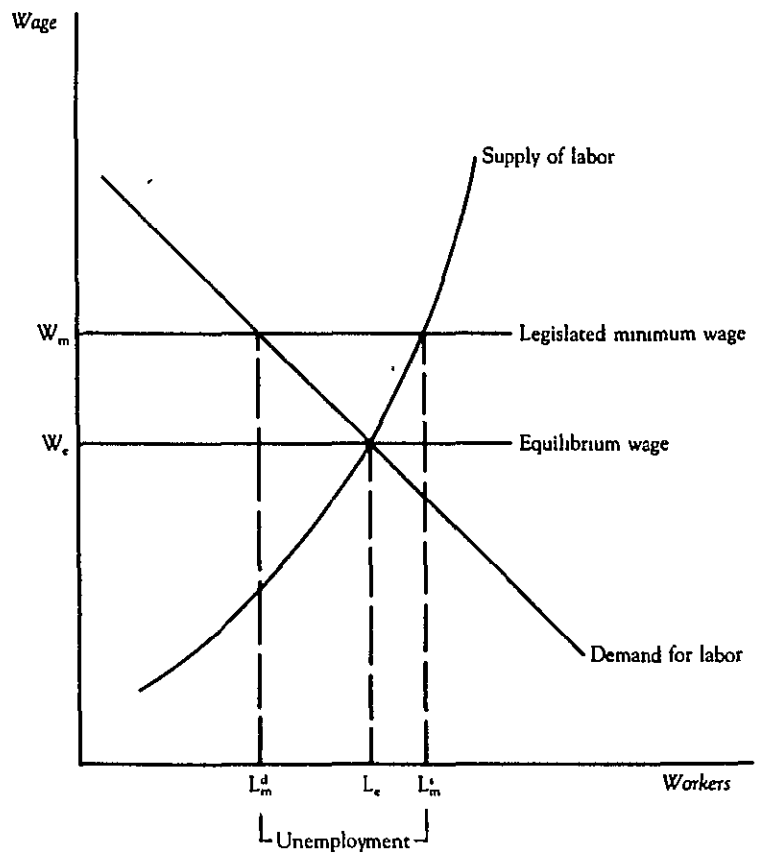
In urban labor markets, attempts to legislate minimum wages and improved working conditions have been much more successful. In large-scale industrial firms, in modern banks and service organizations, and in government employment itself, legislated minimum wages for unskilled employees are enforced relatively easily. Foreign enterprises in particular, not wanting to be charged with exploitation of cheap local labor, usually pay wages at or above the legal minimum and above the rates prevailing in nearby informal labor markets unaffected by government legislation.

The effects of minimum wage legislation on urban labor markets are quite controversial. Almost everyone agrees it has little impact on rural wages, except very indirectly. For workers able to obtain jobs at the higher wage, the result is clearly beneficial. Their incomes are higher than in the absence of the legislation, and their families are likely to be better housed, clothed, educated, and fed. As part of an urban "working-class elite," these workers

are likely to be very strong and vocal supporters of the government program and of efforts to keep intact the real purchasing power of the minimum wage if inflation is tending to erode it. Since many of these workers may actually be part of the government itself, pressures are great to implement and maintain in real terms a minimum wage that provides a comfortable standard of living.

As figure 5-4 illustrates, however, such a wage policy causes several untoward effects. In the absence of minimum wage legislation, the urban labor market clears at an equilibrium wage of W_e and workers employed number L_e. An effective legislated minimum wage raises wages to W_m, which reduces employment to L^d_m, while it increases the number of workers willing to work at W_m to L^s_m. Consequently, the result is unemployment equal to $L^s_m - L^d_m$ workers.

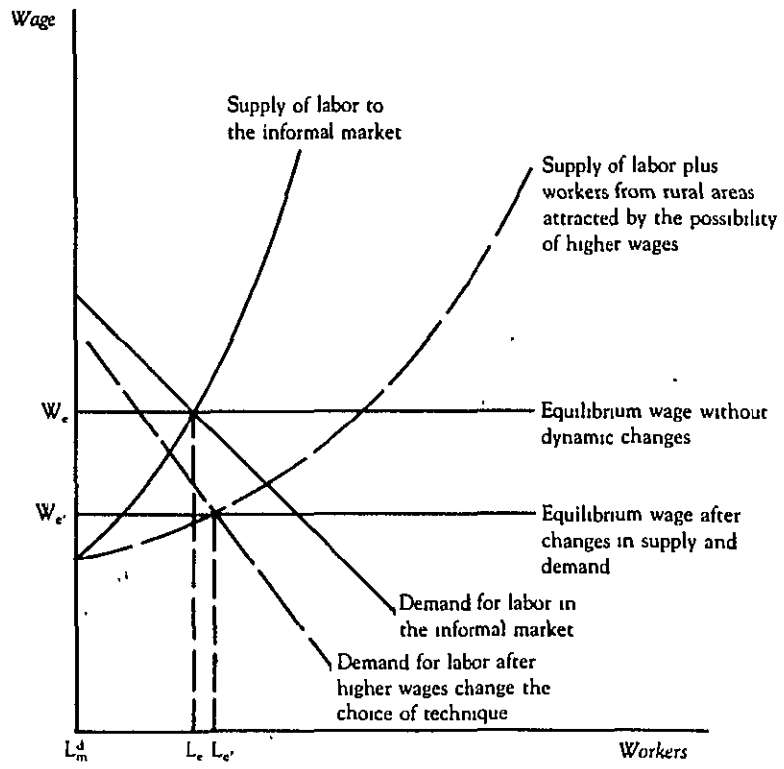
Figure 5-4. Illustration of the Effect of a Minimum Wage on the Urban Labor Market in the Formal Sector



In most poor countries these unemployed workers cannot survive without some type of job, and they seek work in an informal urban sector while awaiting the lucky break that secures them a formal job at the minimum wage. Hence a greater segmentation of the urban labor market exists than before the legislation. Frequently the benefits from official jobs are so great that it is worth spending the entire educational process, including college if necessary, collecting the qualifying credentials and then waiting for years in the informal urban sector until the opportunity comes along. Although the worst manifestations of this queuing occur for civil service sinecures, the problem is pervasive all the way down the hiring range to janitors in a branch bank.

Figure 5-5 illustrates wage formation in the informal urban sector. In the simplest case, the demand and supply of labor for the formal sector are

Figure 5-5. Illustration of Wage Formation in the Informal Sector of the Urban Labor Market after a Minimum Wage Is Legislated in the Formal Sector



subtracted from the total labor demand and supply curves, and the previous overall equilibrium wage W_e is established as the equilibrium wage in the informal sector, with employment equal to $L_e - L_m^d$. Thus workers fortunate enough to have a job in the formal sector are paid W_m (the minimum wage shown in figure 5-4), and all other workers who were willing to work at W_e actually have jobs at that wage in the informal sector. This presumes, of course, that the government does not try to enforce minimum wages in the informal sector by police crackdowns or closing of establishments. If it does, then the previous equilibrium shown in figure 5-4, with its open unemployment, is the actual outcome.

Two dynamic effects prevent the outcome in the informal market from being quite so positive as initially shown in figure 5-5. First, decisions about choice of technique in investment alter the consequent creation of productive jobs. High wages induce firms to substitute capital (especially when subsidized) for labor, no matter how many workers may actually be available in the economy. Labor absorption can proceed more rapidly where entrepreneurs are encouraged, not discouraged, from using the relatively abundant resource. The reduced demand for labor is shown in figure 5-5 by a shifted demand curve, although part of the choice-of-technique effect would show up in the informal labor market as additional supplies of workers in search of jobs.

The second factor also affects the potential supply of urban workers looking for jobs in the formal sector but pushed into the informal sector until they are successful. If the possibility of obtaining a high-paying job in the formal sector attracts additional migrants from rural areas beyond the number that would come at the lower equilibrium wage, then the labor supply curve for the informal market is shifted out. In combination with the shifted labor demand curve, the new equilibrium wage in the informal market falls to $W_{e'}$, well below even the W_e level that would have prevailed in the absence of legislation.

The equilibrium real urban wages that accurately reflect labor abundance may be very low and may leave many families in poverty. The alternative, however, is a badly segmented labor market with many families left destitute by unemployment or low-productivity casual employment. While a targeted food policy can ease the short-run consumption problems of the productively employed poor, reaching the destitute requires relief efforts that are tangential and frequently competitive to the overall task of raising productivity and reducing poverty.

Because minimum wage legislation can be selectively enforced only for a few visible firms or in government enterprises, it tends to short-circuit the gradual process of poverty alleviation by jumping a few lucky workers directly into relative (but only relative) affluence. When the legislation has a meaningful impact on urban wages, and therefore on choice of technique in manufacturing and services, the result is to exclude many unskilled workers from these benefits and to generate a large, and frequently permanent, subclass of labor which must subsist on the fringes of formal economic activity. It is within these fringes that most urban food problems are found.

Rural-Urban Terms of Trade

The rural-urban terms of trade, or the food parity price discussed in chapter 4, are determined by the interaction of four separate sectoral price elements—output prices for agriculture, input prices for agriculture, output prices for the urban-industrial sector, and input prices for the urban-industrial sector. Governments can and do influence all four of these sectoral prices, usually with very specific objectives. Tariffs on rubber tires make the domestic tire industry more profitable, subsidies on steel make bicycle factories more profitable, subsidized fertilizer makes grain production more profitable, and subsidized grain imports make consumers better-off.

When combined, these separate price interventions make up the terms of trade for the rural sector relative to the urban or industrial sector. These are then a direct indicator of the profitability of agriculture and of the purchasing power in goods and services of agricultural income. The terms of trade will find their own market-determined level in the absence of government intervention. But since all governments intervene, the issue is how domestic and international markets condition what governments can do and should want to do to structure the profitability of agriculture relative to industry.

Macro Policies and the Rural Sector

The social profitability analysis in chapter 3 and the price policy analysis in chapter 4 present tools to help address this issue of appropriate government involvement in specific sectoral pricing questions. However, the emphasis here is on the macro economy. How do macro prices and macroeconomic policy influence the rural-urban terms of trade, and how is that influence transmitted to and felt in the rural sector?

Budget policy, fiscal and monetary policy, and macro price policy have a far stronger effect on the rural-urban terms of trade than is often realized. In many circumstances, sectoral efforts to design incentive price policies for particular commodities are partly or even totally vitiated by contrary pressures from the foreign exchange rate, alternative subsidy policies, or high internal inflation. Understanding the incentives facing rural producers is impossible without tracing both the impact of commodity-specific price policies and the broader influence of the macro economy on agriculture.

RURAL-URBAN BALANCE. Most industrial sectors in the developing world are protected by high tariff barriers or direct controls over competitive im-

ports. Agricultural producers receive little protection and frequently are actively discriminated against by subsidies on competitive imports and by taxes on their exports. As a consequence, the rural-urban terms of trade are skewed quite directly by government policy in favor of the urban-industrial sector and against the rural sector.

Such a direct policy has an important indirect effect on the terms of trade as well. The higher the level of protection against imports, the more overvalued the foreign exchange rate will be. The agricultural sector produces a much higher proportion of tradable goods—whose prices are directly connected to international prices—than does the urban-industrial sector. An overvalued exchange rate, even when direct controls are not needed to enforce it because of supporting trade and protection policies, discriminates significantly against agriculture by reducing the rural-urban terms of trade.

The discrimination has consequences for both agricultural production and income distribution. A slower growth in output, reduced incomes in rural areas relative to urban areas, and less job creation in agriculture and the rural nonfarm service economy all result from unfavorable rural-urban terms of trade. Specific commodity price policy can overcome this discrimination to some extent. A high rice price, for example, will directly alter the profitability of growing rice, and the wide variation in domestic rice prices in various countries in Asia is evidence of the substantial scope to use trade and subsidy policy to separate internal commodity price policy from international market prices.

But the vitality of the rural economy depends on more than a single commodity. The influence of the macro economy—the foreign exchange rate, industrial policies that alter costs and prices of important urban goods, and fiscal and monetary policies that generate internal inflationary rates higher than those among the major trading partners—extends into the rural economy and affects its vitality in indirect but powerful ways. The clearest example in recent years of the macro economy's role in altering the profitability of agriculture occurred when oil prices were pushed up on two occasions in the 1970s. The agricultural sectors of oil-exporting countries suffered a sharp decline in their rural-urban terms of trade, while the terms of trade for agriculture in oil-importing countries improved dramatically.

The mechanisms by which oil price shocks were converted into significant changes in the rural-urban terms of trade are instructive for food policy analysts, for they help identify the important connections between macro policy and food sector performance. The first connection is through the foreign exchange rate directly. Oil exporters tend to run balance of payments surpluses when oil prices rise sharply, and thus their domestic currencies appreciate relative to trading partners who are oil importers. Mirroring this effect, the currencies of oil importers tend to depreciate when oil prices rise.

Actual changes in nominal exchange rates are not necessary for these shifts to take place because differential inflation rates can accomplish the same changes in real terms. Thus Indonesia maintained an exchange rate of Rp 415 per U.S. dollar from 1972 to 1978, although its domestic inflation rate averaged 5 to 10 percentage points higher per year than the U.S. inflation rate over this period. The rupiah appreciated relative to the dollar by perhaps 50 percent during this time, although no macro policymaker decided to make a change in the real exchange rate. The rural-urban terms of trade were hit hard by this real appreciation of the exchange rate, and rural productivity and incomes suffered. The 50 percent devaluation of the rupiah in November 1978, a conscious macro policy decision, sharply reversed this rural decline. At least during the late 1970s and the early 1980s, Indonesia was the only oil exporter with a large rural population that was able to maintain a healthy rural economy. This was accomplished by macro policy designed, at least partly, with rural interests in mind.

The second major impact of oil prices on the rural-urban terms of trade is less direct. When oil prices rise, oil-importing countries must find a way to spur exports if the flow of oil is to be maintained. Governments can stimulate exports by providing incentives through a devaluation and also by more specific government actions. If a developing country's local industry is not competitive in export markets because of high protective barriers (at both ends—high costs in its industry and poor access to markets in developed countries), policymakers inevitably look to the rural areas for increased exports. To spur rural exports, greater incentives and increased competitiveness are needed. These come through cost-reducing measures, increased availability of yield-increasing inputs such as fertilizer, removal of export taxes, better attention to infrastructure and marketing facilities, and a commitment to new research and technology for agriculture. The evidence is quite clear that pressures to pay for oil imports force macro policymakers to improve the terms of trade for agriculture.

Income distribution and productive investment. The importance of the rural-urban terms of trade extends beyond structuring incentives to increase output or to earn more foreign exchange to pay for oil imports. Rural-urban income distribution is also to a large extent a function of these terms of trade. Differentials between rural and urban incomes are the source of much of the rural poverty and hunger that food policy analysts are attempting to understand. Through migration decisions made by rural households, many problems of urban poverty are also connected to these differentials. In nearly all countries, average per capita incomes in rural areas are lower than per capita incomes in urban areas. In a few industrialized countries the disparities are only 10 or 20 percent, but in some African and Latin American countries urban residents earn ten times and more the income of the average rural inhabitant. Apart from its obvious impact on human welfare, the distribution

of national income between urban and rural areas is important to food policy analysts because it is linked to the macro economy through the structure of aggregate demand.

Rural consumers have different spending patterns from those of their urban cousins. At any given income level they consume more food and fewer imported goods and services. Rural demand for domestic manufactures emphasizes clothing, cookware and dishes, tiles, bricks, and other home construction materials, lanterns, and eventually bicycles, radios, and sewing machines. By comparison, urban demand patterns usually have relatively less domestically produced starchy staples, more meat and fish, more imported food (both basic grain and processed luxury foods), and manufactured goods with a heavy import content, such as automobiles, motorcycles, television sets, and refrigerators.

In addition, rural households have a higher savings rate at all income levels, reflecting the dual role of many households as both producers and consumers. A significant share of rural household income is reinvested in productive inputs. Some, such as fertilizer or seeds, are only short-run investments, although usually with very high annual rates of return, while others, such as investments in farm implements, irrigation and drainage facilities, and livestock, may have a significant long-term payoff. A diminished flow of income to rural areas usually means a sharply diminished rate of rural investment and a consequent slackening in demand for rural labor.

Extensive research by John Mellor and his colleagues, especially in an Indian context, has shown the important second-round effects of the different consumption patterns in urban and rural households. Each rupee spent by a household creates additional spending as the recipients add these rupees to their incomes and then pass them on through their own expenditure patterns, thus multiplying the effect of any new purchasing power. In terms of employment created and further economic activity in total, the multiplier effects of the extra rupee spent by a rural household are larger than those of the marginal rupee spent by an urban household in the same income class. Some evidence suggests that the multiplier effects are larger for rural lower-income households than for higher-income households in either rural or urban areas if their additional food demand is met from domestic production rather than from imports. Otherwise, as Mellor points out, poverty-oriented development strategies are self-defeating: food price increases or balance of payments problems eliminate the income gains of the poor.

The discussion of the impact of macro policy on the rural-urban terms of trade has now come full circle. A failure of the rural sector to increase productivity is the primary bottleneck for any strategy attempting to raise the incomes and reduce the hunger of the poor. To eliminate the bottleneck, additional incentives to agricultural producers are likely to be needed, but these may well lower the real incomes and increase the hunger of the poor. The food price dilemma has reasserted itself, this time with the added macro dimension. It is important to understand the implications of this new connection, for it narrows the options for policymakers striving to generate a healthy rural economy in the long run, while it reemphasizes the need to find short-run food interventions to reach the poor.

Rural Growth and Long-run Economic Efficiency

The elements of a strategy for dynamic growth in the rural sector include a modern technology base, an infrastructure capable of moving inputs and output efficiently, an institutional support system that provides farmers and merchants with reliable and current information and that sets and enforces fair "rules of the game," and a set of positive incentives to farmers to increase output. In the context of the available technology and all the other infrastructural investments and institutional support, these incentives are heavily influenced by the rural-urban terms of trade, which are the outcome of a host of interacting sectoral and macro policy decisions.

It is fair to say that much of the environment for rural decisionmaking is dictated by macro policy and the macro prices. Rapid rural growth over long periods can occur only when this macro environment encourages the efficient allocation of resources. Short bursts of growth are possible from any of the other elements in the decisionmaking environment—a new seed technology, subsidized fertilizer, or a more effective extension service. But for the long haul, rural growth will falter in the absence of an overall economic environment that encourages and ultimately forces the allocation of land, labor, and capital into their most productive uses. Good macro policy facilitates rural growth.

Precisely the same statement holds for the rest of the economy. The overwhelming lesson of development experience over the past few decades is that the efficiency with which resources are allocated determines how rapid the growth path will be. This experience is contrary to the expectations of many economists and planners in past years, who noted that static economic losses to allocative inefficiencies were small, typically less than 2 percent of national income even for severe distortions, and hence could easily be dominated by more rapid growth. Just the opposite has happened.

The dynamic efficiency losses are compounded, not eliminated, in the face of macro policy that distorts the allocation of economic factors, diverting them from their most productive uses. The distortions usually found—overvalued exchange rates, subsidized interest rates, minimum wage legislation, depressed agricultural incentives, and low food prices—arise from attempts to control inflation and the distribution of output in the short run. But economic growth, including growth in rural areas, is ultimately inhibited by such a set of macro signals. At the same time, the short-run distributional and welfare concerns remain and, indeed, are exacerbated if attempts are made to bring the macro prices and macro policy into alignment with the underlying scarcity value of resources.

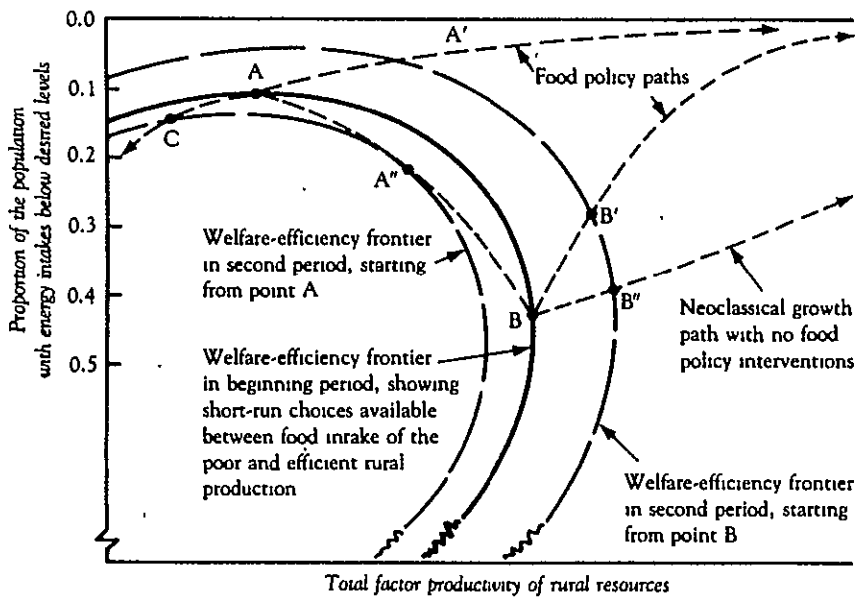
The tension between productive efficiency and economic growth in the

long run and the short-run consumption consequences of the macro environment needed to generate such growth is one of the core topics of this book. A fairly direct link exists between efficient growth in the rural sector and efficient growth in the rest of the economy because both are conditioned by the same set of macro prices and macro policies.

This means that the food price dilemma, which has been treated so far as primarily a sectoral problem, is in fact part of a larger macro price dilemma. This larger dilemma is the basic choice all societies must make between equity and efficiency. To show the nature of the tradeoffs involved in making this choice, it is convenient to focus the discussion on the food sector itself. Even here quantification is not easy, but it is easier to deal with the tradeoffs in the food sector alone than to juggle those in the entire economy.

Figure 5-6 illustrates the basic issues. The core of the figure is the curve showing the "welfare-efficiency frontier," or the short-run choices available between food intake of the poor and efficient allocation of productive resources in the rural sector. There is, of course, much more to the distributional and welfare aspects of the food price dilemma than the food intake levels of the poor. Similarly, there is much more to efficient growth than static allocation of resources and total factor productivity. However, these two axes capture the essence of the dilemma while still permitting some concrete sense of what is at stake.

Figure 5-6. The Food Price Dilemma Illustrated



The curve depicting the current choices available between "efficiency" and "welfare" is drawn in such a way that only part of the range involves a tradeoff. For both low welfare levels and low efficiency levels, raising one also raises the other. In many countries whose present situations fall within these boundaries, greater efficiency in production will improve welfare, not decrease it. For some countries greater welfare would lead to improved efficiency. In contrast, countries currently between A and B on the choices frontier have to make very difficult tradeoffs with respect to food price policy and other food sector interventions, and these countries face the food price dilemma directly.

A healthy rural sector with appropriate incentives will grow in total output and in productive efficiency over time. This is shown by a widened frontier in the second period if society starts at point B, which maximizes the efficiency of resource use. As the productive capacity per capita grows, the society's potential to eliminate food energy deficits also improves.

By contrast, if the society starts at point A, where food intake of the poor is maximized at the expense of efficient use of rural resources, the future capacity either to produce or feed people is reduced—to the inner frontier shown in figure 5-6. The growth path available to society is a function of the actual starting point on the short-run curve of available choices. A high welfare, low efficiency starting point, such as A, is not stable in the long run because the welfare potential declines either toward C, with negative growth, or through A" toward B, with greater growth but reduced welfare. Alternatively, a high efficiency, medium welfare starting point, such as B, puts a country on a path of rapid growth in output via B" but slow progress in reducing hunger.

Starting point B is generated by a macro policy environment that provides efficient incentives to the rural sector but with no food policy interventions on the consumption side. A continuation of such a policy approach would lead society out path BB". The result is rapidly increasing rural productivity and a gradual reduction in the proportion of the population with food energy deficits. In the absence of any consumption interventions, such as the food stamp programs or fair-price shops described in chapters 2 and 4, such a neoclassical growth path eliminates energy deficits slowly and asymptotically. Even wealthy countries without food interventions have hungry people.

The alternative to the neoclassical growth path BB" is a food policy path BB' that involves more active government intervention in the food system. Some growth in efficiency and output is sacrificed for a much more rapid elimination of hunger, but economic growth remains a major objective of overall food policy. How to reach and stay on BB' is practically a definition of the food price dilemma. The resolution requires a combination of policies that provide farmers with adequate incentives while poor consumers are protected from high food prices by targeted food interventions. By now the analyst can begin to see the various pieces needed to complete this puzzle.

Some countries have attempted to use their macro food policies and budgetary allocations to favor short-run welfare. Those that have succeeded find themselves at point A, facing production stagnation and some difficult choices over what policies will best provide for continued short-run protection of existing welfare levels and yet guarantee that future welfare levels can be maintained. As T. W. Schultz's book (see Bibliographical Note to chapter 1 above) on distortions of agricultural incentives indicates, many countries that have followed such a welfare policy are actually at point C, where greater productive efficiency would help welfare even in the very short run.

Ideally, a country starting at point A (or even at point C) could find a set of policies and programs that would permit rapid growth in productive efficiency in the rural sector without sacrificing welfare. Path AA′ (or CAA′) would then permit the small remaining food energy gap to be closed in the context of rapid and efficient growth.

Most rural growth strategies as now understood by the economic development profession do not permit a direct transition from A to A′. In fact, most of the welfare policies that have produced starting point A are inimical to rapid and efficient growth because they suppress incentives to farmers as a way of keeping food prices low to all consumers or financing direct food subsidies for urban consumers. Implementing a rural growth strategy that reverses this low food price bias and provides new price incentives to the rural sector will cause the growth path to be from A via A″ to B, and then along B″.

For policymakers in countries starting between C and A, a growth path of AA″ to BB″ must look distressing indeed. Taking that route requires a significant increase in the degree of perceived hunger among the population, which gives rise both to legitimate welfare concern and to strong political pressures to dismantle the growth policies that use incentive prices. Are there any alternatives?

This book attempts to outline the framework for a set of food policies that open path AA′ and BB′ to governments with a significant desire to alleviate chronic hunger among their people. Reaching such paths requires active government intervention in food systems in a way that encourages private incentives. Simultaneously, consumption interventions that reach the target population of individuals and families with food deficits must be designed in a way that maintains fiscal integrity and does not destroy farm incentives. Achieving these multiple and conflicting objectives is the task of a macro food policy, whose elements are assembled in chapter 6.

The Macro Perspective

Macroeconomic issues are abstract and frequently counterintuitive. What seems at first glance like good policy turns out to have negative consequences. In addition, the familiar decisions of everyday life are not paralleled in macroeconomic decisionmaking. To be sure, there are macroeconomic decisionmakers, but they are public officials who must respond to a wide variety of pressures and constraints, not simple economic criteria, in designing and implementing macroeconomic policy.

Macroeconomic policy also performs in a subtle and frequently irreversible fashion. Economists are accustomed to being able to operate policy levers equally well in either direction and expect decisionmakers to respond at the margin. Supply and demand elasticities work both ways, but response to macroeconomic policy changes is not so direct. Expectations and a sense of the future are inherent components of that response, for the role of macro policy is to keep a nation's economy on an even keel, headed in the right direction, and actually making progress. In short, macro policy fosters the environment in which economic development takes place.

This environment is not merely a succession of short-term policy settings, but is more properly conceived of as part of a historical evolution, where decisionmakers have memories as well as expectations. The memories cause a sharp dichotomy in what macroeconomic policy can accomplish. It can be very effective in creating an environment of distrust, high risk to investments, and extremely short time horizons for decisionmakers. It can, in fact, bring the economic growth process to a halt almost overnight.

Macro policy cannot, however, easily recreate the environment for growth once its fragile structure has been undermined. Regaining the confidence of investors large and small, foreign and domestic, requires a lengthy commitment to investment incentives which have few short-term payoffs. Policymakers often cannot withstand the pressures to show immediate results. They respond with actions that threaten further the very confidence they must win.

The food system has a major stake in this process. Macroeconomics is far removed from the problems caused by a delayed shipload of grain, but solving those problems in a sustainable manner comes with the structural transformation of the food system itself. This transformation is intimately tied in with the development of the rest of the economy, which depends on the continuity and skillful design of macroeconomic policy.

Bibliographical Note

The literature on macroeconomics is vast, but it virtually ignores food and agriculture. Similarly, most of the literature on food and agricultural policy has a micro focus which does not examine the macro environment in which the food sector must develop. The references here note the exceptions, but provide mainly a guide to the macroeconomic policy literature that is relevant to the food policy issues discussed in this chapter and to the literature on food and agriculture that raises macroeconomic issues.

The four basic areas of macro policy—budget policy, fiscal and monetary policy, macro price policy, and the rural-urban terms of trade—are placed in an economic development context in a textbook sponsored by the Harvard Institute for International Development, S. Malcolm Gillis, Dwight H. Perkins, Michael Roemer, and Donald R. Snodgrass, *Economics of Development* (New York: Norton, 1983). Many of the theoretical issues connecting the macro topics discussed here are dealt with in detail in a textbook by Rudiger Dornbusch, *Open Economy Macroeconomics* (New York: Basic Books, 1980). A helpful review of the formal models available to macro policy analysts is Lance Taylor, *Macro Models for Developing Countries* (New York: McGraw-Hill, 1980). Chapter 5 of Taylor's book contains a model called "price policy and the food that people consume" and concludes: "The best way to summarize . . . is to observe that like many macro interventions, changes in food price policy cut with more than one edge. . . . This conclusion . . . does point to an important corollary: attempts to 'get the prices right' may indeed have positive effects on output or economic efficiency, but their negative distributional consequences for some groups in the population may be large." Taylor's book tends to build from Ricardian and Keynesian bases rather than from a neoclassical market-equilibrium approach, but it provides a powerful insight, available in no other volume, into how to think clearly about macro problems, including food and agricultural problems, in a development context.

Budget policies and their relationship with fiscal and monetary policies are summarized in W. M. Corden, *Trade Policy and Economic Welfare* (Oxford: Clarendon Press, 1974), especially pp. 58–87, and are treated at greater length in John F. Due and Ann F. Friedlaender, *Government Finance: Economics of the Public Sector* (Homewood, Ill.: Richard D. Irwin, 1973), and in John F. Due, *Indirect Taxation in Developing Countries* (Baltimore, Md.: Johns Hopkins University Press, 1970).

The term "macro prices" was first used in a paper by C. Peter Timmer, "Public Policy for Improving Technology Choice," Discussion Paper no. 84 (Cambridge, Mass.: Harvard Institute for International Development, March 1980), where their impact on the rural sector and on appropriate development strategies was treated in the context of a continuum of decisionmaking between micro and macro levels. The literature on each individual macro price is extensive. A theoretical approach to exchange rate policy is fully developed in W. M. Corden, *Inflation, Exchange Rates and the World Economy* (Oxford: Oxford University Press, 1977). Complementary textbooks include Richard E. Caves and Ronald W. Jones, *World Trade and Payments: An Introduction* (Boston: Little, Brown, 1981); and Charles P. Kindleberger and Peter H. Lindert, *International Economics* (Homewood, Ill.: Richard D. Irwin, 1978). Empirical evidence on the purchasing power parity theory is contained in Ronald I. McKinnon, *Money in International Exchange: The Convertible Currency System* (New York: Oxford University Press, 1979); on the effects of a devaluation in Richard N. Cooper, "Currency Devaluation in Developing Countries," *Essays in International Finance*, no. 86 (Princeton, N.J.: Princeton University, June 1971); and on the implicit tax on agriculture fostered by an overvalued exchange rate in Ian Little, Tibor Scitovsky, and Maurice FG. Scott, *Industry and Trade in Some Developing Countries* (London: Oxford University Press, 1970).

The approach followed here to analyze interest rate policy is based largely on two seminal books, Ronald I. McKinnon, *Money and Capital in Economic Development* (Washington, D.C.: Brookings Institution, 1973), and Edward S. Shaw, *Financial Deepening in Economic Development* (New York: Oxford University Press, 1973). Empirical evidence of the links between positive real interest rates, financial deepening, and economic growth is presented in Hang-Sheng Cheng, "Financial Deepening in Pacific Basin Countries," *San Francisco Federal Reserve Economic Review* (Summer 1980).

A particularly useful review of financial policies is contained in a special issue, "National and International Aspects of Financial Policies in LDCs," *World Development*, vol. 10, no. 9 (September 1982). The paper by John Williamson in this volume, "On the Characterization of Good Economic Policy: Is There a Consensus?" suggests four policy rules which appear to be consistent with the main themes of this chapter: "(1) the pursuit of microeconomic efficiency, to place the economy on the frontier; (2) maintenance of an effective, though not necessarily rigid, anti-inflationary stance; (3) continuous maintenance of internal balance [between aggregate demand and aggregate supply]; and (4) medium-term pursuit of a current balance [of payments] target guided by thrift and productivity" (p. 695).

The discussion of the formation of wage rates draws on a literature as vast as the economic development literature itself, based as it is on labor surplus models and the availability of rural labor at subsistence wages. A recent review places this entire topic in historical and analytical perspective and emphasizes the enormous complexity of rural wage determination: Hans P. Binswanger and Mark R. Rosenzweig, *Contractual Arrangements, Employment and Wages in Rural Labor Markets: A Critical Review* (New York: Agricultural Development Council, 1981). A book by John Connell and Michael Lipton, *Assessing Village Labor Structures in Developing Countries* (New Delhi: Oxford University Press, 1977), discusses the implications of rural labor markets on rural-to-urban migration. Two books provide very helpful insights into the overall effects of macro policy (and macro prices) on choice of technique, employment generation, and the ultimate impact on alleviation of poverty. A. K. Sen, *Employment, Technology and Development* (London: Oxford University Press, 1975), presents an integrated theoretical perspective on the topic, while Gary S. Fields, *Poverty, Inequality, and Development* (Cambridge: Cambridge University Press, 1980), is the best available review of empirical evidence on the impact of macro policy on the distribution of income and on alleviation of poverty.

For over two decades the works of Bruce F. Johnston and John W. Mellor have provided insight and evidence on the connections between agriculture and development of the rest of the economy. Their joint article in 1961, "The Role of Agriculture in Economic Development," *American Economic Review*, vol. 51 (September 1961), pp. 566–95, began the long process of thinking about the agricultural sector as a potentially positive factor in development rather than as a repository of resources to be tapped at the pleasure of national planners interested in industrialization. Mellor's text, *The Economics of Agricultural Development* (Ithaca, N.Y.: Cornell University Press, 1966), developed many of these themes empirically and analytically. Chapters on "Agriculture and Capital Formation," "Agriculture and Foreign Exchange," and "Increasing Rural Welfare" still speak directly to the macro issues discussed here. A book that synthesizes much of Johnston's thought, done jointly with Peter Kilby, an industrial economist, is *Agriculture and Structural Transformation: Economic Strategies in Late-Developing Countries* (New York: Oxford University Press, 1975). The Johnston-Kilby volume is particularly concerned with the issue of technology choice discussed here and with appropriate policies to generate efficient use of resources. A similar book by Mellor, *The New Economics of Growth* (Ithaca, N.Y.: Cornell University Press, 1976), identifies both conceptually and empirically the important linkages between agricultural performance and overall macroeconomic growth. A paper by Graciela Chilchilnisky and Lance Taylor, "Agriculture and the Rest of the Economy: Macro Connections and Policy Restraints," *American Journal of Agricultural Economics*, vol. 62, no. 2 (May 1980), pp. 303–09, presents a comparative statics framework for addressing these issues, primarily in a Latin American context.

The model of macro-micro connections and the empirical evidence that provided an understanding of the impact of oil prices on the rural-urban terms of trade are presented in C. Peter Timmer, "Energy and Structural Change in the Asia-Pacific Region: The Agricultural Sector," Discussion Paper no. 140 (Cambridge, Mass.: Harvard Institute for International Development, December 1982).

The consequences of macroeconomic distortions and of a macro reform are beginning to be documented in a rapidly growing literature. An analysis of the comparative empirical evidence on the important relationships between macroeconomic policies and development is in two volumes published in the series "Foreign Trade Regimes and Economic Development," for the National Bureau of Economic Research (Cambridge, Mass.: Ballinger Press): Anne O. Krueger, *Liberalization Attempts and Consequences*, vol. 10 (1978), and Jagdish Bhagwati, *Anatomy and Consequences of Exchange Control Regimes*, vol. 11 (1978). The results of these books and of other recent work on this topic are reviewed and extended in Ronald I. McKinnon, "Foreign Trade Regimes and Economic Development: A Review Article," *Journal of International Economics*, vol. 9 (1979), pp. 429–52. A lively debate on the actual effects on

developing economies of stringent macro reforms occasioned by external debt crises, as well as a more general discussion of economic stabilization theory and comparative policy experience, is contained in William R. Cline and Sidney Weintraub, eds., *Economic Stabilization in Developing Countries* (Washington, D.C.: Brookings Institution, 1981).

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6 Pricing for efficiency

In the industrial market economies prices play a pivotal role in the allocation of resources. The centrally planned economies have also started to move in that direction, and in developing countries there is a growing body of evidence on the benefits of using prices to reflect scarcities and encourage growth. Remunerative prices helped foster South Asia's agricultural development in the 1960s, and competitive exchange rates contributed to the export successes of several East Asian countries in the 1970s.

Yet government development programs often still concentrate more on the quantity of saving, investment, and output than on prices Where governments have intervened directly in prices, they have often produced unintended results. Price controls to improve income distribution, for example, have sometimes ended up hurting the poorest—as when low food prices, intended to benefit the urban poor, reduce the incomes of the (more numerous) rural poor. Similarly, import controls designed to save imports and improve the balance of trade have often harmed exports and home production and ended up worsening the trade balance. Controlled low interest rates intended to help investors and farmers often ended up reducing the pool of savings available and forcing small investors and farmers to rely on high interest rates in black or informal markets. Pricing policy became increasingly critical in the 1970s because of the international upheavals in energy prices, interest rates, and exchange rates.

This chapter reviews the extent of price distortions in developing countries in the 1970s and assesses their impact on growth The main conclusion is that during the 1970s price distortions were serious in many developing countries. Those countries with the worst distortions experienced significantly lower domestic saving and lower output per unit of investment, thus leading to slower growth.

Price distortions

The issue of price distortions has been widely researched and debated in recent years and has been reviewed in several earlier *World Development Reports* . Distortions exist when the prices of goods and services, as well as of capital and labor, do not correctly reflect their scarcity. For goods that are internationally traded, scarcity is generally indicated by international prices (a fuller discussion is given in Box 4.1).

Price distortions may be caused by monopolistic tendencies in the private sector or by government intervention. It is possible for government interventions, if properly designed, to correct distortions. In most instances, however, price distortions are introduced by government directly or indirectly in pursuit of some social or economic objective, sometimes deliberately, sometimes incidentally.

In most cases, these price-distorting policies have their origin in a complex set of political and economic factors. In the 1950s the dominant theories of economic development played down the power of prices and the degree of flexibility in resource allocation. Instead, inward-looking trade policies were favored by governments in many newly independent countries, partly in reaction to the colonial power's keenness to export their agricultural products and to import industrial products from the metropolitan country. In other countries, particularly in Latin America, governments wanted to be less dependent economically on the dominant industrial powers Many of the controls leading to distortions were imposed in response to scarcities of foreign exchange, or capital, or certain goods (particularly during and after World War II); but the controls were often continued even after their rationale had vanished. Often distortions have arisen as the unintended by-product of inflation under a regime of fixed exchange rates.

As background research for this Report, the available facts on price distortions have been collated for thirty-one developing countries, representing more than 75 percent of the population of the developing world excluding China. The analysis concentrates on distortions in the prices of foreign exchange, capital, labor, and infrastructure services (particularly power). Distortions are not measured against some theoretical ideal, but are practical approximations commonly used in policy analysis. For example, to measure distortions in the pricing of foreign exchange, one should ideally measure the effective exchange rates for imports and exports as they deviate from the "equilibrium" rate. In practice, it is difficult to calculate equilibrium exchange rates; policy discussions generally focus on changes in real effective exchange rates from a base period, together with the effective protection or taxation of traded goods. Similarly, distortions in interest rates are judged by how far interest rates were negative in real terms; in wages, by movements in real wages relative to productivity adjusted for changes in the terms of trade; in the value of money, by high and accelerating inflation; and in infrastructure prices, by the rates of return in utilities The estimated price distortions are found to be inversely related to growth and efficiency, but there is no strong evidence of such distortions leading to any gain in equity.

Exchange rates

Changing the real exchange rate can be a powerful tool for balancing trade without burdening the administrative system and without distorting domestic incentives. Yet in the 1970s in many countries with a large balance of payments deficit, the exchange rate was allowed to become overvalued in relation to the purchasing power of the currency This lack of competitiveness became particularly serious in sub-Saharan Africa, where the average real effective exchange rate appreciated by 44 percent between 1973 and 1981. (The real effective exchange rate is here defined as the import-weighted exchange rate adjusted by the ratio of the domestic consumer price index to the import-weighted combination of consumer price indices in the trading partners.) Several African countries now find that producers of traditional export crops cannot be paid enough to cover their costs of production, even though these are the crops for which they have a strong comparative advantage. (Cocoa in Ghana is an obvious example and is discussed in Chapter 8, Box 8.1.) While the problem was generally less severe for other regions, in several countries an overvalued exchange rate harmed not only the balance of payments but also their growth. Even in such countries as Argentina, Chile, Sri Lanka, and Uruguay, which initiated programs of economic reform during the 1970s, the real exchange rate was subsequently allowed to appreciate and thus weakened their reform programs.

Trade restrictions

Trade restrictions have often led to high and variable rates of protection between different manufacturing industries. By contributing to an overvalued exchange rate, such restrictions have inadvertently discriminated against both exports and agriculture. In several countries (such as Cameroon, Ghana, Senegal, Tanzania, and Turkey), this bias against exports has been supplemented by export taxes or even outright restrictions, sometimes leading to increased agricultural imports at the expense of domestic production.

When import controls are intended to protect infant industries, they are rarely geared to promote an industry's long-run growth potential; nor are they reduced even after the industry has reached adolescence. The loss of efficiency resulting from such policies can be considerable. In extreme cases—steel in Bangladesh, tin cans in Kenya, and cars in Thailand—the foreign exchange cost of importing raw materials and capital significantly exceeds the foreign exchange cost of importing the finished products. Apart from these losses, the system of protection in many developing countries has become a serious administrative burden and, by giving windfall gains to those who obtain import licenses, often makes the distribution of income more unequal as well.

Interest rates

Overvalued exchange rates and low tariffs on imported capital goods encourage capital-intensive techniques at the expense of creating jobs. These tendencies are strengthened when interest rates charged to borrowers (and paid to savers) fall short of the inflation rate. At various times in the 1970s, negative real interest rates were almost a worldwide phenomenon But they were particularly severe and persistent in countries such as Argentina, Brazil, Ghana, Jamaica, Nigeria, Peru, and Turkey, frequently reaching double figures. Such negative real interest rates not only penalize savers and stimulate capital outflows but also encourage excess demand for credit—which is then suppressed by rationing loans, causing more administrative burdens.

Costs of labor

Capital-intensive investment has also been encouraged where the price of labor has been increased by unrealistic minimum wage laws and social security taxes. In many mineral-based economies, especially in Africa and Latin America, the drive for higher mining wages has spread to other sectors. This has pushed labor costs far above those of competitors, and encouraged rural people to leave the land in pursuit of the high wages paid to those lucky enough to find jobs in the urban sector. In some Latin American countries in the 1970s, social security contributions have added up to 20 percent to the cost of labor. In the 1970s wage negotiations in several countries (such as Ivory Coast and Sri Lanka) failed to allow for deterioration in the country's terms of trade. As a result, real wages grew significantly faster than productivity adjusted for changes in terms of trade.

Infrastructural services

The rapid increases in international costs of energy and capital in the 1970s required correspondingly higher prices for infrastructural services, which are generally both energy and capital intensive. With the exception of some oil-exporting countries and some energy products, most developing countries have adjusted domestic energy prices to international levels. However, infrastructure prices have been raised too slowly to judge by the low rate of return on capital achieved by power utilities. A review of sixty countries conducted by the World Bank in 1980 showed that about half had low (less than 4 percent) rates of return, while several incurred losses. In transport and water supply, rates of return are not available for any sizable sample of countries, but the indications are that most countries fail to recover the full costs of these services. Such underpricing not only increases demand for these capital- and energy-intensive services but also undermines the financial viability of the agencies supplying them.

Inflation

The 1970s was a decade of rising inflation the world over, with most developing countries experiencing double-digit rates. Nearly all the countries that had high—15 percent a year or more—inflation in the 1960s (such as Brazil, Chile, Republic of Korea, and Uruguay) continued in that category in the 1970s, and many others joined their ranks. In several countries (such as Argentina, Bolivia, Chile, Ghana, Mexico, Nigeria, and Turkey), the rate of inflation in the 1970s was high, and several times that in the 1960s. Rapid and accelerating inflation undermines allocative efficiency because it increases uncertainty and induces savers to invest in unproductive "inflation hedges" such as real estate, consumer durables, gems, and foreign currency deposits. Some countries have developed complex systems for indexing wages and prices to compensate for inflation, though this is administratively costly and tends to penalize those (mostly poor) people outside the indexation system. Where indexation does not exist, the "inflation tax" contributes to a growing sense of social and economic injustice.

Linkages among distortions

Most price distortions are connected: some counteract each other, others are reinforcing. For example, an overvalued exchange rate tends to offset the degree of protection given by tariffs, but it increases the bias against exports caused by export taxes. Consumer subsidies may moderate the pressures for raising wages but exacerbate inflationary pressures through increasing budgetary deficits Low interest rates and transport prices for farmers, along with subsidized inputs, may counterbalance the losses they suffer from an overvalued exchange rate. Similarly, agricultural protection works not only through its effects on agriculture but also through its effects on wages and industrial efficiency.

It is therefore not enough to judge the efficiency of allocation on the basis of individual distortions—as is done, for example, when growth is related just to inflation or just to interest rates Some composite measure of price distortions is needed. Nor is it enough to analyze only static efficiency. Price distortions that produce a loss of static efficiency might nevertheless increase dynamic efficiency, or they might produce cumulative dynamic losses. Finally, it is hard to know at what point investment encouraged by protection or subsidized interest rates becomes profligate. The answers to these questions must be sought from empirical evidence.

That evidence is set out in Figure 6.1 For each

TABLE 6 1
Indices of price distortions and various components of growth in the 1970s

Country	Distortion index	Simple group average	Annual GDP growth rate (percent)	Simple group average	Domestic savings income ratio (percent)	Simple group average	Additional output per unit of investment[a] (percent)	Simple group average	Annual growth rate of agriculture (percent)	Simple group average	Annual growth rate of industry (percent)	Simple group average	Annual growth rate of export volume (percent)	Simple group average
Malawi	1.14		6.3		14		25 3		4 1		7 0		5 7	
Thailand	1 43		7 2		21		27.6		4 7		10 0		11.8	
Cameroon	1 57		5 6		18		26 3		3 8		8 6		2.5	
Korea, Rep of	1 57		9.5		22		31 1		3 2		15.4		23 0	
Malaysia	1.57	1.56	7.8	6.8	20	21.4	32 6	27 6	5.1	4 4	9.7	9.1	7.4	6 7
Philippines	1 57		6 3		24		23.1		4.9		8.7		7.0	
Tunisia	1 57		7 5		27		31.4		4 9		9 0		4 8	
Kenya	1 71		6 5		19		32 7		5 4		10 2		−1 0	
Yugoslavia	1 71		5 8		27		18 4		2 8		7.1		3.9	
Colombia	1.71		5.9		22		27 4		4 9		4 9		1 9	
Ethiopia	1.86		2.0		8		30.7		0 7		1 4		−1.7	
Indonesia	1 86		7 6		22		40 1		3 8		11.1		8 7	
India	1 86		3.6		20		15.6		1.9		4 5		3 7	
Sri Lanka	1 86		4.1		13		22 2		2.8		4 0		−2 4	
Brazil	1.86	1.95	8.4	5.7	22	17 8	35 5	26 9	4 9	2 9	9 3	6 8	7.5	3 9
Mexico	1.86		5 2		22		23 4		2.3		6 6		13 4	
Ivory Coast	2.14		6 7		24		25 5		3 4		10 5		4 6	
Egypt	2.14		7.4		12		24 2		2 7		6 8		−0 7	
Turkey	2.14		5.9		17		24 5		3 4		6 6		1.7	
Senegal	2.29		2 5		8		12 8		3 7		3 7		1 2	
Pakistan	2 29		4 7		7		28.1		2.3		5 2		1.2	
Jamaica	2 29		−1 1		16		..		0 7		−3 5		−6 8	
Uruguay	2 29		3 5		14		20 9		0 2		5 2		4 8	
Bolivia	2 29		4 8		20		22 7		3.1		4 3		−1 6	
Peru	2 29	2.44	3 0	3.1	21	13 8	21 5	16 8	0 0	1 8	3 7	3 2	3 9	0 7
Argentina	2 43		2.2		22		10 7		2 6		1 8		9 3	
Chile	2 43		2 4		14		15 1		2.3		0.2		10 9	
Tanzania	2.57		4 9		12		23 9		4.9		1.9		−7 3	
Bangladesh	2 57		3 9		2		22 3		2 2		9 5		−1.9	
Nigeria	2.71		6 5		21		23 8		0 8		8 1		2.6	
Ghana	2 86		−0.1		9		..		−1 2		−1.2		−8 4	
Overall average	2.01		5 0		17 4		23 2		3 0		6.1		3 5	

.. Not available
a Increase in real GDP valued at current prices divided by investment at current prices This is the reciprocal of the incremental-capital-output ratio, adjusted for differential rates of inflation in investment goods and GDP. It is thus equivalent to income rate of return on revalued capital
b GDP growth rates were negative
Source World Development Report 1982

of the major prices, distortions are classified as high, medium, or low on the basis of available figures and the qualitative judgments of Bank staff. For a particular country the degree of distortion may be widely different for different prices. A composite index was therefore obtained by calculating an average of price distortions (see Box 6 1). Figure 6.1 ranks countries in order of increasing distortion in the 1970s. Malawi, Thailand, Cameroon, the Republic of Korea, and Malaysia have the lowest distortion, while Argentina, Chile, Tanzania, Bangladesh, Nigeria, and Ghana are in the "high" category. It is interesting to note that these groups contain a mixture of countries, unconnected by geography, natural resources, or degree of government activism.

Price distortions and growth

A large body of theoretical literature has demonstrated how price distortions result in a loss of efficiency. At an empirical level, studies of Brazil, Chile, Pakistan, Philippines, and Turkey relating to the 1960s estimated that the costs of distorted prices due to trade restrictions alone could have amounted to 4 to 10 percent of their GNP Those countries that embarked on programs of correcting prices in the 1960s (for example, Brazil, Colombia, and the Republic of Korea) also showed significant gains in output (and employment) resulting from these liberalization efforts More recently, as recounted in the 1981 *World Development Report*, it has been found that countries which avoided distorting trade policies were typically more successful in adjusting to external shocks in the 1970s than those with distorted prices

Statistical analysis of the relationship between the price distortion index and growth in the 1970s confirms these earlier findings The average growth rate of those developing countries with low distortions in the 1970s was about 7 percent a year—2 percentage points higher than the overall average. Countries with high distortions averaged growth of about 3 percent a year, 2 percentage points lower than the overall average

The relation between price distortions and the various components of growth is presented in Table 6 1. High distortions are associated with low do-

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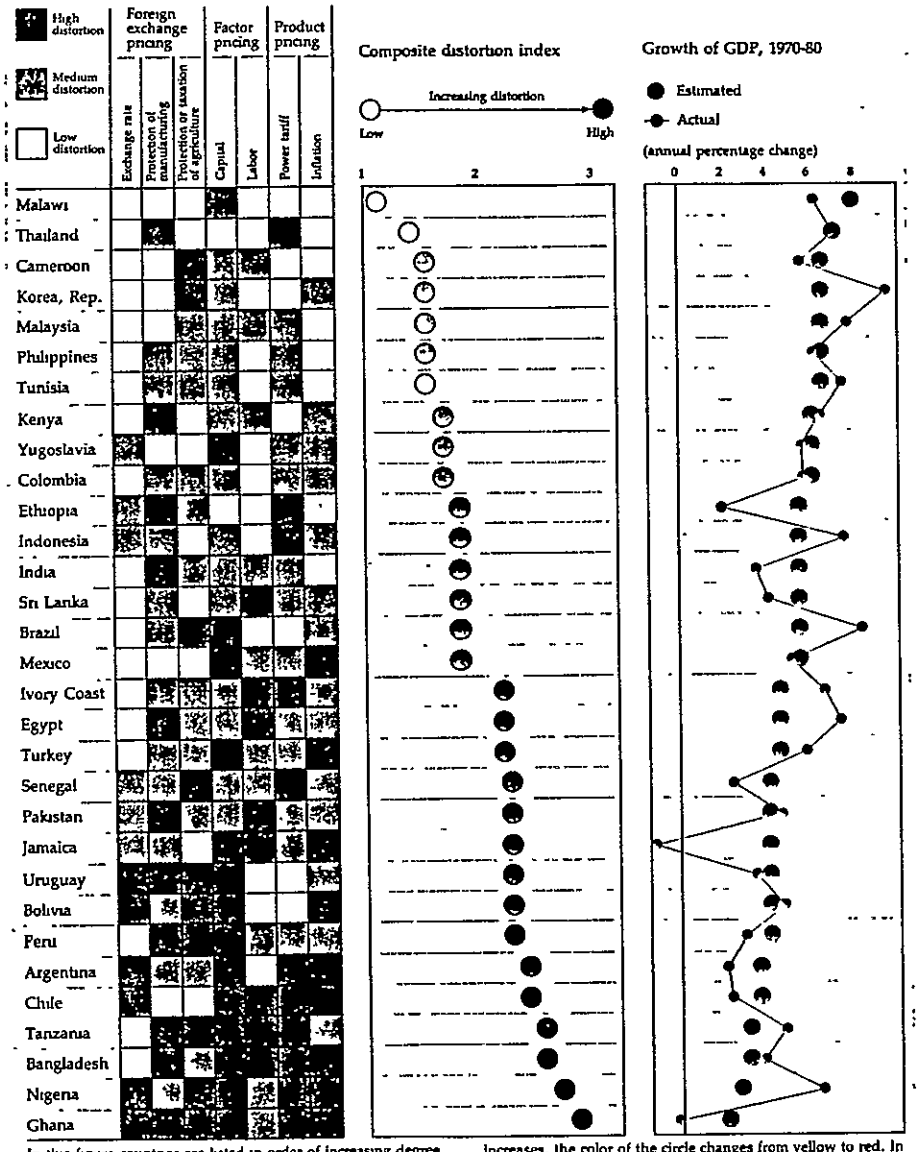
FIGURE 6 1
Price distortions and growth in the 1970s



In this figure countries are listed in order of increasing degree of distortion in prices In the first section, the color of the squares indicates the degree of distortion in the principal categories of prices The middle section is a composite index of price distortion for each country as a country's distortion index increases, the color of the circle changes from yellow to red. In the right hand section, the blue circles show the actual annual rate of growth of GDP, the green circles are estimates of GDP growth obtained by a regression relating growth to the distortion index.

Box 6.1 Price distortions and growth: a statistical analysis

In Figure 6 1 the distortion indices in major prices are classified as low, medium, and high. For statistical analysis, these categories were replaced by numbers 1, 2, and 3 respectively. For the panel of thirty-one countries, the degree of distortion in each price, thus defined, was found to be negatively correlated with the GDP growth rates during the 1970s, with the exchange rate distortion being the most significant

These distortions are interrelated among themselves and each distortion affects growth through a complicated set of interactions on various elements of the economy There are therefore major conceptual and statistical problems in any attempt to identify simultaneously the effects of individual distortions on overall growths or the relative importance of different distortions in the total mix. In these circumstances the composite distortion index in Figure 6 1 is obtained as a simple unweighted average of the individual distortions

The figures on growth rates and distortion indices show that the relatively high (top one-third) distortion countries had growth rates about 2 percentage points lower than the average (which is about 5 percent a year) and the low (bottom one-third) distortion countries, were about 2 percentage points higher than average.

The regression equation relating growth to the composite distortion index shows that price distortions can explain about one-third of the variation in growth performance. Many other elements, not least natural resource endowment as well as other economic, social, political, and institutional factors, would need to be considered in a more complete explanation to account fully for the variation in growth rates Thus as shown in Figure 6 1, Brazil, Egypt, Indonesia, Nigeria, Republic of Korea, and Ivory Coast did much better than would have been predicted by the regression equation, and Ethiopia, Ghana, and Jamaica considerably worse

While the degree of distortions in prices has a significant association with growth, the analysis indicated virtually no correlation with the distribution of income For twenty-seven countries for which figures are available on income distribution, the analysis shows that the distortion index explains hardly 3 percent of the variation in equity, when the latter is measured by the proportion of income going to the bottom 40 percent of the population

mestic savings in relation to GDP and with low value added per unit of investment (this latter association being statistically stronger). Distortions also affect growth rates in agriculture and industry, with a marked influence on exports. In short, the statistical analysis clearly suggests that prices do matter for growth

However, price distortions alone can explain less than half the variation in growth among countries; the rest is the result of other economic, social, political, and institutional factors. So a country well endowed with natural resources (such as Nigeria) or with an active and mobilized labor force (such as China) could still grow relatively fast even if its price structure is distorted. With fewer price distortions, however, its growth would be significantly faster.

AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: Agricultural Policy Reform **Date:** Monday, June 2

Guest Speaker: John Mellor **Time:** 12:00-1:30 pm

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OBJECTIVE(S): At the end of this session participants will be able to:

- Understand what are the key issues of policy dialogues and the respective place of issue delineation, policy papers and policy research in that process.

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ABSTRACT:

Policy dialogue between foreign assistance donors and recipient countries requires an understanding of the respective roles of the various levels of policy from the broad macro framework to sectoal policy to the specifics of project related policy. Without facilitative macro policy, projects will not work; but, conversely good macro policy is for the prupose of creating a favorable environment for the real business of development - projects - and hence good projects and project policy are also esential.

Policy dialogue requires correct delineation of the issues; development of papers drawing from existing knowledge to focus on those issues; and researchh to expand knowledge so that policy papers and policy can improve in the future. Lack of knowledge especially at the sectoral and project level is a major constraint to improve policy in developing countries. They still lack the institutionalized systems for providing data and data analysis for effective policy improvement.

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Required/Optional

HANDOUTS:

- Mellor, John, "Agriculture on the Road to Industrialization", IFPRI, Reprint # 83, Washington. ___/ X
- Mellor, John and Johnston, Bruce, "The World Food Equation: Interrelations Among Development, Employment, and Food Consumption," IFPRI, Reprinted from the Journal of Economic Literature, Vol. 22, June 1984. ___/ X

AGRICULTURAL POLICY REFORM 1/

John Mellor 2/

John Mellor focused his talk on three important themes:

1) The importance of research and policy papers;
2) How should the major donors focus attention on policy change; and,
3) The major policy dialogue issues.

1) The Importance of Research

If a policy needs to be changed, then you need a policy statement. You need the 'written word' which clearly states the arguement and its justification. This forces the writer to be logically consistent. If information is lacking then you are limited and you do the best you can.

The need for policy change and policy papers creats the need for new research which inturn generates new information in a systematic fashion. The International Food Research Institute (IFPRI) conducts research on food policy issues to close information gaps. Its research program is pragmatic, and does not focus on more esoteric topics, such as; improving methodological approaches to social science investigation, or defending mathematical arguements for new analyetical techniques. Practical research programs in the fields of

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1/ Presented to the Agricultural Policy Course #206 sponsored by USAID's Training Division and Checchi and Company, Fredericksburg, Virginia, June 2, 1986. This summary is based on notes from Ernest Carter, Course Supervisor, Checchi and Company.

2/ Director of the International Food Research Policy Institute, Washington, D.C.

economics and agricultural economics exist at US Land Grant universities, however these programs could be made more relevant. One major question which still must be addressed is how to institutionalize research programs in developing countries.

2) How to Focus Attention on Policy Changes

It is necessary to first define just a few core objectives, and focus attention on a simple set of priorities at the top. In Africa, there may be an advantage when only a few rudamentary institutions exist, because this allows you to get a fresh start. The next step involves breaking down the core objectives into their operational parts -- this is where the process becomes complex and disagreements arise.

To be effective, major donor agencies like the World Bank and AID must be able to follow and support policy changes all the way down through the system, from the ministerial level on down to the farm level. However, experience shows that donor agencies are incapable of doing so, because budgets are spread too thinly or personnel are rotated too frequently. It is improtant to understand how Land Grant universities fit into this scheme, and how their support can be better tailored. There is a need for more policy papers at the various levels of policy analysis.

3) The Major Policy Issues (Africa)

** Agricultural Growth Linkages

Convert growth in the agricultural sector to overall economy-wide growth. This dynamic process is especially important for employment reasons. This point comes from the Asian experience (for example, conversion worked well in Taiwan), however it is still relevant in the African context.

** Markets and Pricing Policy

Conservative political parties are now asking for greater reliance on market forces, but even in the US it is politically difficult to press for policy reform in this area. In developing countries the task is even more difficult because you need large data bases on seasonal price changes, cropping patterns and production responses, etc. However, as yet there is little information. Furthermore, the government must still make the necessary investments in infrastructure and extension to facilitate a greater reliance on markets.

** Agricultural Production

Parts of Africa are undergoing a production decline which must be reversed. Several areas deserve attention. Agricultural Research Systems are overextended. National programs must narrow their focus on fewer commodities, and international programs must be better coordinated and research goals better prioritized. Fertilizer application focusing on maise and a few other crops must be increased. The Asian experience demonstrates the importance of fertilizer and other inputs in increasing yields. Infrastructure, especially Road Systems, must receive higher priority. Marketing margins are demonstratively higher in Africa as compared to Asia. One solution to this situation is to regionalize. Finally, Labor Productivity must increase.

** International Trade

The world will be entering a more dynamic demand and supply period where the more open economies of developing countries will experience even greater gains and losses from trade. Therefore, an improved trade analysis capacity will become even more important for developing countries.

AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: Measuring Costs and Benefits of Agricultural Market Intervention — **Date:** Monday, June 2

Lead Instructor: Tweeten — **Session #:** 3

Co-Trainer(s): Fletcher — **Time:** 2:00-4:30 pm

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OBJECTIVE(S): At the end of this session participants will be able to:

- o Understand the impacts of government pricing policies on producers, consumers, marketing agencies, and the government budget.
- o Identify information on pricing policies relevant to policy decision makers.
- o Develop skills needed to reconcile efficiency and equity objectives in designing alternative market and price interventions.

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ABSTRACT:

- o Demand and Elasticity Concepts
  - * consumers' surplus
- o Supply and Elasticity Concepts
  - * producers' surplus
- o Types of Inefficiencies
  - * allocative
  - * x-inefficiencies
  - * rent-seeking behavior
  - * public administration costs
- o Costs and Benefits of Market and Price Interventions
  - * agricultural producer price policies
  - * consumer price policies
  - * input price policies

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READINGS: Required/Optional

- o Tweeten, L., Introduction to Agricultural Policy Analysis: The Distribution of Economic Costs and Benefits from Market Intervention, Abt. Associates, USAID, 1985. X /___

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INTRODUCTION TO AGRICULTURAL POLICY ANALYSIS: THE DISTRIBUTION OF ECONOMIC COSTS AND BENEFITS FROM MARKET INTERVENTION

by

Luther Tweeten*

Government interventions in markets sometimes correct market failure and thereby provide more efficient and equitable allocations. In other cases, perhaps most, interventions result in allocations that are less equitable and efficient than those of the market. This paper shows how to measure economic costs, benefits and redistributions induced by market interventions.

The paper is divided into five parts. The first introduces a conceptual framework for policy analysis. The second applies the framework to agricultural product markets; the third to agricultural input markets. The fourth section illustrates the framework applied to actual data for price policies in Portugal and Liberia. The final section lists conclusions and limitations.

1. INTRODUCING A CONCEPTUAL FRAMEWORK FOR POLICY ANALYSIS

Policy analysis of the symptoms, causes, and cures for economic problems requires understanding of concepts such as supply and demand

*Regents Professor, Department of Agricultural Economics, Oklahoma State University, Stillwater. Background material for Agricultural Policy Analysis Project; Abt Associates lead contractor, and funded by the U.S. Agency for International Development.

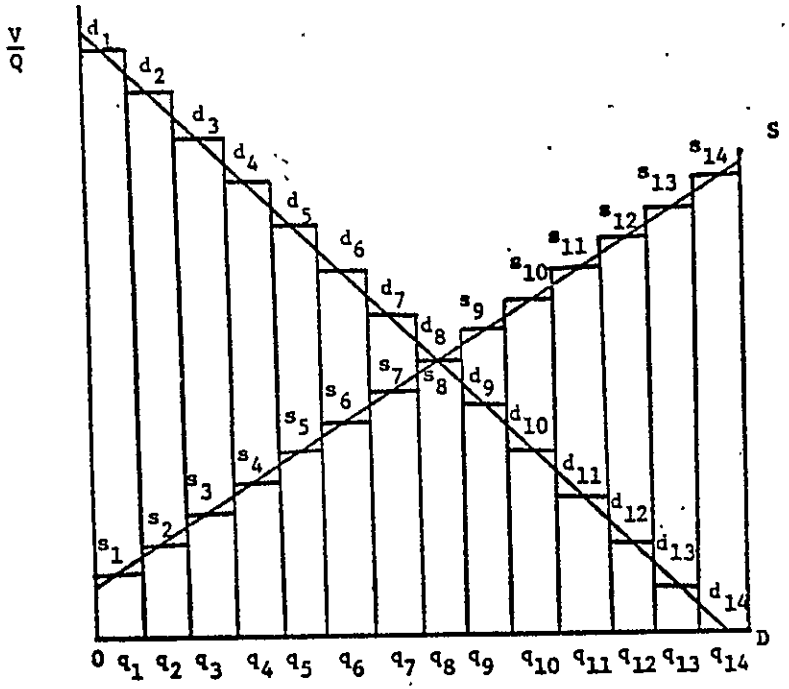
and of economic efficiency and equity. Obtaining that understanding and noting the role of the public and private sectors in achieving economic efficiency and equity is the purpose of this section.

Understanding Supply and Demand

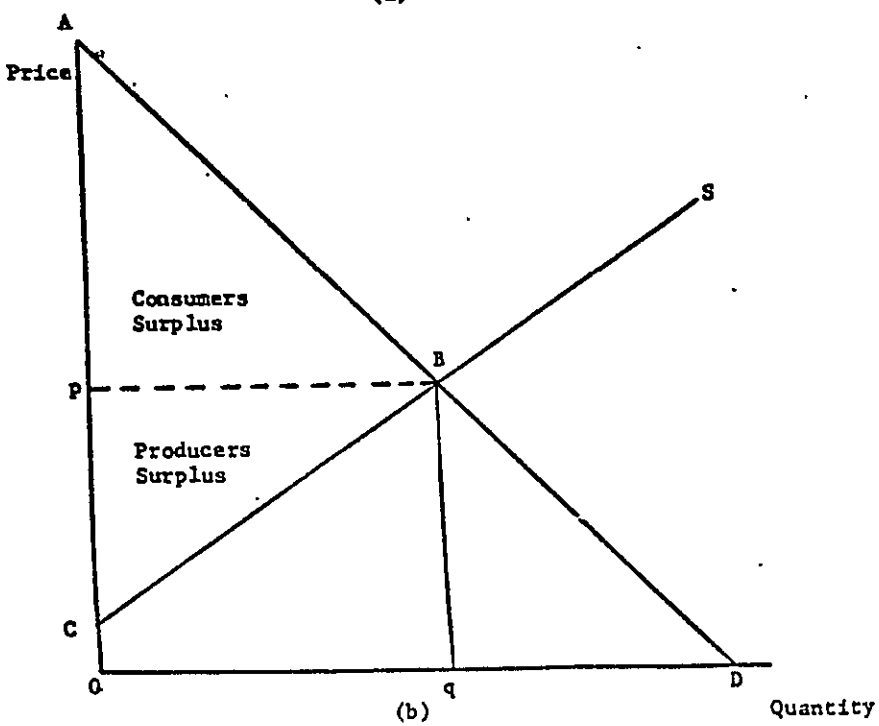
A political-economic-social system serves numerous ends or purposes such as providing employment, price stability, justice, security, and growth. Each of these can be regarded as ends-in-view to the most basic of all ends of the system: to improve what is variously called satisfaction, welfare, well-being, utility, or quality of life for people.

Figure 1.1 shows how economics relates to that concept. One unit of a good (or service) Q provides the most satisfaction when people have little of it. As they consume more, they value each additional unit less and less. Also some people derive more satisfaction from the commodity Q than do other people. Arraying units q_1, q_2, ..., q_{14} per unit of time for a given population, from the initial unit providing the most satisfaction d_1 to the final unit providing zero satisfaction d_{14}, the curve D is traced out in Figure 1.1a. The total satisfaction is quantity times utility per unit and from the first unit is q_1d_1, from the second unit is q_2d_2, and so on to $q_{14}d_{14} = 0$ satisfaction from the last unit. Total satisfaction potentially obtainable from consuming Q is the sum of all these individual segments. Adding these bits of satisfaction arrayed from the first unit giving someone much enjoyment to the last unit giving no enjoyment obviously traces out the area beneath curve D. If Q were costless to produce, society would do well to consume 14 units of Q.

Figure 1.1. Economic Costs and Benefits Illus...



(a)



(b)

BEST AVAILABLE

When resources are used to produce and consume Q, satisfactions are lost because of fewer resources to produce and consume other goods and services. The opportunity cost or satisfaction foregone from other goods by producing q_1 is s_1, of producing q_2 is s_2, and of producing unit q_{14} is s_{14} in Figure 1.1a. The cost of producing additional units of Q rises because diminishing returns set in — more and more resources are required (more output of alternatives is foregone) to produce each additional unit of Q. Producing more food means foregoing production of more health care, shelter, transportation, or entertainment. The total value foregone by producing Q is the number of units times the value foregone per unit. Thus the total satisfaction sacrificed to produce 14 units of Q is $q_1 s_1 + q_2 s_2 + \ldots + q_{14} s_{14}$. That amount is the area beneath curve S.

The benefit d_1 less the sacrifice s_1 is the <u>net</u> benefit to society from producing and consuming q_1. Up to q_8 in Figure 1.1a, the benefit exceeds the cost of producing and consuming each additional unit of Q. But the cost (sacrifice) exceeds the benefit from producing more than q_8. The net benefits to society, $q_1 (d_1 - s_1) + q_2 (d_2 - s_2) + \ldots + q_{14} (d_{14} - s_{14})$, are greatest by producing and consuming eight units of Q. To produce less Q would reduce well-being because each unit of output provides benefits in excess of costs. To produce more than eight units of Q would reduce well-being because each additional unit of output requires more sacrifice than is gained in benefits from having more Q.

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Thus the most efficient output, eight units in Figure 1.1a, provides the most net satisfaction to society.[1]

Any economic system -- whether socialist, barter, or capitalist -- must produce and consume where D and S intersect if they are to provide the most possible well-being to society. A problem is that individuals acting in their self interest do not bring about this outcome in the absence of a coordinating framework. Individuals acting alone can enrich themselves at the expense of society. Some coordinating system is essential to ensure that private greed is turned into public good; to ensure that self interest is turned into the public interest.

Two basic systems attempt to do this -- the market system and the public system. The market system uses prices and profits to allocate resources and products to their best uses; the public sector uses political and administrative decisions to allocate resources and products. Each system has advantages and disadvantages, a number of which are discussed below.

The Role of the Market

If consumers are rational in allocating incomes to achieve the greatest satisfaction in a competitive market system, the value per

[1] Problems arise in aggregating satisfactions among individuals. Tweeten and Mlay (1984) and Harper and Tweeten (1976) have estimated total and marginal utility of income in the U.S. Utilities derived from a given income do not seem to differ statistically among regions, between rural and urban sectors, and over time. However, marginal utility systematically declines for higher income levels. The empirical studies provide optimism that utilities can be measured and compared with some reliability among groups but not necessarily among individuals.

unit (V/Q) in Figure 1.1a is price. This price-quantity schedule is shown as the demand curve AD in Figure 1.1b. If suppliers discriminated among consumers to derive the maximum price for each unit, total revenue available from Q ($q_1d_1 + q_2d_2 + \ldots + q_{14}d_{14}$ in Figure 1a) is the area beneath the demand curve AD in Figure 1.1b.

If producers are rational and act to increase profits in a competitive market, they will supply quantity q_1 at a price s_1, quantity q_2 at a price s_2, and so forth. If suppliers are paid only this minimum price, they will just cover their variable or extra costs of producing Q. They will be as well off by producing as by not producing and they will make no profit. These variable costs just equal the value of other output that could have been produced had they not produced Q. (Fixed costs are not opportunity costs that influence supply because they do not represent goods and services sacrificed; that is, fixed resources cannot be diverted to other commodities in the specified time horizon.) It is apparent that the greatest potential net money value of goods and services available from society is the area between D and S to the left of q_8 (Figure 1a) in a market economy, the same output that provided the most net satisfaction as noted earlier.

That area of net social benefit or net value of output is shown as ABC in Figure 1.1b. If the market price is p for all, net value of output is divided into a portion ABp going to consumers, called <u>consumers surplus</u>, and a value pBC going to producers, called

producers surplus, in Figure 1.1b.[1] The producer surplus is a return to fixed resources.

Whether in fact the actual allocation in a market economy will result in that of the ideal (q_8 in Figure 1a) depends on a number of assumptions or considerations, the most important of which are listed below:

(1) Society is rational, with producers allocating resources and products to increase profit and consumers allocating to increase well-being.

(2) Buyers and sellers are sufficiently numerous so that no one can manipulate market price.

(3) Private incentives facing individuals and firms are the same as social incentives applicable to society.

(4) The distribution of resources is equitable.

It is useful to review briefly each of these assumptions. How well are they met?

Producers Act to Increase Profit and Consumers Act to Increase Satisfactions

There is substantial evidence that most consumers and producers act rationally to improve their satisfactions in a competitive economy. Producers do this by allocating resources and products to increase profits or to reduce losses. Consumers do this by spending their income to improve their well-being.

If producers do not combine resources in a least-cost manner to produce output, net benefits to society (producers plus consumers

[1] The concept of producers and consumers surplus has been used widely to measure economic outcomes. See Gardner (1981) and Tweeten (1979, chapters 15 and 16) and Timmer et al. (1983, chapter 4).

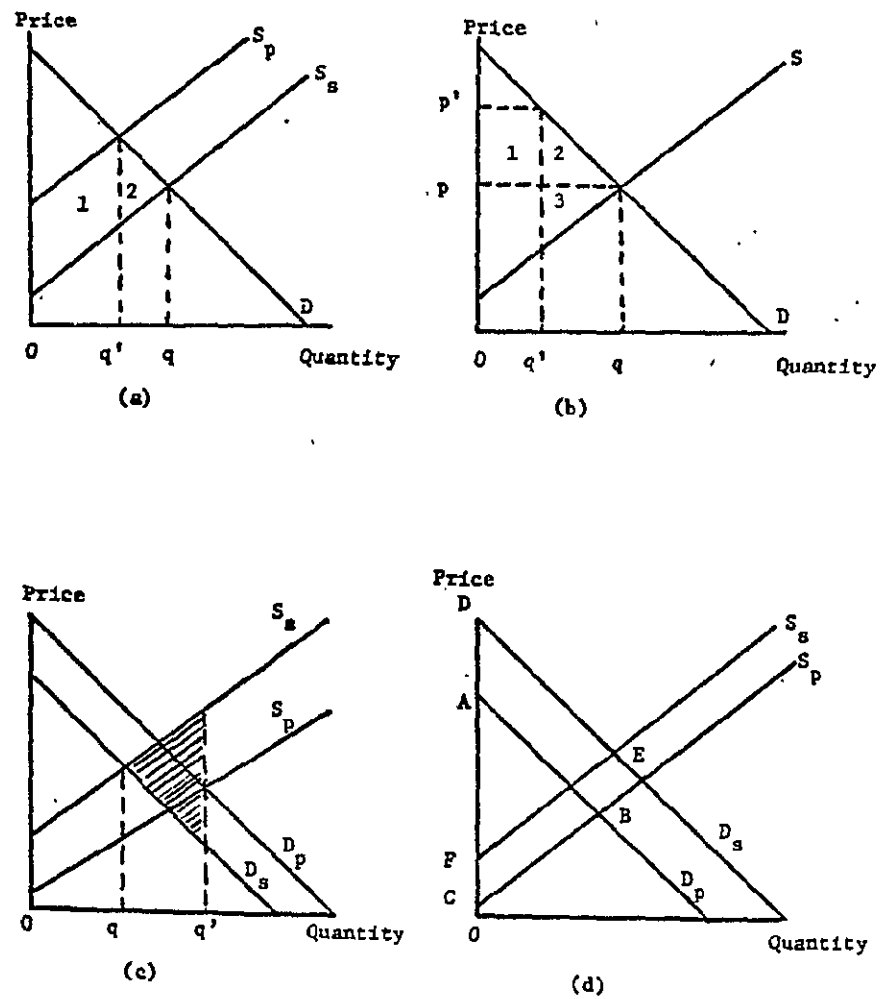

Figure 1.2. Illustrations of Social Costs and Benefits.

surplus) are reduced as indicated in Figure 1.2a. Assume that producers use inefficient combinations of resources to produce output so that the private supply curve is S_p rather than the minimum-cost social supply curve S_s. A higher price than the real cost to society is required to induce firms to produce and supply any given quantity in Figure 1.2a. Quantity q' is produced rather than the ideal quantity q. The net social cost (net value of goods and services foregone) is area 1 plus 2. The cost of an inefficient input mix (sometimes called "X-inefficiency") is area 1 and the cost of deviation from the equilibrium output q is area 2 (sometimes called "dead weight" loss).

Of course, firms and consumers have multiple objectives such as stability, security, and growth. For these and other reasons, economic adjustments frequently require more time than might be supposed. Market participants will change allocations only if expected benefits exceed expected costs of adjustments. Because incremental costs become very high for achieving full information and for removing all variation in economic outcomes, it does not pay to remove all instability or uncertainty. That is, a well-functioning economy will contain uncertainty and instability. After adjusting data for risk, time preferences, and costs of adjustments, research analysts find that producers and consumers on the whole behave quite predictably in response to incentives in a market economy.

Many Buyers and Sellers

Competition in the market among buyers and sellers drives price to p, resulting in ideal output q in Figure 1.1b. No one producer or consumer can influence price. Suppose a market has insufficient

numbers of buyers or sellers to provide workable competition. Success by producers in restricting output to obtain a higher price loses some of the potential net social benefit and transfers income from consumers to producers.

Each farm firm usually faces a flat demand curve, hence a change in output of any one farm does not influence market price. When a farmer in a competitive environment attempts to raise price, his entire market and revenue are lost. Figure 1.2b illustrates what happens when an imperfectly competitive firm facing an downward sloping demand curve restricts quantity at level q' to raise price from p to p'. One effect is to transfer net social benefits from consumers to the producer. The change in net social benefits is the gain to producers (area 1 less area 3) less the loss to consumers (area 1 plus 2). The net social loss (net revenue foregone by society) is therefore area 2 + 3 from restricted output q' instead of ideal output q.

How many competitors in an industry are essential to maintain effective competition? Studies in the United States indicate that producers' profits are not much influenced until 8 firms control 65-80 percent of the output of an industry or 4 firms control 50-65 percent of the output of an industry (see Miller, 1982). Even fewer firms may be unable to exploit consumers if competition is available from competing products or from abroad. For example, a highly concentrated broiler producing industry may not be able to obtain monopoly profits if competition is keen from beef and pork. Also, monopoly profits elude one or a few domestic firms in a concentrated industry if competition is maintained through open international trade channels.

Thus the market is quite robust in producing desired outcomes shown as p and q in Figure 1.1b even without a large number of firms in an industry that is not shielded from competition.

Private Incentives the Same as Social Incentives

The market does not allocate efficiently when incremental private benefits (costs) differ from social benefits (costs). That point is illustrated in Figure 1.2c. When firms incur no costs for air and water pollution they impose on others, incremental opportunity costs applicable to society are S_s but to the firm are S_p. Firm output in response to prices is depicted by the supply curve S_p. When social costs exceed private costs, too much output is produced and the net value of output is reduced.

Sometimes social benefits diverge from private benefits. When private firms respond perfectly to increase profit under such circumstances, inefficiency results. When producers sell commodities containing harmful pesticide residues or microorganisms unbeknown to the consumer, private benefits to the producer exceed social benefits to the consumer. That is, the private demand curve D_p exceeds the social demand curve D_s. Consumers make their purchases based on prices along the demand curve D_p. When individuals and firms face demand curve D_p and supply curve S_p, equilibrium output is q' compared to socially efficient output q in Figure 1.2c. The net loss in real value of goods and services sacrificed due to the divergence between private and social cost (benefit) is the area between D_s and S_s from q to q' — the shaded triangle — in Figure 1.2c.

Many factors cause divergence between private and social cost (benefit). For lack of property rights or other reasons, developers

of improved technologies such as high yielding varieties may not be able to appropriate sufficient benefits to cover development costs. Hence social benefits exceed private (firm) benefits and the market acting alone is inefficient.

Sometimes the market must ration limited resources among competing users. The incremental cost to any one producer using a communal grazing area may be much smaller than the cost to producers as a whole or to society. If each producer acts alone to increase net revenue, the land will be overgrazed to the detriment of all. This "tragedy of the commons" also applies to communally held air and water resources. Establishment of individual property rights alleviates the commons problem but creates distributional problems.

In a very different case, suppose a highway bridge has been built. As long as the bridge is not overcrowded, the cost to society of another vehicle using the bridge is essentially zero. If a toll is charged to users, the private cost will exceed the social cost of using the bridge. A toll causes some vehicles to avoid the underutilized bridge. Because those who can benefit from it at no cost to society fail to use it, a net social cost accrues.[1]

In the case of so-called public goods such as national defense and police forces, provision of the service for some also provides the same service for others. And consumption by one consumer does not reduce consumption by others. It is not possible to exclude nonpaying "free riders" from taking advantage of police protection or national defense provided by others. Most people will want to be free riders.

[1] One quandry is how and when to finance construction of bridges in the absence of a toll.

A private firm providing local and national security will be unable to appropriate enough of the benefits required for an optimal system to cover costs. The system will not be adequately funded by the market alone. Net social costs such as the shaded area in Figure 1.2c will accrue, except that in this case the output will be underproduced with q' to the left of q.

Distribution of Resources

It was apparent in Figure 1.1b that market price and quantity determine the distribution of net benefits between producers and consumers. The market tends to reward factors of production according to their contribution to output. Those who bring few human and material resources to the market carry few goods and services home. If everyone were equally efficient in turning resources into output, those with no resources would produce nothing and would starve in the absence of charity. Thus the market outcome is conditioned by the initial distribution of resources. The market alone does not provide distributive justice.

An inequitable distribution of resources in a very real sense may be viewed as a divergence between private and social costs.[1] That is, redistributing resources from those who derive little satisfaction from another unit to those who derive much satisfaction raises the effective demand curve from D_p to D_s in Figure 1.2d. An unintended side effect of the transfer may be reduced incentives for efficient resource utilization, raising real costs from S_p to S_s

[1]For merit goods such as food or education for the needy, social benefits are judged to exceed private benefits; hence the public intervenes in the market to provide distributive justice.

as shown in Figure 1.2d. On the other hand, those who "sacrifice" to transfer income to the needy may derive considerable satisfaction from doing so, hence real costs after transfer may be less than S_p in Figure 1.2d. To make full use of resources, the redistribution chosen should maximize the net value of goods and services produced and consumed DEF. That utility value after redistribution must be greater than the initial net (area ABC) in Figure 1.2d to be desirable.

Some redistribution of wealth is essential to provide distributive justice in the form of access to education for developing human resources, provision of food stamps for the hungry, and maternal and child care of those unable to afford minimum treatment. But to avoid large and perhaps offsetting reductions in welfare due to lost output, funds for distributive justice are best derived from sources minimally interfering with incentives. Examples are taxes on real property, estates, or luxury consumption goods. Such redistribution may entail intangible costs such as loss of personal freedom to use earned wealth as one chooses.

The Role of the Public Sector

We have already observed what the market can and cannot do. Worldwide experience indicates that producers respond to market prices -- but, of course, to private rather than to social incentives (S_p and D_p curves rather than S_s and D_s curves in Figure 1.2). The market effectively and impersonally makes millions of allocative decisions each day which a publicly administered system could not handle efficiently because of diffuse goals, inadequate information, high administrative costs, personal conflicts, or political favoritism.

Because the market responds to private incentives rather than to social incentives, the public sector sometimes can improve overall social efficiency by correcting private incentives to bring them more into line with social incentives. Some examples are:

- Promoting market competition by an active government policy to remove old or avoid new barriers to domestic and foreign trade.

- Making provision for basic institutional services such as the legal framework for property rights, local and national security, product grades and labeling standards, and information systems such as the agricultural census and outlook.

- Funding or coordinating infrastructure development such as port facilities, irrigation systems, and farm-to-market highways.

- Regulating through taxes or other means the use of chemical pesticides and other environmental hazards to bring incremental social benefits in line with costs.

- Funding agricultural research and extension to adapt or develop productive and profitable new and improved inputs such as crop varieties.

The above guidelines are largely to correct imperfections to promote economic efficiency of markets. The following are emphasized to promote equity, although efficiency is also influenced and cannot be separated from equity:

- Providing human resource development opportunities through free and universal basic schooling. Public investment in human resources may also entail provision for sanitation, food stamps for the truly needy, and community health clinics especially to serve maternal and young child needs in health, nutrition, and family planning.

- Funding of public programs through taxes which are as neutral as feasible with respect to resource allocation. Property and estate taxes are examples of such means.

In short, the approach suggested to promote equity and efficiency is to utilize the private market system where possible, supplementing it with public intervention only where a strong case can be made that markets have failed. Even here the costs of market failure must be carefully weighed against the costs of public intervention. Worldwide experience suggests that public intervention frequently entails larger net social cost than the market failure it intervened to correct. This conclusion suggests advantages in erring on the side of too little rather than too much government.

Several additional qualifications need to be added to the foregoing analysis. No accounting is made for administrative costs of transfer payments which frequently attend government intervention in markets. These administrative costs typically run from 2 percent of simple direct transfers to 50 percent or more of transfers for complex programs such a provision of fertilizer or credit inputs to farmers. Also, government transfer recipients may spend large sums of money to influence the political system to continue transfers. These so called "PEST" outlays and expenses to administer programs tend to be net social costs because they employ resources that have high potential value in other uses.

Finally, consumer and producer surpluses are most accurately measured close to equilibrium and ordinarily cannot be estimated with much reliability at the extremes of price and quantity. For that reason, in subsequent analysis net social benefits and costs are

analyzed mainly for deviations from existing or equilibrium prices or quantities.

2. AGRICULTURAL PRODUCT POLICIES

We now turn to analysis of agricultural product policies including:

(1) Price supports,

(2) Food price controls,

(3) Export and import taxes or subsidies, and

(4) Measures to reduce economic instability.

Market-supplement action by government ranges from providing a favorable environment for the market at one extreme to complete takeover of the market by the public sector at the other extreme. Interventions in the market influence economic efficiency and equity, as evident in income level, distribution, and variability. In the previous section, we learned that selective interventions in the market to align social and private benefits (costs) at the margin can increase well-being of society. Most of the interventions considered in this section reduce the net value of goods and services available to society.

Price Support Policies

Price Support of a Commodity Not Exposed to World Markets

Figure 2.1 shows the impact on producers, consumers, taxpayers, and society of farm price supports for a commodity produced and consumed in isolation from foreign markets (2.1a and 2.1b), and for a commodity when the country is a net importer (2.1c) or a net exporter (2.1d).

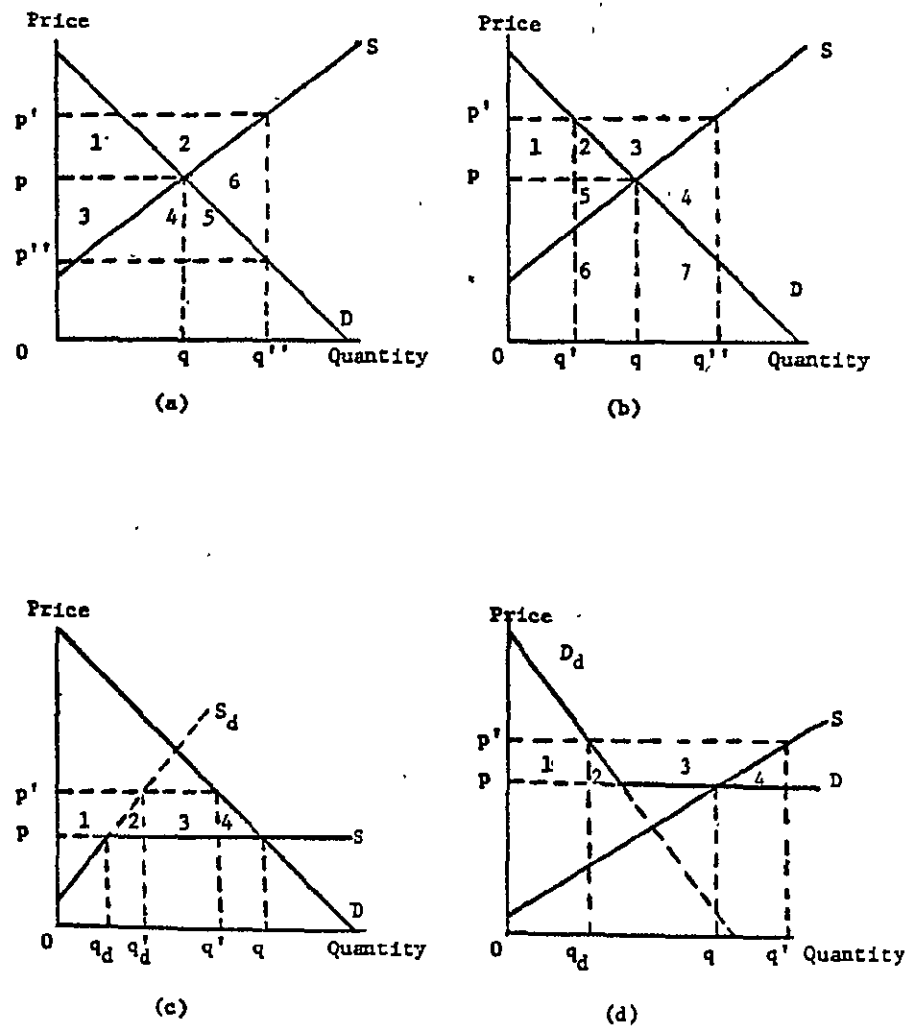

Figure 2.1. Economic Costs and Benefits of Commodity Price Support Policies

In Figure 2.1a, producers supply quantity q" in response to price supported at p'. The government through outright purchases or payments to producers reduces the price to p" so that q' will clear the market. Given market clearing price and quantity p and q in the absence of price supports, the costs and benefits of the price support through government purchase at price p' and resale to consumers at p" are shown in Figure 2.1a as follows:

	Area (Value)
Gain to producers	1 + 2
Gain to consumers	3 + 4 + 5
Loss to taxpayers	1 + 2 + 3 + 4 + 5 + 6
Net loss to society	6

Producers and consumers gain from the price support policy. The cost to taxpayers exceeds revenue gained by producers and consumers, however, resulting in a net cost to society. Of course, some persons simultaneously may be taxpayers, consumers, and producers. The social cost in Figure 2.1a, which does not include administrative expenses or the value of greater stability, will be small if the price support is small and if supply and demand are perfectly inelastic.

The cost to taxpayers will be even larger than indicated if consumers resell the commodity to producers who in turn resell to the government. Such behavior is not uncommon in countries where such two-price systems are used to provide high prices to producers and low prices to consumers.

Figure 2.1b shows the impact of a price support program with the government purchasing production that will not move at price support

level p'. The surplus q''- q' is either destroyed or disposed of at no salvage value. The costs and benefits of this price support policy compared to those with market equilibrium price p and quantity q in Figure 1b are as follows:

	Area (Value)
Gain to producers	1 + 2 + 3
Loss to consumers	1 + 2
Loss to taxpayers	2 + 3 + 4 + 5 + 6 + 7
Net loss to society	2 + 4 + 5 + 6 + 7

The cost to taxpayers depends heavily on the degree of support p'-p and on the elasticities of supply and demand. It is apparent that a price support policy failing to salvage any benefit from surplus production is costly to consumers and taxpayers. An example is when accumulated surplus stocks are allowed to spoil.

Price Support of a Commodity Exposed to World Markets

In many countries, costs of transportation or other factors may not insulate the domestic market from world markets. Figure 2.1c illustrates costs and benefits of price supports for a commodity supplied partly by domestic production and partly by imports. Outcomes for open market economic equilibrium at p and q are compared with those from a policy supporting price at p'. The total supply curve S is comprised of a domestic portion S_d up to p and an import portion which is horizontal at p.[1] With domestic price support p'

[1] The horizontal curve implies the "small country" assumption. Countries accounting for significant proportions of world trade are unlikely to face horizontal curves.

protected by a tariff $p'-p$, the domestic quantity supplied is q' and imports are reduced from $q-q_d$ to $q'-q_d'$. The costs and benefits of the price support policy in Figure 2.1c are as follows:

	Area (Value)
Gain to producers	1
Loss to consumers	1 + 2 + 3 + 4
Gain in tariff revenue	3
Net loss to society	2 + 4

Figure 2.1d illustrates benefits and costs of price supports when the country is an exporter. Total demand D is the horizontal summation of the domestic demand D_d and the perfectly elastic (horizontal) export demand at p. Price, initially in equilibrium at p with quantity q, is raised to p' and quantity to q'. Domestic producers, initially providing q, supply q' in response to a higher price. The export subsidy to support the price is $(p'-p)(q'-q_d)$.

The costs and benefits of the price support policy in Figure 2.1d are:

	Area (Value)
Gain to producers	1 + 2 + 3
Loss to consumers	1 + 2
Loss to taxpayers	2 + 3 + 4
Net loss to society	2 + 4

Consumer Price Controls

Purchasing power can be transferred from producers to consumers through farm product price controls. In Figure 2.2, it is assumed

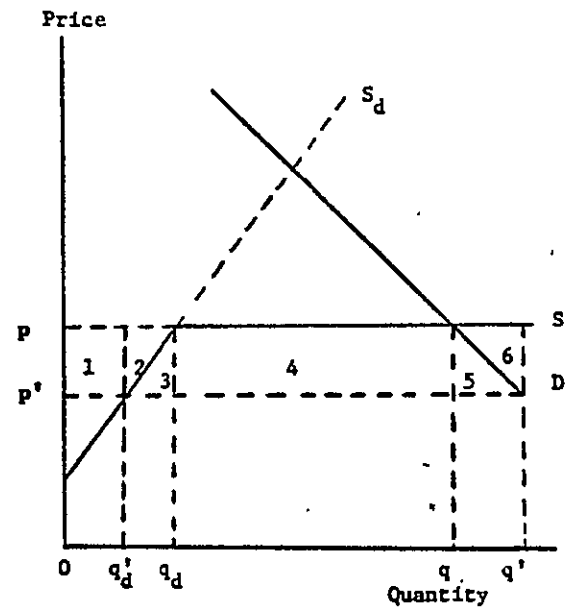

Figure 2.2. Economic Costs and Benefits of Consumer Price Controls

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that the country imports and domestically produces a product with domestic supply S_d and import supply horizontal at price p. Total supply is S and demand is D. Competitive equilibrium price and quantity are p and q.

Consumer price controls lower price to p', reducing domestic production from q_d to q_d'. An import subsidy of $(p-p')(q'-q_d')$ enables consumers to import the commodity at price p and consume it at price p'.

Benefits and costs of consumer price controls (subsidies) as depicted in Figure 2.2 are as follows:

	Area (Value)
Gain to consumers	1 + 2 + 3 + 4 + 5
Loss to producers	1 + 2
Loss to taxpayers	2 + 3 + 4 + 5 + 6
Net loss to society	2 + 6

Again the net social cost depends on the slopes of demand and supply curves -- it is less when domestic supply and demand are inelastic. If the nation is a net exporter and export demand is perfectly elastic, price controls will require considerable regulatory surveillance because producers will have incentives to export domestic production rather than sell it locally at the lower, controlled price.

Export Tax or Overvalued Currency

A number of countries levy taxes on farm products to raise revenue. Such taxes are frequently levied on farm exports. An overvalued exchange rate is an implicit export tax; the two policies

have similar impacts as depicted in Figure 2.3. Only eight of the 146 countries holding membership in the International Monetary Fund permit their individual currencies to float freely.

Demand D and supply S initially are assumed to be in competitive equilibrium at price p and quantity q. Because of an export tax of p-p' per unit, export demand is reduced from the horizontal line at p to p' and total demands falls from D to D'. The costs and benefits from the export tax as shown in Figure 2.3 are summarized as follows:

	Area (Value)
Gain to consumers	1 + 2
Loss to producers	1 + 2 + 3 + 4 + 5
Gain to taxpayers	4
Net loss to society	3 + 5

Domestic consumption increases from q_d to q_d'. Exports change form $q-q_d$ to $q'-q_d'$. The drop in exports is greater as the elasticities of domestic demand and supply are greater.

An overvalued currency operates somewhat like results depicted in Figure 2.3 except the distributions of benefits and costs are different. An overvalued currency redistributes income to domestic consumers of undervalued imports rather than to taxpayers but away from domestic producers.

Export Subsidy

From time to time, nations use export subsidies to dispose of domestic production. Impacts are illustrated in Figure 2.4. From initial competitive equilibrium at price p and quantity q, an export subsidy of p'-p per unit is provided to move the price from p to p'.

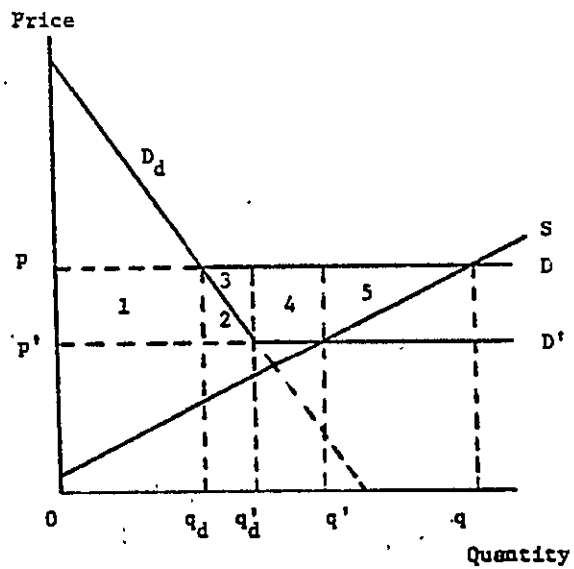

Figure 2.3. Economic Costs and Benefits of an Export Tax or Exchange Controls

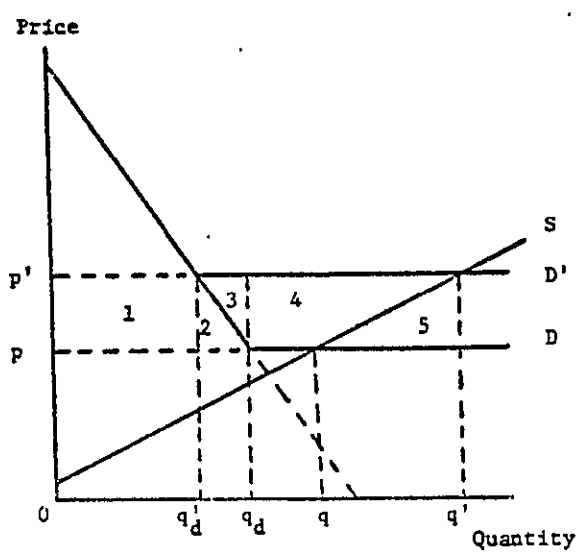

Figure 2.4. Economic Costs and Benefits of An Export Subsidy

Domestic demand quantity decreases from q_d to q_d' along the export demand curve which has effectively been raised from a horizontal line at p to p'.

The distribution of benefits and costs of an export subsidy are observed from Figure 2.4 as follows:

	Area (Value)
Gain to producers	1 + 2 + 3 + 4
Loss to consumers	1 + 2
Loss to taxpayers	2 + 3 + 4 + 5
Net loss to society	2 + 5

It is apparent that impacts of an export subsidy are reverse those of an export tax shown in Figure 2.3. Consumers gain from an export tax; producers gain from an export subsidy. It might seem that because a net social loss results from an export subsidy in Figure 2.3, then a net social benefit would result from an export tax in Figure 2.4. But either intervention, a tax or subsidy, entails a social cost. In fact, if the intervention p'-p is similar in Figures 2.3 and 2.4, the social costs of an export subsidy or tax are similar in magnitude.

Reducing Price and Quantity Instability

Most producers and consumers are risk averse. They prefer a given average income stream that is less variable to one that is more variable. Thus instability in prices, quantities, income, and expenses that arise from unpredictable forces of man and nature reduce the well-being of people. Because the costs of wringing more and more

instability out of the system become successively higher (and eventually higher than benefits received from additional stability), it does not pay to remove all instability. An extended presentation of the conceptual framework for dealing with instability exceeds the scope of this analysis, but two elementary issues are raised regarding the level and distribution of benefits and costs from (1) "naive" expectations by producers, and (2) buffer stock policies.[1]

Coping with Instability that Arises from Naive Price Expectations

Cycles characterizing production and marketing of numerous agricultural commodities arise from "naive" price expectations. Assume price and quantity initially are in equilibrium at p and q. Because of a shock to the system such as unfavorable weather, production falls to q_L and price rises to p_U in Figure 2.5. If producers assume price p_U will prevail when the production they are now planning reaches the market next year, they will produce q_U. This quantity when placed on the market brings price p_L which in turn brings forth production q_L in the next period. That production brings price p_U which induces production q_U, thus repeating the cycle. Depending on the slopes of demand and supply curves, the cycle may dampen, continually repeat itself as shown in Figure 2.5, or explode.

Socially accounting for the distribution of benefits and costs between consumers and producers and the net gain to society from

[1] For a more complete analysis, see Gardner (1979) and Tweeten (1979, chapter 7).

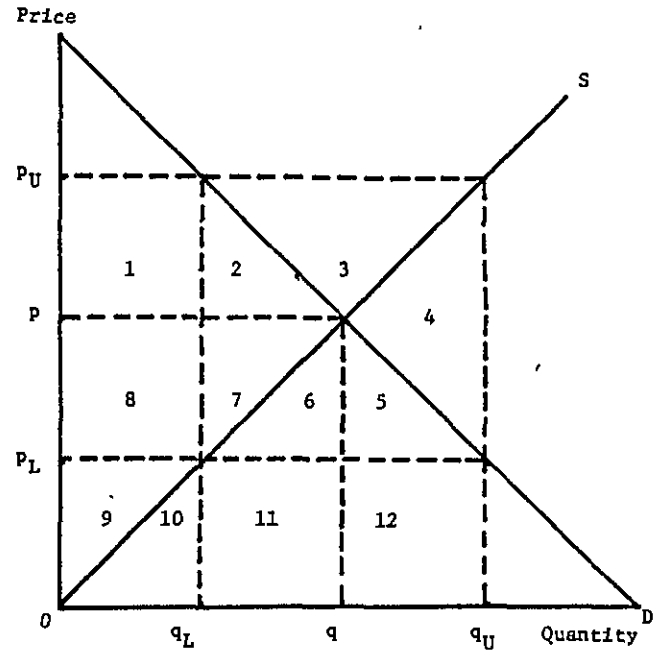

Figure 2.5 Supply and Demand Curves Illustrating Benefits of Stabilization Policies.

stabilization of price p and quantity q versus the cycle of high and low prices and quantities is depicted in Figure 2.5 as follows:

(With q_L and p_U)	Area (Value)
Loss to producers	1 - 7
Gain to consumers	1 + 2
Net gain to society	2 + 7

(With q_U and p_L)	Area (Value)
Gain to producers	4 + 5 + 6 + 7 + 8
Loss to consumers	5 + 6 + 7 + 8
Net gain to society	4

Because q_L and q_U each happen half the time, the benefits of stabilization over the entire cycle can be estimated as follows:

Loss to consumers	.5[(5 + 6 + 7 + 8) - (1 + 2)]
Gain to producers	.5[(4 + 5 + 6 + 7 + 8) - (1 - 7)]
Net gain to society	.5(2 + 4 + 7)

Under the assumptions in Figure 2.5, consumers lose from stabilization and producers gain. Hence instability transfers income from producers to consumers. Gains to producers from stabilization exceed losses to consumers by the net social cost. This conclusion does not necessarily mean that measures to stabilize price at p and quantity at q will enhance well-being. For stabilization policies to provide overall net benefits, the administrative and informational costs of such policies (not included in the above estimates) must be less than net social benefits (one-half the area 2 + 4 + 7).

Improved outlook information, greater information on cyclical behavior, buffer stocks, and other policies can reduce both the net

social cost and income redistribution arising from instability. If the social cost of production controls successful in stabilizing quantity exceeds the net social cost shown above, then such controls reduce well-being. However, utility gained by risk averse persons from greater stability is not included in the benefits shown in Figure 2.5.

Buffer Stock Policies to Reduce Instability

Commodity stocks can be of several forms: (1) seasonal stocks to smooth consumption from one harvest to the next, (2) pipeline stocks that tend not to be available for consumption but are normal quantities in transit at any one time, and (3) buffer stocks carried over from one season to the next to reduce year-to-year variation in quantity consumed. Commodity buffer stocks can be a cost-effective measure to reduce price instability. Storage stocks can smooth out market prices from year to year even as production or utilization varies.

The value of a buffer stock policy is shown below based on Figure 2.5 and several critical assumptions. Supply quantity is assumed to shift randomly from year to year with a probability of .5 for q_L and .5 for q_U. In the absence of a buffer stock policy, production and consumption of q_L will bring price p_U; production and consumption of q_U will bring price p_L. Because producers are unable to predict whether p_U or p_L will prevail, they expect the price to be p, an average of the upper and lower prices. Incremental variable costs of area (value) 6 + 10 + 11 in Figure 2.5 accrue each year whether production is q_L or q_U. Consumers utilize q each year

with a buffer stock policy. The cost of storage is initially assumed to be zero.

Suppose in Figure 2.5 that when favorable weather brings unusually high production q_U, a quantity $q_U - q$ is stored. When production is q_L, the quantity $q - q_L$ $(= q_U - q)$ is released on the market so that price remains at p although production fluctuates between q_L and q_U. The costs and benefits of stabilization with buffer stocks are as follows based on Figure 2.5:

(with production q_L)	Area (Value)
Gain to producers	6 + 7 + 11 - 1
Gain to consumers	1 + 2
Net gain to society	2 + 6 + 7 + 11

(with production q_U)	Area (Value)
Gain to producers	6 + 7 + 8 - 12
Loss to consumers	5 + 6 + 7 + 8
Net loss to society	5 + 12

Society gains from stabilization when production is low but loses when production is high. Overall net gain to society from stabilization accounting for both high and low production is as follows:

	Area (Value)
Gain to producers	6 + 7 + .5(8 + 11 - 1 - 12)
Loss to consumers	.5(5 + 6 + 7 + 8 - 1 - 2)
Net gain to society	.5(2 + 6 + 7 + 11 - 5 - 12)

Producers gain and consumers lose from stabilization with buffer stocks. The actual gains and losses will depend on the supply and

demand curves. With the curves drawn as in Figure 2.5, the gain to producers from stabilization is area 6 + 7 and the loss to consumers is area 6, hence the net gain is equal to area 7. It will pay to pursue a buffer stock policy if its cost is less than the benefit shown as area 7.

As demand elasticity approaches infinity under the "small country" assumption for an open economy, net social benefits and net redistributive effects between producers and consumers approach zero from a buffer stock program. To be sure, storage will reduce variation in receipts and costs from year to year for consumers and producers if demand is perfectly elastic. But because net social benefits of the type indicated above do not accrue, the only basis for storage is to satisfy desires of those who are sverse to risk.

If demand shifts randomly from year to year and the demand curve is highly elastic, the cost of a buffer stock policy to stabilize prices becomes very large. In such cases, rather than establish a buffer system, it is cost-effective for the government to establish an insurance reserve of funds to (a) purchase supplies from abroad when domestic food supplies are short, and/or (b) provide payments to producers when domestic quantity is short and receipts low.[1]

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[1] Storage of food supplies costs interest, depreciation, spoilage, etc. On the other hand, a cash reserve earns interest. The lower cost of a cash reserve must be balanced against the quicker response time with commodity reserves.

For further information on food security insurance, see Huddleston et al. (1983).

3. AGRICULTURAL INPUT MARKETS AND POLICIES

Governments frequently supplement markets by providing inputs on concessional terms to farmers. Government assistance ranges from free inputs to input price concessions brought about by exchange control or overvalued currency.

The motivation for public (government) intervention may be "market failure" elements noted in the first section, the strong political power of producers, or other reasons. A government may judge that the market alone will not provide sufficient research on new crop varieties. A private firm developing and marketing a new crop variety may be unable to appropriate sufficient receipts from the market to pay development costs. One reason is because one producer can obtain the seed from the developer, propagate it, and sell it to his neighbors. A new farm management practice purchased and applied by one farmer may be easily observed and emulated by others. A market news report heard on all radios (not just on radios of a few subscribers to the service) may not reward the initiator enough monetarily for adequate provision of the input despite its large value to producers. Because of these and other reasons, the public sector provides data, information, and basic research services for agriculture.

Several other inputs such as fertilizer, credit, and irrigation water have fewer public good properties and are frequently allocated by the private sector. At issue is what are the efficiency and equity (distributional) effects of relying on the public sector, private sector, or on some combination such as private sector incentives modified through subsidies.

Farm Level Impact

First consider input allocation of commercial fertilizer at the individual farm level. In Figure 3.1, curve VMP shows additions to the firm's revenue with successive additions of commercial fertilizers. Successively greater application of fertilizer per unit of land during a crop season (or at planting) adds less and less to output, hence the Value of Marginal Product (VMP) or demand by a profit-seeking producer declines, though not necessarily in a straight line as depicted arbitrarily in Figure 3.1. If the market is functioning well, a farmer will be able to purchase all the fertilizer he wants at price p and that price will reflect the value of foregone opportunities to produce other goods with resources used to supply the fertilizer. For example, foreign exchange used to import fertilizer could be used instead to import wheat. If fertilizer is produced domestically from local resources, the fertilizer price ideally reflects the value foregone by using domestically produced natural gas for cooking, for export, or for fueling irrigation pumps.

If government agency supplies quantity x of fertilizer free to farmers, the value of the fertilizer to a farmer is area 1 + 2 + 3 + 4 in Figure 3.1a and the government cost is 3 + 4, leaving a net gain of 1 + 2. This quantity brings greatest net benefits to society. In reality, the government is unlikely to allocate optimal quantity x.

Let us consider economic gains and losses measured by departures from the ideal amount x as illustrated in Figure 3.1a:

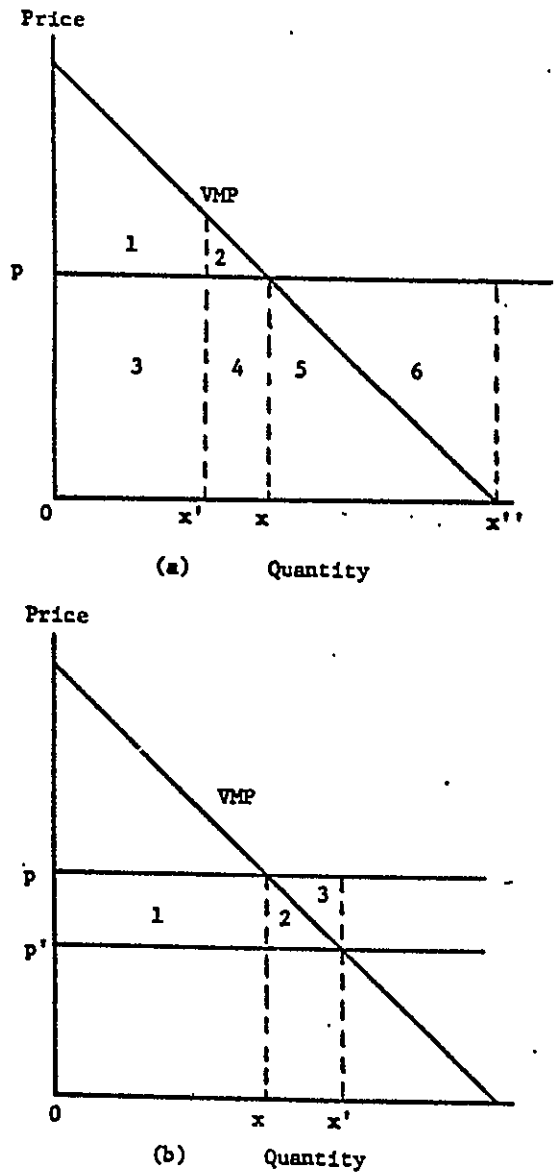


Figure 3.1. Economic Costs and Benefits of Policies for Input x at the Farm Firm Level.

(Providing Too Little Fertilizer x')

	Area (Value)
Loss to producer	2 + 4
Saving to government	4
Net loss to farmer and society	2

If the government allows the producer to choose the quantity desired, the producer will utilize x" because that quantity provides the most revenue. The impact of supplying x" compared to x is as follows from Figure 3.1.

(Providing Too Much Fertilizer x")

	Area (Value)
Gain to producer	5
Loss to government	5 + 6
Net loss to society	6

A government committed to supplying free fertilizer but pressed to reduce Treasury outlays might find allocation x' attractive. On the other hand, producers allowed by a permissive government to choose the quantity desired will utilize x" because that quantity provides the most revenue. It is assumed above that government programs cause deviations from the optimal fertilizer input x. If, on the contrary, producers use suboptimal quantity x' in the absence of government interference, then a successful government policy costing area 4 to push consumption to x has implications as follows:

(Initially Too Little Fertilizer x')

	Area (Value)
Gain to producers	2 + 4
Loss to government	4
Net gain to society	2

This example illustrates that under some circumstances government intervention may increase efficiency and generate net social benefits.

Figure 3.1b shows benefits and costs at the farm level if government allocates by price rather than by quantity. Each producer will face a horizontal, perfectly elastic fertilizer supply at p in a well-functioning market. If the producer can generate revenue at alternative applications as represented by the curve VMP, the optimal allocation to provide the most net return is at x. If the government subsidizes fertilizer at a unit rate p-p', the new supply curve is the horizontal line at p' at the individual farm level. To make the most possible net income, the producer uses x' fertilizer. The economic implications of the input subsidy measured by deviations from the ideal allocation at p and x are as follows based on Figure 3.1b:

	Area (Value)
Gain to producers	1 + 2
Loss to taxpayers (subsidy)	1 + 2 + 3
Net loss to society	3

Industry Level Impact

We now turn to industry rather than firm impacts of input subsidies using the example of fertilizers. Input policies influence output, of course. In Figure 3.2a, industry supply and demand for output are initially in competitive equilibrium at output quantity q and price p. Then the government is assumed to provide an input subsidy shifting the social supply curve S_s to the private supply curve S_p. The result is to reduce the price to farmers from p to p'

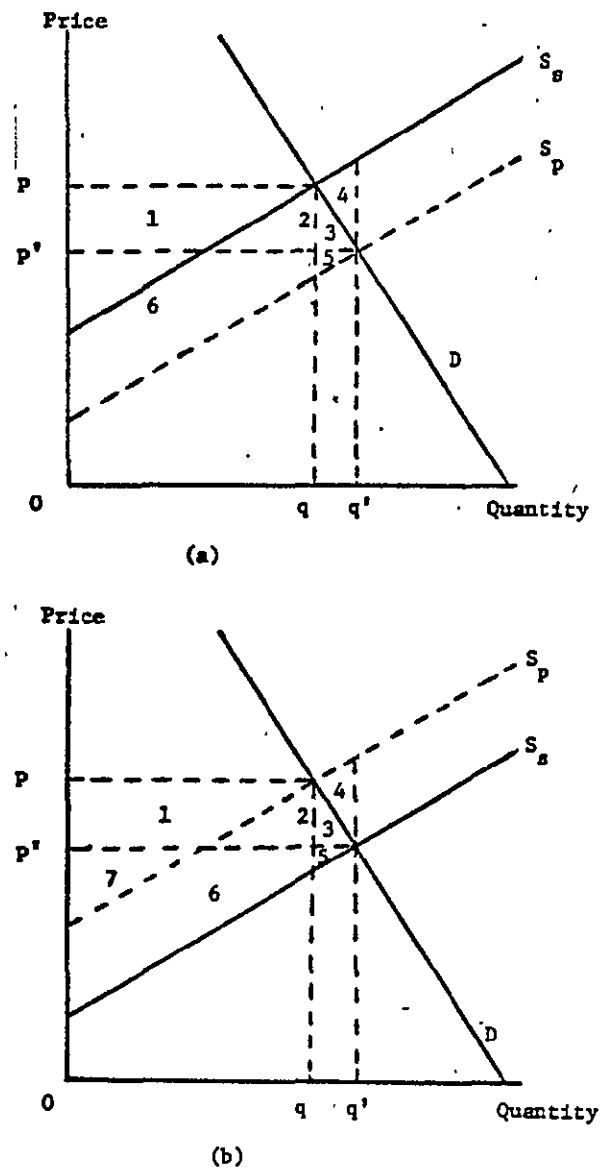


Figure 3.2. Economic Costs and Benefits of Policies Influencing Inputs, Industry Level.

and to increase quantity from q to q'. The impact as depicted in Figure 3.2a is as follows:

	Area (Value)
Gain to consumers	1 + 2 + 3
Gain to producers	5 + 6 - 1
Loss to taxpayers	2 + 3 + 4 + 5 + 6
Net loss to society	4

The gain to producers may be positive or negative, depending on the size of area 5 + 6 compared to area 1 in Figure 3.2a.

It is possible that producers are not responding fully to price signals so that the private supply curve S_p lies to the left of the social supply curve S_s as in Figure 3.2b. That is, producers are using less than the socially desirable level of fertilizer at any given price. The government is assumed to intervene with subsidies to reduce the fertilizer price and shift the private supply curve to the social supply curve in Figure 3.2b. The economic implications of shifting from the original allocation at p and q to a new allocation by using input subsidies to shift the commodity supply curve from S_p to S_s are shown in Figure 3.2b:

	Area (Value)
Gain to consumers	1 + 2 + 3
Gain to producers	3 + 4 + 5 + 5 + 6 - 1
Loss to taxpayers	2 + 3 + 4 + 5 + 6
Net gain to society	3 + 5

Of course, it is possible that distortions in fertilizer mix or other inefficiencies introduced by subsidies would eliminate potential net social gain 3 + 5. As a general rule, the larger the subsidy the

more likely are such distortions and administrative costs to offset potential economic gains from correcting market failure. So-called "pure" transfers that do not distort incentives are rare indeed.

Input and Output Interventions

A number of countries adjust market incentives with a combination of policies influencing both input and output prices and quantities. The net impact of such policies can be judged only by considering all interventions. Figure 3.3 illustrates for a net importer. The government provides an input subsidy along with a product price ceiling policy that reduces price from p to p'. The lower product price raises consumption from market equilibrium level q to q'. Provision of the same subsidy p-p' on domestic production moves the effective domestic supply curve forward from S_d to S_d'. Hence the initial equilibrium domestic production q_d is maintained.

The net result of simultaneous subsidy on imports and domestic production to hold domestic price to p' is illustrated in Figure 3.3 as follows:

	Area (Value)
Gain to consumers	1 + 2 + 3 + 4
Loss to producers	2 + 6 - 1 - 2 = none
Loss to taxpayers	1 + 2 + 3 + 4 + 5
Net loss to society	5

The result of this policy of domestic food price controls, import subsidies, and producer subsidies is to transfer income from taxpayers to consumers, leaving producers' output and net income unchanged.

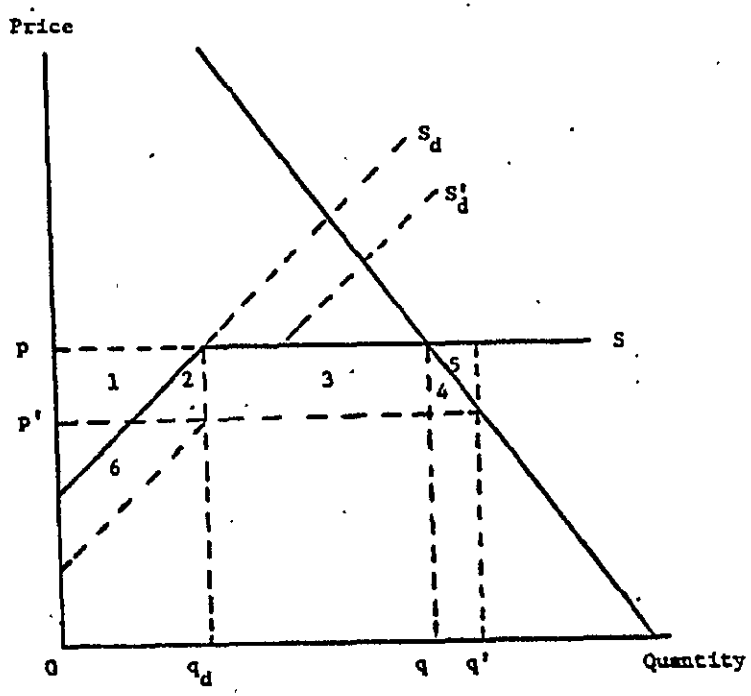


Figure 3.3. Economic Costs and Benefits of Policies of Food Price Controls and Input Subsidies

Again it is cautioned that such transfers are difficult indeed to hold independent of resource mix. A combination of subsidies and price controls in reality tends to cause greater inefficiency than depicted in Figure 3.3.

4. SELECTED APPLICATIONS OF FRAMEWORK

To provide further insight into the conceptual framework established above, and how to operationalize it in policy analysis, an illustration is included from Truong (1982) for corn in Portugal and from Tweeten and Rogers (1985) for rice in Liberia.

The situation for corn in Portugal is shown graphically (although not to scale) in Figure 4.1. The Government of Portugal purchases corn through an agency EPAC at a price p_p above the cif world market price p. In the absence of price supported above the world market level, domestic corn growers would market q_d but the higher price increases sales to q_d'.

ECAP purchases corn from farmers for the price p_p and sells to consumers (processors) at a price p_c below the world price. In the absence of the subsidy, consumers would pay price p and consume q; with the subsidy they pay p_c and consume q'.

To determine the distribution of costs and benefits among consumers, producers, and taxpayers and the net social costs of intervention compared to world market pricing, the prices and quantities shown in Figure 4.1 must be estimated. The procedure is shown step by step in Tables 4.1 and 4.2.

The addition to producers surplus is found by subtracting area 2 from the "gross" value of the subsidy to producers, area 1 + 2 or

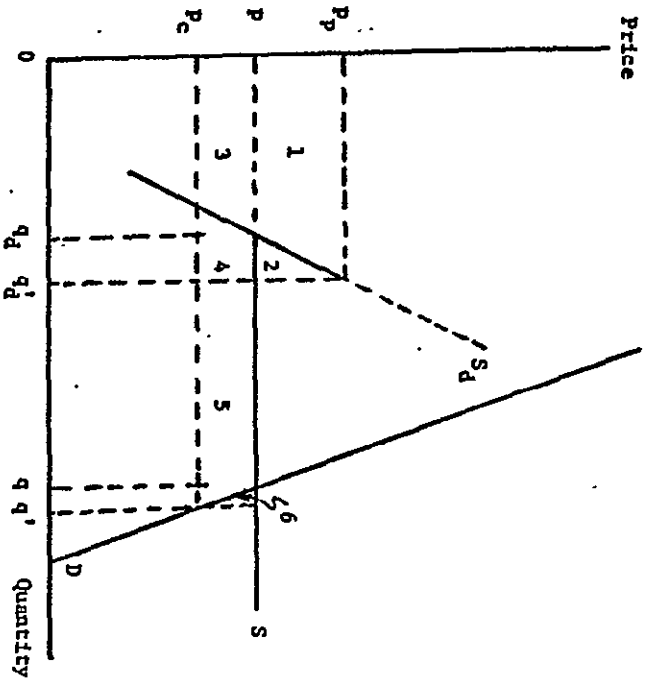


Figure 4.1. Estimated Supply-Demand Framework for Estimating Costs and Benefits from Policy Featuring Subsidies to Producers and Consumers.

Table 4.1. Corn Producer and Consumer Subsidy Equivalents and Values, 1980.

Item	Figure 4.1 Designation: Area	Figure 4.1 Designation: Price-Quantity	Portugal Example: Units	Portugal Example: 1980
		Producers		
(1) Domestic production sold to EPAC		q_d'	Thousand metric tons	18.90
(2) Guaranteed producer prices		p_p	Escudos per kg.	11.30
(3) Producer receipts [(1) x (2)]		$q_d'p_p$	Million escudos	213.57
(4) Computed cif import price		p	Escudos per kg.	8.31
(5) Producer subsidy [(2) - (4)]		p_p-p	Escudos per kg.	2.99
(6) Policy transfers to producers [(1) x (5)]	1+2	$q_d'(p_p-p)$	Million escudos	56.48
(7) Proportional subsidy [(5) + (4)]		$(p_p-p)/p$	Percent	26.45
		Consumers (Millers & Compound Feeders)		
(8) EPAC sales to millers and compound feeders		q'	Thousand metric tons	2,906.30
(9) Millers and compound feeders purchase price		p_c	Escudos per kg.	7.00
(10) Consumer costs [(8) x (9)]		$q'p_c$	Million escudos	20,344.00
(11) Computed cif import price		p	Escudos per kg.	8.31
(12) Consumer subsidy [(11) - (9)]		$p-p_c$	Escudos per kg.	1.31
(13) Policy transfers to millers and compound feeders [(8) x (12)]	3+4+5+6	$q'(p-p_c)$	Million escudos	3,811.70
(14) Proportional subsidy [(12) + (11)]		$(p-p_c)/p$	Percent	18.74

Table 4.1. (Continued)

Item	Figure 4.1 Designation: Area	Figure 4.1 Designation: Price-Quantity	Portugal Example: Units	Portugal Example: 1980
		Government		
(15) Policy transfers to producers (6)	1+2	$q'_d(p_p-p)$	Million escudos	56.48
(16) Policy transfers to consumers (subsidy) (13)	3+4+5+6	$q'(p-p_c)$	Million escudos	3,811.70
(17) Total subsidy [(15) + (16)]	1+2+3+4+5+6	$q'_d(p_p-p)+q'(p-p_c)$	Million escudos	3,868.28

Source: Adapted from Truong (1982).

Table 4.2. Estimated Policy-Generated Trade Benefits and Costs for Corn, Portugal, 1980.

Item	Figure 4.1 Designation: Area	Figure 4.1 Designation: Price-Quantity	Portugal Example: Units	Portugal Example: 1980
		Producers		
(18) Direct price elasticity of supply			Percent	.10
(19) Trade volume generated by production subsidy [(1) x (7) x (18)]		q'_d-q_d	Thousand metric tons	.50
(20) Production value loss [.5 x (5) x (19)]^b	2	$.5(p_p-p)(q'_d-q_d)$	Million escudos	.75
(21) Gain to producers (Addition to producers surplus) [(15)-(20)]			Million escudos	55.73
(22) Production value loss per unit of gain to producers [(20)÷(21)]^b			Escudos	.01
		Consumers		
(23) Direct price elasticity of demand			Percent	-.30
(24) Trade volume generated by consumption subsidy [(8) x (14) x (23)]^a		$q'-q$	Thousand metric tons	-163.36
(25) Consumption value loss [.5 x (12) x (24)]^b	6	$.5(p-p_c)(q'-q)$	Million escudos	107.13
(26) Gain to consumers (Addition to consumers surplus) [(16) - (25)]	3+4+5		Million escudos	3,761.15
(27) Consumption value loss per unit gain to consumers [(25) ÷ (26)]			Escudos	.03

Table 4.2. (Continued)

Item	Figure 4.1 Designation: Area	Figure 4.1 Designation: Price-Quantity	Portugal Example: Units	Portugal Example: 1980
		Government		
(28) Net policy generated trade volume [(19) + (24)][a]		$(q_d' - q_d) + (q' - q)$	Thousand metric tons	-162.86
(29) Loss to taxpayers (total subsidy [(15) + (16)])	1+2+3+4+5+6	$q_d'(p_p - p) + q'(p - p_c)$	Million escudos	3,868.28
		Society		
(30) Gain to producers and consumers [(21) + (26)]	1+3+4+5		Million escudos	3,816.88
(31) Gain per unit of total transfer (subsidy) income [(30) ÷ (17)]			Escudos	.99
(32) Loss to society (economic cost) [(20) + (25)]	2+6		Million escudos	107.88
(33) Loss per unit of transfer income to consumers and producers[a] [(32) ÷ (29)]			Escudos	.03

[a]A positive figure indicates an addition to exports or a reduction of imports; a negative figure indicates the contrary. Row number designations (1) to (17) are from Table 4.1.

[b]Only absolute values are considered in computations.

Source: 1980 data from Troung (1982).

$q_d'(p_p - p)$. Calculating area 2 entails several steps as designated in Tables 4.1 and 4.2.

Calculating the proportional price subsidy in Table 4.1 (step 7) also gives the proportional value subsidy because quantity q_d' is the same for the numerator and denominator. The proportional price subsidy $(p_p - p)/p$ is simply the proportion by which p_p exceeds p.

In step 19, Table 4.2, the EPAC trade volume $q_d' - q_d$ generated by the production subsidy is calculated as

$$q'_d[(p_p - p)/p][(dq/dp)(p/q)]$$

where the last term in brackets is the elasticity of supply.

The area 2 in Figure 4.1 may be approximated by a triangle whose area is half the base times the height, a calculation carried out as step 20 in Table 4.2; that is

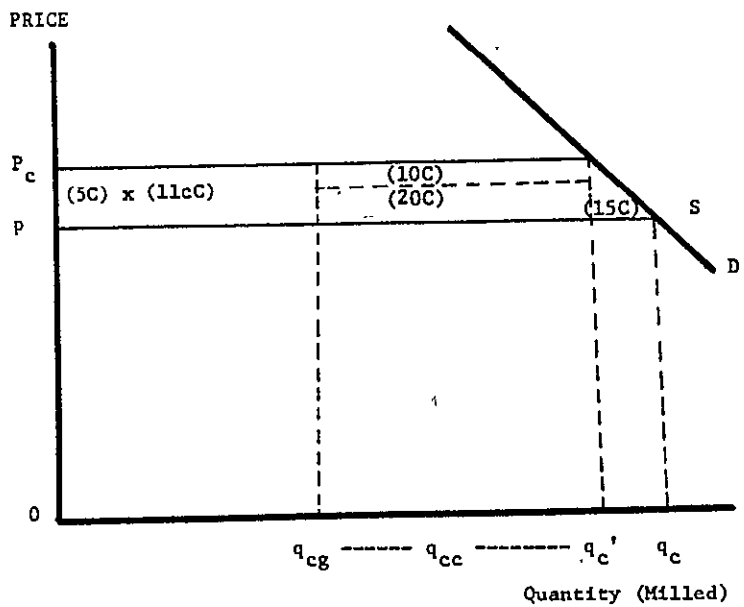
$$.5\,(p_p - p)\,(q_d - q).$$

This value of area 2 is subtracted from the subsidy to producers to derive area 1 in step 21. A similar procedure was used to calculate area 6 in Figure 4.1, the net social cost of the subsidy to consumers.

Rice Policy in Liberia

Table 4.3 and Figure 4.2 show estimated gains and losses from Government market interventions in the Liberian rice economy in 1982, 1983 and 1984. Analysis is at the producer level (P) expressed in paddy rice and at the consumer level (C) in milled clean rice.

First consider impacts on producers as estimated in the first panel (P) in Table 4.3 and the lower panel of Figure 4.2. The official support price at the county receiving stations was 18 cents per pound paddy but at the farm level was approximately 12 cents per



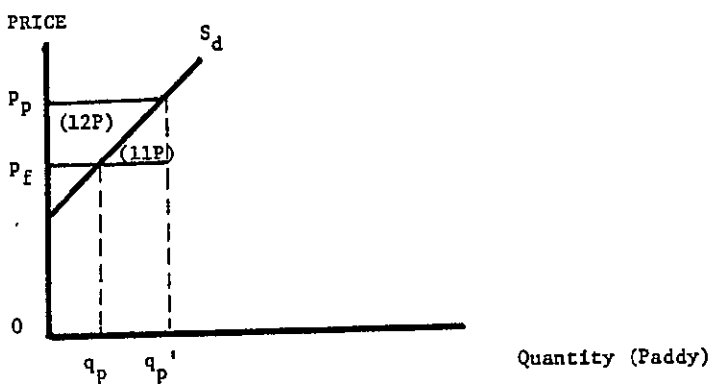


Figure 4.2. Graphic Illustration of Liberian Rice Policy Intervention.

Table 4.3. Gains and Losses from Government Policies, Liberian Rice Economy.

Item	Producers (Farm Level) P Notation	Units	1982	1983	1984
(1) Domestic production sold to LPMC	q'_p	1,000 mt paddy	10.00	17.19	9.25
(2) Guaranteed producer price	P_g	$/mt (18¢/lb.)	396.90	396.90	396.90
(3) Effective producer price	P_p	$/mt	264.60	264.60	198.36
(4) Producer receipts (1)x(3)	$q'_p P_p$	$1,000	2,646.00	4,548.47	1,834.83
(5) Normal market price, farm level	P_f	$/mt (8¢/lb.)	176.40	176.40	176.40
(6) Producer subsidy (3)-(5)	$P_p - P_f$	$/mt	88.20	88.20	21.96
(7) Policy transfer to producers (1)x(6)	$q'_p(P_- - P_p - P_f)$	$1,000	882.00	1,516.16	203.13
(8) Proportional subsidy (6/5)x100	$(P_p - P_f)/P_f$	Percent	50.00	50.00	12.45
(9) Direct price elasticity of market surplus		Percent	1.30	1.30	1.30
(10) Quantity generated by production subsidy (1)x(8)x(9)/100	$q'_p - q_p$	1,000 mt	6.50	11.17	1.50
(11) Production value loss .5(6)x(10)	$.5(P_p - P_f)(q'_p - q_p)$	$1,000	286.65	492.75	16.44

Table 4.3. (Continued)

Item	Producers (Farm Level) P Notation	Units	1982	1983	1984
(12) Gain to producers (addition to producers surplus) (7)-(11)		$1,000	595.35	1,023.41	186.69
(13) Production value loss per unit of gain to producers (11/12)		$	.48	.48	.09
(14) LPMC quantity sold from local production		1,000 mt	4.00	5.35	5.15
(15) LPMC marketing cost of local production sold		$/mt	205.06	205.06	205.06
(16) Normal marketing cost for competitive sector		$/mt	132.30	132.30	132.30
(17) Excess resource cost of marketing (15-16)x(14)		$1,000	291.04	389.27	374.71
(18) LPMC purchases less sales (1)-(14)		1,000 mt	6.00	11.84	4.10
(19) Value lost from waste .5(5)x(18) (assume half loss)		$1,000	529.20	1,044.29	361.62
(20) Sum of social costs (11)+(17)+(19)		$1,000	1,106.89	1,926.31	752.77
(21) Social cost per unit gain to producers (20)/(12)		$	1.86	1.88	4.03

Table 4.3. (Continued)

Item	Consumption (Wholesale Level) C Notation	Units	1982	1983	1984
(1) Total quantity marketed and consumed	q'_c	1,000 mt	95.40	102.40	102.40
(2) Support price, wholesale	p_c	$/mt	465.00	440.00	474.00
(3) Consumption cost (1)x(2)	$q'_c p_c$	$1,000	44,361.00	45,056.00	48,537.60
(4) Computed cif world wholesale price	p	$/mt	419.50	391.10	403.00
(5) Consumption tax (2)-(4)	$p_c - p$	$/mt	45.50	48.90	71.00
(6) Policy tax on consumers (1)x(5)	$q'_c(p_c - p)$	$1,000	4,340.70	5,007.36	7,270.40
(7) Proportional tax (5/4)x(100)	$(p_c - p)/p$	Percent	10.85	12.50	17.62
(8) Commercial imports	q_{cc}	1,000 mt	50.00	55.00	55.00
(9) Prescribed import margin .03(4)		$/mt	12.59	11.73	12.09
(10) Planned commercial tax revenue (5-9)x(8)		$1,000	1,645.75	2,044.18	3,240.05
(11) LPMC a) PL 480		1,000 mt	43.00	45.00	46.40
b) In-country purchases		1,000 mt	2.40	2.94	2.68
c) Total	q_{cg}	1,000 mt	45.40	47.94	49.08

Table 4.3. (Continued)

Item	Consumption (Wholesale Level) C Notation	Units	1982	1983	1984
(12) Policy tax transfer to GOL (5)x(11c)+(10)		$1,000	3,711.45	4,388.45	6,724.73
(13) Direct price elasticity of demand		Percent	-.60	-.60	-.60
(14) Consumption lost by tax (1x7x13)/-100	$q_c - q'_c$	1,000 mt	6.21	7.68	10.82
(15) Consumption value loss .5x(5)x(14)	$.5(p_c - p)(q_c - q'_c)$	$1,000	141.24	187.82	384.27
(16) Loss to consumers (6)+(15)		$1,000	4,481.94	5,195.18	7,654.67
(17) Consumption value lost per unit of tax (15)/(12)		$	.04	.04	.06
(18) Spoilage and waste above normal		1,000 mt	1.50	1.50	1.50
(19) Cost of spoilage (4)x(18)		$1,000	629.25	586.65	604.50
(20) Gain to commercial importers (6)-(12)		$1,000	629.25	618.19	545.67

Table 4.3 (Continued)

Society Gains and Losses from Market Intervention[a]

Private Sector	Source	Units	1982	1983	1984
+ Gain to producers	(12P)	$1,000	595.35	1,023.41	186.69
- Loss to consumers	(16C)	$1,000	4,481.94	5,195.18	7,654.67
+ Gain to commercial importers	(20C)	$1,000	629.25	618.91	545.67
Net		$1,000	-3,257.34	-3,552.87	-6,922.30
Public Sector					
- Policy transfer to producers	(7P)	$1,000	882.00	1,516.16	203.13
- Excess cost of country marketing	(17P)	$1,000	291.04	389.27	374.71
- Value lost from country waste	(19P)	$1,000	529.20	1,044.29	361.62
+ Policy transfer from consumers to GOL	(12C)	$1,000	3,711.45	4,388.45	6,724.73
-Spoilage and waste	(19C)	$1,000	629.25	586.65	604.50
Net		$1,000	1,379.96	852.09	5,180.77
Net cost of public intervention to society (Loss to private sector less gain to public sector)		$1,000	1,877.38	2,700.78	1,741.54

[a]Omitted from analysis:
(a) Net costs and benefits of PL 480 imports — could be established as separate account.
(b) The subsistence rice production-consumption sector.

pound p_p. The effective support price was lower in 1984 because the official support price could not be sustained for lack of funds. In the absence of supports, farm price was estimated to be p_f = 8 cents per pound, hence the effective proportional subsidy was 50 percent in 1982 and 1983 as shown in row (8P). The support price generated a market surplus quantity $q'_p - q_p$. The subsidy of $(p_p - p_f)(q'_p - q_p)$ to producers was partially offset by additional production costs as shown in row (11P).

Only the market surplus is assumed to be effected by rice price support in the above calculations. Approximately the same additional quantity is produced in row (10P) if it is assumed that total rice supply elasticity is .1 and all Liberian rice production, even in remote areas for subsistence use, is effectively raised in price by 25 percent.

Mainly because of limited milling capacity, the Liberian Produce Marketing Corporation (LPMC) was only able to market a portion of paddy acquisitions as noted in row (14P). An estimated half of the unmarketed quantity was lost as waste at a value shown in row (19P). In addition, marketing costs were estimated to exceed competitive marketing costs. The excess resource cost for marketing is shown in row (17P). The sum of the lost value from three sources (production value lost, excess marketing cost, and spoilage) is shown in row (20P). The loss of well over $1 in goods and services to transfer $1 of income to producers as shown in row (21P) indicates very low efficiency in transferring income to producers.

Effects of Government rice policy on market consumers (C) are shown in the second panel in Table 4.3 and the upper panel of Figure

4.2. The Liberian price p_c was supported above the cif world price level p as shown in row (5C), reducing consumption from q_c to q'_c as shown in Figure 4.2. Of this consumption, $q_{cc} = q'_c - q_{cg}$ was imported commercially and q_{cg} was from LPMC in-country and PL 480 acquisitions as shown in row (11C) of Table 4.3. The loss to consumers from the consumption tax was (16C). The Government received part of the tax directly and (10C) of the tax indirectly from a duty on commercial imports. Commercial importers gained (20C) of the tax as economic rent, hence consumers lost (15C) not gained by Government or commercial importers. In addition, social costs roughly estimated in (19C) were incurred due to above normal spoilage of LPMC stocks.

The distribution of gains and losses from market interventions is summarized in the final panel of Table 4.3. Gains to producers and commercial importers were offset by losses to consumers so that the private sector incurred a net loss of over $3 million each year. The public sector gained because transfers from consumers more than offset losses from price supports to producers, excessive marketing costs, and spoilage and waste. The net loss to society was over $2 million in 1983 because losses to the private sector exceeded gains to the public sector. The social cost must be balanced against unaccounted for benefits of rice policies such as stability of rice prices, public employment and political support. Net costs and benefits of PL 480 counterpart funds are not included in the calculations.

5. CONCLUSIONS AND LIMITATIONS

Classical welfare analysis is a powerful tool of economic policy analysis. It is sufficiently flexible to encompass not only social

costs from an inefficient output (dead weight loss) and an inefficient resource mix (x-inefficiency) but also from excessive spoilage and administrative cost, as well as lost output from resources "wasted" in political economic-seeking transfer (PEST) activities. This cardinal approach requires stronger assumptions than Pareto-partial analysis which reveals inefficiency only as disequilibrium at the margin. Pareto-partial marginal analysis indicates presence of inefficiency but not the magnitude. The advantage of classical welfare analysis is that it indicates whether a deviation from the marginal equilibrium represents an inefficiency (net social cost) of $1 billion or only $1.

The Marshallian concepts of produce and consumer surplus have been not only useful but also controversial. Major criticisms are listed below.

1. Consumer surplus must be estimated from a demand curve which ordinarily is estimated from time series data. The historic price-quantity data used to estimate the demand curve are likely to be narrow in range. The shape of the demand curve outside the range of historic price-quantity data is unknown. Accordingly, consumer surplus outside the historic price-quantity data range can be measured imperfectly if at all. The appropriate means to alleviate the shortcoming is to estimate consumers surplus only within the historic price-quantity data range and only as deviations from equilibrium as shown in the text.

2. A second major criticism of consumer surplus is that price as a measure of marginal utility and the area beneath the demand curve as a measure of total utility requires constant marginal utility of income (see Samuelson, 1965, 1983). Ideally, consumers surplus would

be estimated from an income-compensated demand curve. Such a curve is not easily estimated. If the change in income is small from changes in consumers surplus being considered, error introduced by failure to adjust demand for changing marginal utility is small.

3. Marginal utilities differ among individuals, creating problems in using aggregate demand to measure utility. Although differences within groups such as consumers or producers may average out, systematic differences are likely to appear between producers and consumers or between consumers and taxpayers.

Figure 5.1 shows the marginal utility of income estimated by Tweeten and Mlay for the United States. No major differences in marginal utility among groups, sectors, or regions were apparent that could not be accounted for by age, education and occupation.

Estimates of marginal utility from Figure 5.1 can be used to adjust policy analysis results. The marginal utility of income, expressed as a proportion of marginal utility of median income MY, is

$$MU = 1.3582 - .3582\ MY.$$

Suppose that median income of taxpayers is 1.2 times the national median, of consumers in 1.1 times the national median, and of producers is .8 times the national median income. The marginal utility for each of these groups is shown in column "MU" below:

Unadjusted		Adjusted for Marginal Utility	
	$	MU/$	$
Loss to taxpayers	100	.928	92.8
Loss to consumers	100	.964	96.4
Gain to producers	180	1.072	193.0
Net social cost	20		3.8

This marginal utility of income is used to adjust hypothetical policy analysis results above. Marginal utilities were simply multiplied by gains and losses under the assumption that changes in income were small. Because the income redistribution was from higher income taxpayers and consumers to lower income producers, the utility-adjusted net social cost is only a fraction of the unadjuated net social cost.

A variant of the above approach is to divide consumers, producers, and taxpayers into income subgroups. Marginal utilities then can be applied to income in each subgroup to calculate utility gains and losses which finally are summed to make an overall appraisal of net utility gains and losses.

4. Producers surplus is a return to fixed resources -- a net return after subtracting variable costs from gross returns. Supply curves are behavioral relationships. They can be used only imperfectly to measure economic rent in the long and short run (see Mishan, 1968). Often the best solution to this problem is to estimate producers surplus as gross receipts less all costs which are variable in the time period under considerations.

5. Equilibrium prices and quantities could account for interactions among commodities in a simultaneous system of demand and supply equations. This contrasts with the single commodity analysis in the previous sections.

6. Long-run as well as short-run elasticities could be recognized.

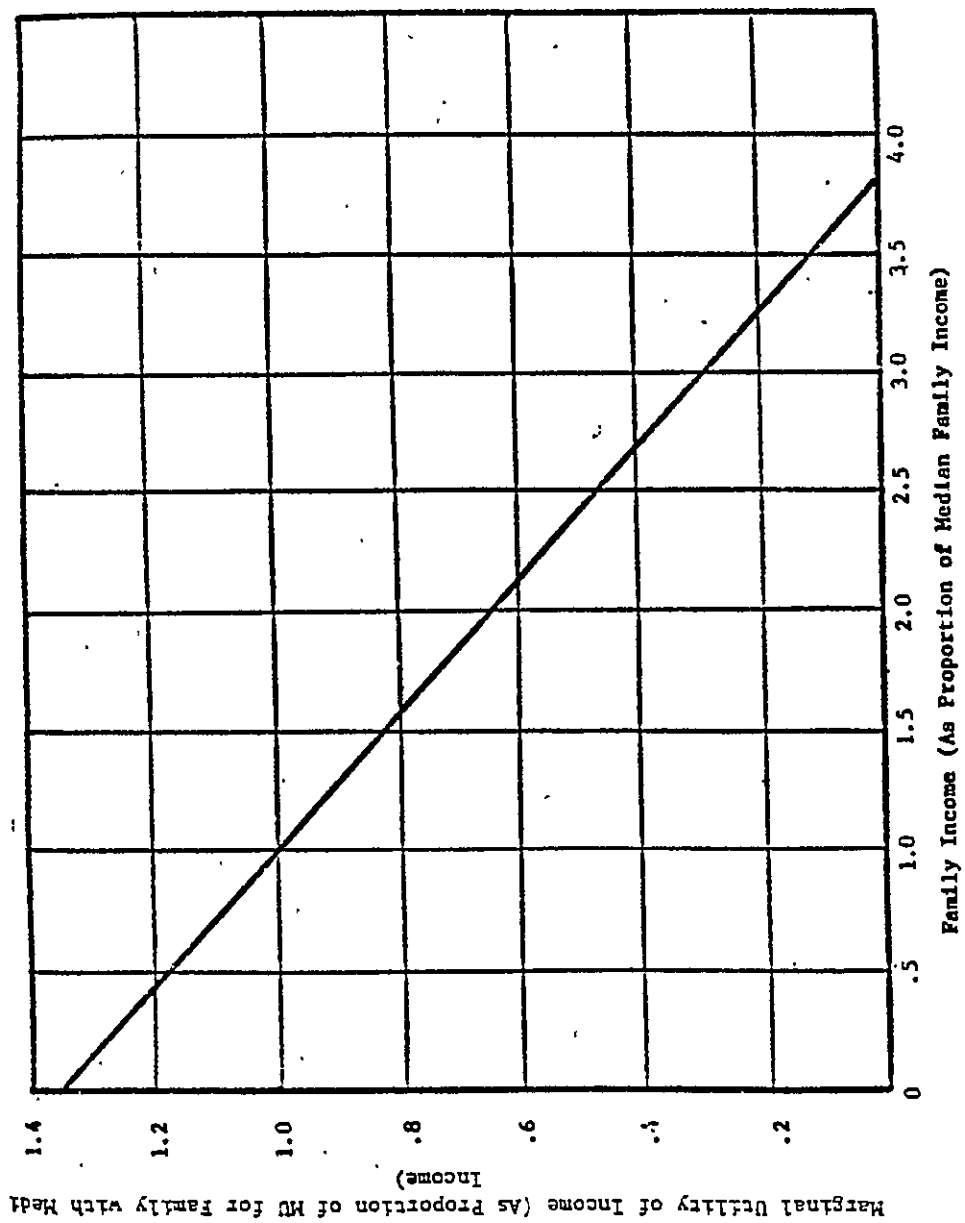


Figure 5.1. Estimated Marginal Utility of Income for U.S.

Finally, estimating price distortion from government interventions requires considerable effort. It is useful to draw on previous studies when possible. Useful references include Schultz (1978), Scandizzo and Bruce (1980), and Agarwala (1983).

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AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: Working Groups
Lead Instructor: Fletcher
Co-Trainer(s): Tweeten, Odell, Carter

Date: Monday, June 2
Session #: 4
Time: 5:00-6:00 pm

OBJECTIVE(S): At the end of this session participants will be able to:

- o Apply concepts and learnings from today's sessions to group and individual action plans for presentation on Friday
- o Suggestion questions of special interest/relevance for tomorrow's sessions

---

ABSTRACT:

With specific reference to team/individual projects:

- o Draw linkages between agricultural sector and overall national economic growth and development. Relation between macro/pricing policy and food/agricultural sector
- o Identify appropriate policy interventions especially with reference to pricing issues
- o Identify potential impact of these interventions in terms of (a) growth, (b) equity
- o Outline anticipated costs and benefits of proposed interventions
- o Suggest preliminary approaches that might encourage LDC adoption of policy changes
- o Review tomorrow's session outlines and suggest questions of special interest that presenters might address where feasible.

READINGS: Required/Optional

- o None.

TUESDAY

READINGS FOR TUESDAY

Session	Required/Optional
Session 1	
o Evenson R., Waggoner P., and Bloom P., "Agricultural Research System of the Philippines: A Reconnaissance Report," Economic Development Center, Department of Economics Bulletin No. 81-3, University of Minnesota, St. Paul, May 1981.	X /
o Ruttan, Vernon, "Assistance to Expand Agricultural Production," World Development, Vol. 14, No. 1, 1986, pp. 39-63.	/ X
Session 2	
o Marceau, Ian, "Privatization in the Agricultural and Agribusiness Sectors," Paper presented at the AID International Conference on Privatization, Washington, February 17-19, 1986.	X /
o Meissner, Frank, Jamaica Commodity Trading Corporation Case Study, 1986.	X /
o Ghai, Yash, "The State and the Market in the Management of Public Enterprises in Africa," Public Enterprise, Vol. 6, No. 1, 1986.	X /
Session 4	
o Norton, Roger, "Haitian Agriculture: Production Costs and Pricing and Fiscal Structures," pp. 19-31.	/ X
o Norton, Roger, "Policy Issues in Mexican Agriculture," World Bank, July 1984, pp. 1.1-2.23; 3.20-4.13; 4.17-5.6.	X /
o Hazell and Norton, "Methods of Policy Analysis," Chapter 12 in Mathematical Programming for Economic Analysis.	/ X
Session 5	
o "Steps in Developing a Multimarket Computer Simulation Model," 1986.	/ X
o "Details used to Describe How the Agricultural Sector Works," 1986.	/ X
o D'Silva, Brian, Sudan Case Study, 1986.	X /

AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: Public Sector Investment in Agricultural Research and Extension — **Date:** Tuesday, June 3

Lead Instructor: Pray — **Session #:** 1

Co-Trainer(s): — **Time:** 8:30-10:00 am

==========

OBJECTIVE(S): At the end of this session participants will be able to:

- o Understand the problems of government research and extension systems.
- o Understand how to assist governments in improving national research and extension programs.

==========

ABSTRACT:

Investments in government agricultural research and extension programs have been very productive in developing countries. After very rapid growth from 1959 to 1980, real expenditure in programs has declined in recent years as costs have increased dramatically.

Using the Philippine example, the following issues will be discussed:

* How much should government invest in research and extension ?
* How should government research resources be allocated ?
* How can governments mobilize political support for research ?
* What institutional changes are needed to develop an effective research system ?
* What alternatives are available for reducing costs and increasing effectiveness in the context of rising costs and scarce resources?
* What can AID do to assist the research and extension system ?

==========

READINGS: — Required/Optional

- o Evenson R., Waggoner P., and Bloom P., "Agricultural Research System of the Philippines: A Reconnaissance Report," Economic Development Center, Department of Economics Bulletin No. 81-3, University of Minnesota, St. Paul, May 1981. — X /___
- o Ruttan, Vernon, "Assistance to Expand Agricultural Production," World Development, Vol. 14, No. 1, 1986, pp. 39-63. — ___/ X

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UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D. C. 20523

HONDURAS

PROJECT PAPER

AGRICULTURAL RESEARCH FOUNDATION

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Project Number:522-0249

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D. Economic Analysis

I. INTRODUCTION

The capacity to develop and manage technology in a manner consistent with a nation's physical and cultural environment is the single most important factor accounting for differences in agricultural productivity among countries.1/ That capacity, in turn, is dependent in part on the existence of well-functioning institutions to generate and transmit agricultural research results to farmers. Since the mid-1950's numerous studies have examined the impacts of agricultural research, extension, and education on productivity and output growth for a wide range of commodities and countries. The vast majority of these studies have indicated high rates or return to public investment in agricultural research. The results of several of these studies as listed in Table 1. For example, Barletta (1970) estimated an annual real rate of return of 45-93% for crop research in Mexico. Ayer and Schuh (1972 obtained an estimated return of 77-110% for cotton in Brazil; Hines (1972) a 35-55% return for maiz in Peru; Wennergren and Whitaker (1977) a return of 44% for sheep in Bolivia; Scobie and Posada (1978) a return of 79-96% for rice in Colombia; and Hertford, Ardila, Rocha, and Trujillo (1977) a return of 60-82% for rice, 79-96% for soybeans, 11-12% for wheat, and none for cotton in Colombia. Most of these rates of return are well in excess of the 15-20% returns which private firms would consider necessary for investments with similar risk levels.

Due to the difficulty of maintaining proprietary rights to research produced in underdeveloped countries, private firms lack an assured incentive to undertake sustained substantive research in countries such as Honduras. It is likely that this was one factor influencing United Brands to reduce its research efforts on bananas. Even if it were to continue to invest $300-400,000 per year on banana breeding research to eliminate Black Sigatoka, once a resistant variety is developed, it would be available to all firms producing bananas.

1/ Ruttan, V. W. Agricultural Research Policy, University of Minnesota Press, Minneapolis, 1982

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TABLE 1. SUMMARY STUDIES OF AGRICULTURAL RESEARCH PRODUCTIVITY.

Study	Country	Commodity	Time Period	Annual Internal Rate of Return (%)
Index Number:				
Griliches, 1985	USA	Hybrid corn	1940-1955	35-40
Griliches, 1958	USA	Hybrid sorghum	1940-1957	20
Peterson, 1967	USA	Poultry	1915-1960	21-25
Evenson, 1969	South Africa	Sugar cane	1945-1962	40
Barletta, 1970	Mexico	Wheat	1943-1963	90
Barletta, 1970	Mexico	Maize	1943-1963	35
Ayer, 1970	Brazil	Cotton	1924-1967	77+
Schmitz and Seckler, 1970	USA	Tomato harvester, with no compensation to displaced workers	1958-1969	37-46
		Tomato harvester, with compensation of displaced workers for 50% of earnings loss.		16-28
Ayer and Schuh, 1972	Brazil	Cotton	1924-1967	77-110
Hines, 1972	Peru	Maize	1954-1967	35-55
Hayami and Akino 1977	Japan	Rice	1915-1950	25-27
Hayami and Akino, 1977	Japan	Rice	1930-1961	73-75
Hertford, Ardila, Rocha and Trujillo, 1977	Colombia	Rice	1957-1972	60-82
		Soybeans	1960-1971	79-96
		Wheat	1953-1973	11-12
		Cotton	1953-1972	none
Pee, 1977	Malaysia	Rubber	1932-1973	24
Peterson and Fitzharris, 1977	USA	Aggregate	1937-1942	50
			1947-1952	51
			1957-1962	49
			1957-1972	34
Wennergren and Whitaker, 1977	Bolivia	Sheep	1966-1975	44
		Wheat	1966-1975	-48
Pray, 1978	Punjab (British India)	Agricultural research and extension.	1906-1956	34-44
	Punjab (Pakistan)	Agricultural research and extension	1948-1963	23-37

TABLE 1 cont'd

Study	Country	Commodity	Time Period	Annual Internal Rate of Return (%)
Index Number:				
Scobie and Posada, 1978	Colombia	Rice	1957-1964	79-96
Pray, 1980	Bangladesh	Wheat and rice	1961-1977	30-35
Regression Analysis:				
Tang, 1963	Japan	Aggregate	1880-1938	35
Griliches, 1964	USA	Aggregate	1949-1959	35-40
Latimer, 1964	USA	Aggregate	1949-1959	not significant
Peterson, 1967	USA	Poultry	1915-1960	21
Evenson, 1968	USA	Aggregate	1949-1959	47
Evenson, 1969	So. Africa	Sugar cane	1945-1958	40
Barletta, 1970	Mexico	Crops	1943-1963	45-93
Duncan, 1972	Australia	Pasture Improvement	1948-1969	58-68
Evenson and Jha, 1973	India	Aggregate	1953-1948	40
Cline, 1975 (revised by Knutson and Tweeten, 1979)	USA	Aggregate	1939-1948	41-50
		Research and extension	1949-1958	39-47
			1959-1968	32-39
			1969-1972	28-35
Bredahl and Peterson, 1976	USA	Cash grains	1969	36
		Poultry	1969	37
		Dairy	1969	43
		Livestock	1969	47
Kahlon, Bal, Saxena, and Jha, 1977	India	Aggregate	1960-1961	63
Evenson and Flores, 1978	Asia--national	Rice	1950-1965	32-39
			1966-1975	73-78
	Asia--Internat'l	Rice	1966-1975	74-102
Flores, Evenson, and Hayami, 1978	Tropics	Rice	1966-1975	46-71
	Philippines	Rice	1966-1975	75
Nagy and Furtan, 1978	Canada	Rapeseed	1960-1975	95-110
Davis, 1979	USA	Aggregate	1949-1959	66-100

TABLE 1 cont'd

Study	Country	Commodity	Time Period	Annual Internal Rate of Return (%)
			1964-1974	37
Evenson, 1979	USA	Aggregate	1868-1926	65
	USA	Technology oriented	1927-1950	95
	USA	Science oriented	1927-1950	110
	USA	Science oriented	1948-1971	45
	Southern USA	Technology oriented	1948-1971	130
	Northern USA	Technology oriented	1948-1971	93
	Western USA	Technology oriented	1948-1971	95
	USA	Farm management research and ag extension	1948-1971	100

Source: Ruttan, V. W. Agricultural Research Policy, University of Minnesota Press, Minneapolis, 1982.

Historically, publicly supported agricultural research in Honduras has lagged far behind the rest of the world in terms of its growth rate of scientific staff and research expenditures as a percent of agricultural gross domestic product. A survey of 41 less developed countries showed only 4 countries with negative growth rates in scientific staff during the 1970's. Honduras was one of those with a -1.82% rate of change in scientifc staff. It also had the lowest level of expenditures on public agricultural research as a percent of agricultural gross domestic product (0.16 percent) of all 41 countries.[3/]

3/ Private research expenditures, particularly for bananas, have been substantial in Honduras.

Table 2. Forty-one countries arranged in order of growth rates of scientific staff, 1970/80.

Countries	Growth rate of staff	Expenditures as % of Ag. GDP	Growth rate of Ag. GDP 1970-1979 1/	Income Group
Bangladesh	33.32	0.48	1.9	Low
Malaysia	21.90	0.81	5.0	Middle
Togo	20.74	0.76	0.3	Low
Nigeria	17.27	0.70	-0.3	Middle
Ecuador	16.11	0.35	0.7	Middle
Sri Lanka	15.12	0.41	2.6	Low
Indonesia	14.78	0.44	3.6	Middle
Thailand	14.66	0.26	5.4	Middle
Guatemala	14.18	NA	5.1	Middle
Uruguay	13.35	0.59	0.2	High
Tanzania	11.34	0.35	4.9	Low
Syria	9.70	0.24	6.4	Middle
Nicarauga	8.82	0.27	4.2	Middle
El Salvador	8.44	0.17	3.2	Middle
Senegal	8.17	1.21	3.6	Low
Brazil	7.49	1.15	5.0	High
Paraguay	7.13	0.28	6.8	Middle
Chile	6.82	0.81	3.5	High
Kenya	6.48	1.08	5.4	Low
Peru	6.26	0.33	0.1	Middle
Bolivia	5.48	0.34	3.1	Middle
Sudan	5.46	0.57	2.7	Low
Mexico	5.16	0.65	2.2	High
Jordan	4.93	0.44	NA	Middle
Cyprus	4.85	1.12	NA	High
Zaire	4.85	0.20	1.2	Low
Burundi	4.47	0.81	1.8	Low
Venezuela	3.55	1.32	3.8	High
Zambia	3.39	0.80	2.3	Middle
Nepal	3.23	0.20	0.8	Low
Philippines	3.19	0.16	4.9	Middle
Barbados	2.82	1.36	NA	High
Korea, Rep.	2.67	0.23	4.8	Middle
India	2.25	0.29	2.1	Low
Costa Rica	1.56	0.24	2.6	High
Argentina	1.05	1.64	2.5	High
Panama	0.30	0.53	2.2	High
Magadascar	-0.64	0.39	0.1	Low
Honduras	-1.82	0.16	1.3	Middle
Jamiaca	-3.65	2.16	1.3	Middle
Colombia	-6.23	0.67	4.8	Middle
AVERAGE	6.10			

1/ Agricultural GDP growth rates for 1970-1979 taken from World Bank 1981 World Development Report.

Source: Oram, P.A. and V. Bindlish, Resource Allocations to National Agricultural Research Trends in the 1970's. ISNAR, IFPRI, 1981.

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It is little wonder that the production of major food commodities, particularly corn, soybean, beans and plantains have stagnated since 1970 as well (Table 3). It is estimated that 70% of the population suffers from malnutrition.

At the same time that production and the capacity to improve agricultural productivity has stagnated, population has grown at an annual rate in excess of 3% per annum. As a result, Honduras has moved from a net corn exporter to a point where it can no longer meet domestic demand. This situation is compounded by the recent weakness in the banana market which along with other factors has reduced the foreign exchange available to import food. If one looks to the future and assumes that population grows at about 3.3% per year, per capita income growth at a very modest 1.0 - 1.5% per year with an income elasticity of 0.7, the projected rate of growth in demand for food would be at least 4% per year. 4/ This figure indicates the extreme importance of increasing basic food production as well as developing exports to generate stable foreign exchange earnings to meet food import requirements.

Without increases in Honduran agricultural production, substantial upward pressure would be exerted on domestic food prices which, in turn, would reduce the rate of growth of economic development and employment in the industrial sector. It is the lowest income groups that spend the highest proportion of their income on food and experience the highest rates of unemployment. Consequently, these would be the hardest hit groups.

4/ The rate of growth in demand for food equals the rate of growth of population plus the product of the income elasticity of demand for food and the rate of growth of per capita income.

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Figure 1. Classification for Agricultural Research Systems

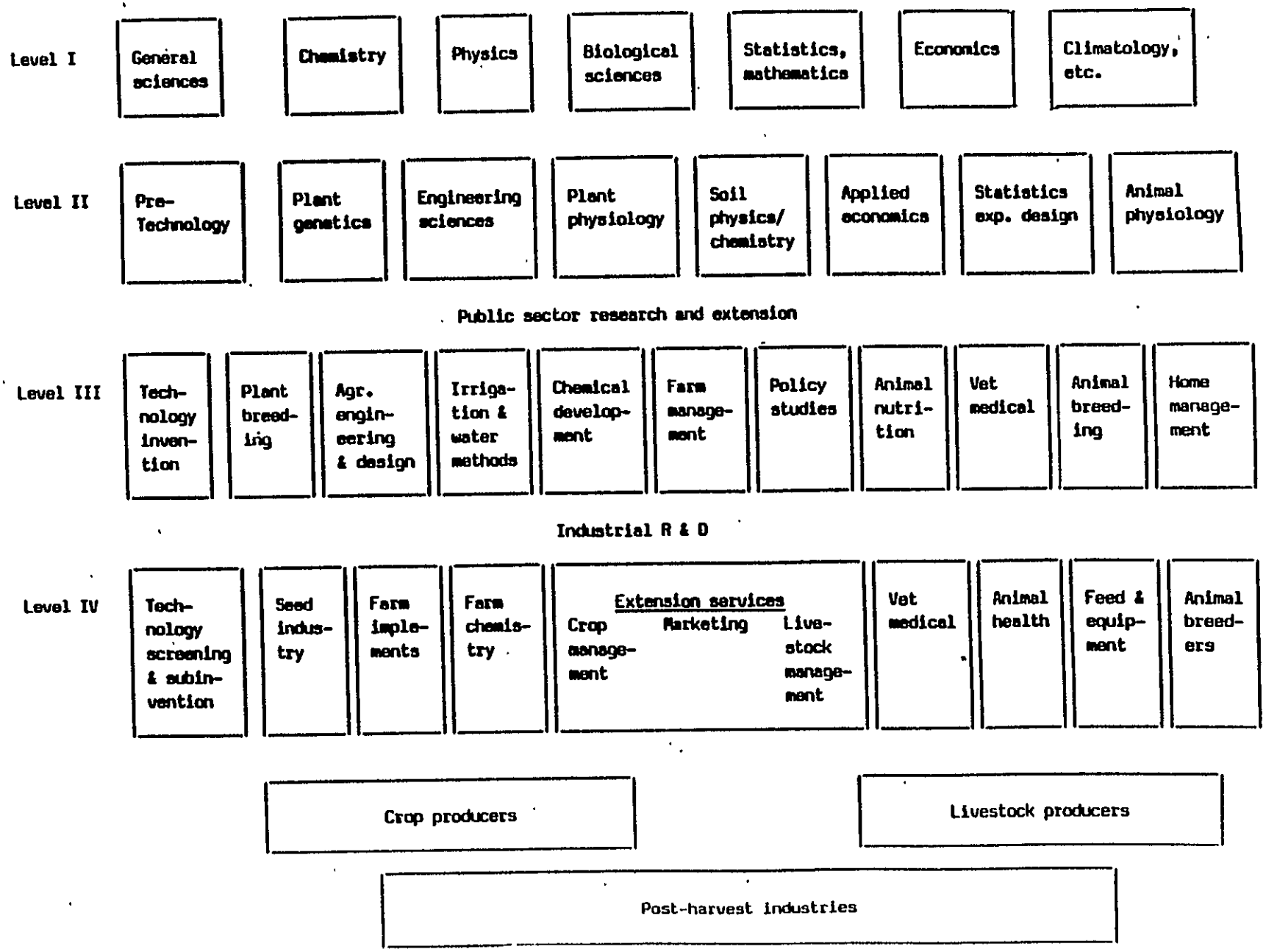

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FIG 1.3
RATES OF RETURN ON INVESTMENT IN AGRICULTURAL RESEARCH IN DEVELOPING COUNTRIES

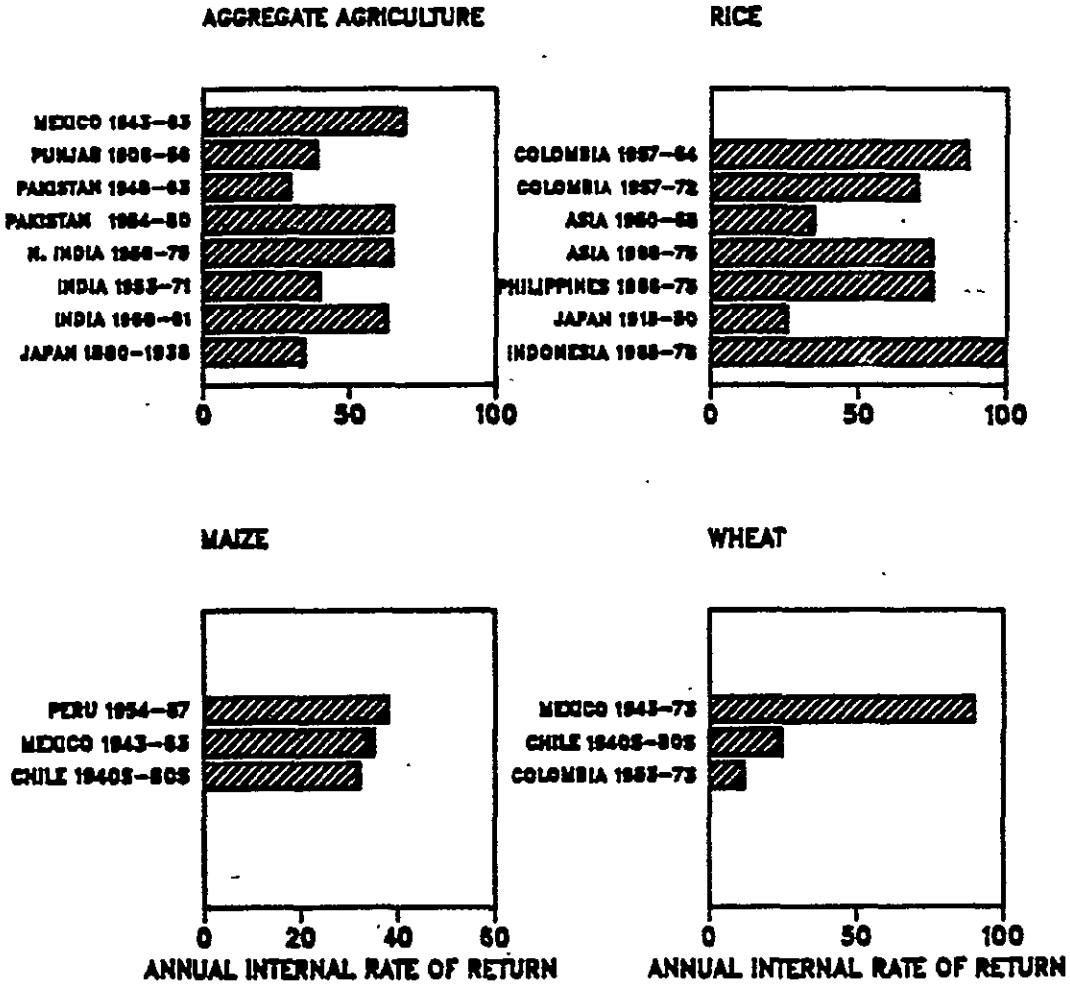

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TABLE 7: Resources received by INTA, Argentina, EMBRAPA, Brazil and INIA, Chile. 1978-83.

	INTA	EMBRAPA	INIA
	1974 US dollars	1974 US dollars	1974 US dollars
1978	72.362	85.868.585	6.375.027
1979	79.478	93.648.944	6.599.091
1980	70.853	90.527.479	7.401.650
1981	59.804	95.357.478	9.094.796
1982	21.851	124.378.175	6.178.006
1983	24.064	68.340.009	5.039.433

Source: Prepared by the authors on the basis of information provided by INTA, EMBRAPA, and INIA.

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Table _ . Breakdown of agricultural research expenditures by commodity, 1974-84. (million pesos at current prices)

Commodity	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Rice	4.5	4.6	6.3	6.9	6.8	8.5	8.0	10.1	10.9	11.4	13.0
Corn	3.4	2.2	2.3	3.3	2.1	4.1	3.1	3.9	5.5	5.2	6.1
Sugarcane	11.0	11.1	13.3	13.6	14.1	15.6	18.0	22.3	24.0	24.6	29.3
Coconut	2.2	2.3	2.6	3.3	4.0	5.5	6.1	7.3	8.9	9.7	11.2
Tobacco	0.9	0.9	1.3	3.0	1.8	4.4	7.1	7.9	10.6	11.3	19.1
Fruits and Veg.	2.8	2.5	3.6	4.9	0.1	4.8	4.2	0.2	0.3	1.5	3.0
Other Crops	10.2	9.0	10.9	15.4	8.5	17.9	18.3	19.0	15.4	18.6	27.2
Livestock and Poultry	4.5	7.4	4.6	8.9	8.4	12.8	17.0	16.5	15.9	16.0	16.6
Other researches	0.4	0.1	0.8	1.9	1.7	0.5	2.0	2.3	1.6	5.0	3.9
TOTAL	39.8	40.0	45.5	61.2	47.4	74.3	83.7	89.4	91.1	101.2	131.4
CPI (1980=100)	53.6	57.9	61.5	66.9	71.0	84.6	100.0	113.1	124.6	137.1	195.7
TOTAL RESEARCH EXPENDITURE (at constant 1980 prices)	74.3	69.0	74.0	91.5	66.7	87.8	83.7	79.1	73.1	73.8	67.1

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Table _ . Percentage share of selected commodities in gross value added and in research expenditures in agriculture, 1974 and 1984.

Commodity	1974 %Share in GVA	1974 %Share in Research	1974 Research Intensity	1984 %Share in GVA	1984 %Share in Research	1984 Research Intensity
Rice	22.45	11.30	0.09	19.70	11.40	0.07
Corn	8.44	8.60	0.19	7.14	4.65	0.08
Sugarcane	9.55	27.60	0.55	5.07	22.30	0.53
Coconut	14.29	5.50	0.07	13.29	8.50	0.08
Tobacco	1.01	2.20	0.42	0.95	14.50	1.85
Fruits and Veg.	7.09	7.00	0.19	11.90	2.30	0.02
Other crops	17.15	25.60	0.28	22.62	20.70	0.11
ALL CROPS	79.98	87.80	0.21	80.67	84.33	0.10
Livestock/Poultry	20.02	11.40	0.11	19.33	12.70	0.08
TOTAL AGRIC.	100.00	99.20	0.19	100.00	97.03	0.12

Note:
Research intensity = (research expenditure/gross value added) x 100

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May 1981

CONOMIC DEVELOPMENT CENTER

THE AGRICULTURAL RESEARCH SYSTEM OF THE PHILIPPINES: A RECONNAISSANCE REPORT

Robert E. Evenson
Paul E. Waggoner
Paul R. Bloom

ECONOMIC DEVELOPMENT CENTER
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Department of Agricultural and Applied Economics, St. Paul

UNIVERSITY OF MINNESOTA

Bulletin Number 81-3

May 1981

The Agricultural Research System of the Philippines:

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Economic Development Center

Department of Economics, Minneapolis

Department of Agricultural and Applied Economics, St. Paul

University of Minnesota

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INTRODUCTION

The Philippines, like many other Asian countries have been facing a severe disparity in realized as well as prospective growth in the demand and supply of agricultural products. With population growth of approximately 2 1/2 percent per year and with very modest growth in per capita incomes, the demand for basic foodstuffs has been growing at roughly 4 percent per year. Over long historical periods no countries in Asia, or elsewhere, have been able to achieve a growth in the supply of agricultural products to match this. The U.S. and Japan, for example, have both averaged less than 2 percent per year in the growth of agricultural supply over the past century. A number of countries in recent periods have managed four to five percent growth rates, but not without major investment in irrigation and other forms of land improvement, in public infractracture and in the development of new technology.

Economists now have completed a considerable body of economic studies which show very clearly that if low cost agricultural supply growth is to be achieved in Asia, investment in the production of new technology must be a central, indeed the central focus of a growth strategy. Something on the order of two hundred studies of the contribution of agricultural research to growth have now been undertaken. Research programs in many commodities and in many countries have been studied. With few exceptions these studies have shown that these research programs have produced agricultural supply growth. Furthermore, they have shown that the costs to an economy of producing such growth through research investment are a small fraction of the costs of achieving growth through alternative means. Put differently, the returns realized on investment in agricultural research have been estimated to be extraordinarily high (Everson, Waggoner and Ruttan, 1979).

Our objective in this paper is to provide a quantitative and qualitative assessment of past investment in agricultural research in the Philippines. Our focus is not simply on the quantity of resources being devoted to this activity but on the progress toward building on institutional capacity to conduct research and to direct research resources toward national objectives.

In the first section of this report we review the history of the agricultural research institutions in the Philippines because their current condition cannot be understood without attention to their history, including the role of the Philippine Council for Agricultural and Resources Research (PCARR) in aiding their development. Although our primary concern is with the Philippine national research institutions, we also consider the contribution and influence of the International Rice Research Institute (IRRI) to national program development. We then provide a quantitative and qualitative assessment of the current system. A further section briefly reviews the major commodity research programs. Although we are sketchy in these reivews, we believe some judgments regarding the quality and quantity of research by commodity is useful. In the final section we assess the state of development and discuss several policy questions for the future.

*This paper is based on a field review trip in August, 1980. This review was undertaken as part of the U.M. Asia Bureau Agricultural Research Review.

II. History

For perspective, we concentrate on three periods; 1949-1962, 1962-1972 and 1972-1980, which correspond roughly with international emphasis on building institutions, international research centers and national programs.

A. 1948-1962: Institution Building

Our major point concerning this period is the extent of the resources required to build the modest but significant research capacity in the country by 1962. The College of Agriculture at Loa Banos (UPCA) attained its capacity with considerable assistance from international agencies. Many graduate fellowships drawn from a national pool and several visiting scholars, notably from Cornell University, were instrumental in this development. Furthermore, most of these resources were concentrated on one institution, (UPCA).

In 1962 the second institution with significant research capacity was the Bureau of Plant Industry (BPI). This capacity was partially built before World War II as was the case with UPCA. In the post-1948 period, however, staffing and training was primarily from UPCA. In building this research system, relatively large investements in land and field plots were made by the BPI. In addition to the BPI, other agencies also developed limited research capabilities. These included The Bureaus of Animal Industry, Soils, Agricultural Economics and The National Irrigation Authority. If present conditions are a reliable guide, however, the research capacity of these units was modest at that time.

Before World War II, research on sugarcane was moderately well advanced in the Philippines particularly at Victorias Milling, a private firm. Efforts to develop a research capacity in the Philippine Sugar Institute were less successful.

By 1962 the Ministry of Agriculture had established many experiment stations throughout the Philippines. Most were staffed with personnel with limited research skills. Similarly, by 1962 the Philippines had built many vocational agricultural schools (later to become colleges) and agricultural colleges. Again, with few exceptions, staff members in these institutions were not research-oriented and were inadequately trained to undertake research.

This pattern of development is not unique to the Philippines. We believe it especially important to note the heavy reliance on institutions outside of the Philippines for graduate training and the fact that almost total support for this training was funded by aid agencies. At this point, Philippine political bodies were generally not willing to sustain the strong research centers that had been developed. They were, however, willing to support the smaller agricultural schools and regional stations which relied on genuinelly low cost research personnel.

B. 1962-1972: International Centers Influence.

This decade is characterized by the following developments:

1) The first decade of IRRI's operations.
2) The further development of the University of the Philippines College of Agriculture at Los Banos.
3) The upgrading of numerous vocational schools to agricultural colleges.
4) The demise of formal institution-building programs by aid agencies and foundations.

The establishment of IRRI and its extraordinarily rapid success has profoundly effected the agricultural research system in the Philippines. This was the period of "green revolution" euphoria, and IRRI's public relations efforts partly created

the euphoria. Readers of the press can be excused for failing to note that rice research at the UPCA had, in fact, contributed greatly to improved rice production. The fact that the productive rice variety, C4-64, for example, was developed at UPCA at the same time as IR-8 at IRRI, and ultimately was probably a more important variety is not widely known.

During this decade the international agricultural development community turned to building International Research Centers. The institution building of the foundations and USAID, which had been important in the development of UPCA, were largely phased-out during this period. Loans replaced grants and research entrepreneurship became important. Only a few research institutions in the Philippines were organized to take advantage of them.

In some ways the end of this decade was the high point of development for the UPCA. Most of the original Ph.D. fellowships had borne fruit, and the college was developing many strong research and graduate programs. Most faculty were available full time and were dedicated to the teaching and research programs of the college. The UPCA had made great strides and deserved its reputation as a research center.

During this decade other agricultural colleges multiplied. By 1972 some 140 or more colleges, mostly former vocational high schools, were offering Bachelor's Degrees in agriculture. Although most of these programs did not prepare students for a career in research they responded to a demand for schooling in technical agriculture, which was in part created by research at UPCA and, to some degree, at IRRI.

This decade also showed a reduction in the sustained efforts by aid agencies to create centers of excellence in national programs. Many programs designed to strengthen national programs had run their course. The principal

attentions of the foundation and other international agricultural leaders were directed to the international system of research centers. The number of international scientists serving in national programs was sharply reduced. Perhaps as many as half of the staff members of the international centers in the early 1970's were formerly associated with national program development. A significant number of international center staff were Asians who might otherwise have been active in national program development.

It was also clear, by the end of this decade, that the international centers had effects on some local research programs which went beyond the diversion of funds and staff. UPCA's excellent rice research program was clearly affected by IRRI's presence. Indeed by the mid 1970's it had practically ceased to exist.

At the same time it was clear that national interests and concerns had grown during the decade. National entrepreneurship had grown as well. The growth in the agricultural colleges is one indication of this. Similar growth in extension services indicated that regional groups were interested in supporting extension and some very applied research.

C. 1972-1980: National Programs

This period is of most concern in this report. We see the major developments as:

1) The establishment of PCAR and later PCARR.
2) The effort to build regional agricultural research.
3) The reorganization of sugar and coconut research.
4) The growth of the agri-business sector.
5) The maturation of IRRI as an institution and its further effect on rice research in the Philippines.

6) The reorganization of UPCA as the University of the Philippines at Los Banos (UPLB).
7) The increased demand by regional institutions and international institutions for researchers at UPLB.
8) The increased demand for skilled researchers by non-research institutions.

We have a particular interest in PCARR's efforts over this period. With limited authority, PCARR has attempted to achieve two major objectives. In collaboration with researchers it has attempted to select research priorities and then assemble more coherent and coordinated projects to achieve these priorities. Second, it has attempted to build stronger research institutions in the major regions of the Philippines. In building these institutions, it is employing a different strategy than was employed in the building of the UPLB units.

Specifically, it is relying almost totally on UPLB rather than foreign institutions for scientist training. It is attempting a low-cost expansion of the research system in a setting where most previous development has been a high-cost matter. The costs associated with a successful Ph.D. program in a U.S. university have been rising rapidly and are now on the order of $75,000 presuming normal brain-drain type losses. Recent indications are that the relatively good experience with Philippine students returning to the home institutions may be deteriorating. (At least this appears to be the case in the social sciences.)

PCARR's strategy to attempt to rely on UPLB makes good sense provided that the graduate training capacity of UPLB can be strengthened. Direct costs are perhaps one-third as high as they are for internationally trained stucents and there is little loss of students to international agencies or U.S.

institutions. In fact, from PCARR's perspective, it could afford to spend as much or more to strengthen the capacity of UPLB as a graduate training center as it does on direct training support. This has not happened. Indications are that many UPLB graduate programs are not stronger than they were in 1972. A number of factors have been responsible for this.

The most fundamental change is the general increase in the demand for scientists for both scientific and non-scientific tasks. This increase in demand was partly created by the "success" of scientists as administrators and planners. It was partially due to the hiring practices of international agencies and the disruption of salaries that they created. It was also influenced by a shift toward "quick-fix" applied projects by international and national funding agencies.

The response of research systems to these forces, in many countries of Asia, has generally been inadequate to maintain and develop quality research institutions. When the salary structure is inflexible and out of line with markets, most research institutions turn to "multiple-job-holding" which destroys research and teaching institutions. The Philippines has used research honoraria to try to hold researchers' allegiance by making salaries more competitive. This tends, however, to encourage easily managed research projects and does not generally provide incentives for the concentration required for quality research.

Excess demand for Ph.D. level scientists, including social scientists, is pervasive throughout Asia. It appears to have become much more serious in the Philippines in recent years, and a number of important members of the academic community at UPLB are now on leave with international and regional organizations, adversely affecting the research and graduate teaching at UPLB.

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As institutions such as UPLB have sought to expand programs, they have created new structures. The College of Development Economics and Management illustrate this. Once a Department of Agricultural Economics in the College of Agriculture, this unit is now a college with two institutes (ACCI and ARI), 3 centers and 4 departments. It offers 3 undergraduate and 7 graduate programs. This institutional organization would suit an institution with perhaps 5 or 10 times the faculty presently at UPLB. In fact, actual faculty strength is approximately the same as it was ten years ago because faculty are on leave and abroad for training. The College now has 125 graduate students, many from other Asian countries, and expects 200 in two years, all with the same faculty strength that taught 50 well 5 years ago.

We see the merit in effective organization, and much of the institutional development at UPLB has merit. It appears to us, however, that complex structures can be a burden when staff is scarce. In our jucment some UPLB units have suffered fragmentation of effort and increased administrative costs by complicating the structure.

In our perusal of research projects at UPLB and elsewhere, we note two trends that may have serious implications for the UPLB units. The first is a shift from traditional scientific disciplines toward a range of applied and broad research programs. The second is a tendency to invest scarce resources in some minor commodities, while neglecting some major commodities.

The shift from the traditional crop and animal improvement programs toward the cropping-system and various "integrated", "intensive" and "basic needs" programs has been heavily influenced by funding agencies. Despite the evidence that the traditional programs have been productive and that many rural development projects have not, funding agencies are attracted by newer programs. Indeed, much of the research that is ostensioly done in these

programs is not research in the conventional sense at all. It might better be called development or refinement and packaging of technology.

The traditional system of research and extension does not appear to work well when extension workers are poorly trained and have little experience on farms. It also does not work well without clients with political clout. The Philippines has both of these problems. In this situation, researchers and research institutions are motivated to move toward extension activities because they see clear opportunities to accomplish things.

Our concern that research is being damaged by this shift is not based on a judgment that the traditional research-extension system is optimal. It probably is not. Our concern is that scarce research skills are not being used to their best comparative advantage. In many fields the Philippines has a limited supply of scientists at the "research frontier". The demand for their skills as teachers and administrators is high.

PCARR has accomplished a great deal in the past several years and it has done this with very limited authority and in the face of a number of serious constraints. We are somewhat critical of certain of the forms which program development has taken, but not of the overall thrust of the development. With PCARR's assistance, some regional strengthening has taken place. It is probably true that the erosion of scientific staff associated with the salary structure has been alleviated somewhat by the form of research support and its use to bring net salaries more in line with market forces. PCARR has certainly increased the demand for graduate training at UPLB and at the Philippine centers and has probably assisted somewhat in increasing the supply as well.

We would note that while PCARR has regularized research funding and research planning, it has also created a lengthy process for project approval

and generally appears to have an administrative system which might be too large. This may be the result of the fact that PCARR has only indirect control over research funds for projects in a number of Ministries.

III. The Current Program: A Quantitative Assessment

We now turn to available data on research spending to draw some comparative insights regarding the system and its development. We are interested in the general growth of the system as well as in its regional and commodity emphasis.

Table 1 provides a summary of the overall growth in the Public Agricultural Research and Agricultural Extension programs in the Philippines measured in constant 1978 pesos. In the past 6 years of most direct PCARR involvement, crops research increased by roughly 60 percent, soils and related research increased by 70 percent while livestock research increased very little. Forestry research (not included in Table 1) increased by roughly 70 percent over this period and fisheries research (also not included) showed an increase of 250 percent.

Table 1 shows that the Philippines has emphasized extension programs to a much greater extent than research programs in its national efforts to improve farm productivity. This has been changed somewhat with the increased emphasis on research in the recent period. It appears that the Philippines is now spending less than half of one percent of the value of its agricultural product on research. This is low by international standards. Boyce and Evenson (1975) estimate that the Philippines was spending much less by this measure than the average for Southeast Asia in 1974. Expenditures on extension are also low by international standards. Other countries in the region appear to have been more extension-oriented than the Philippines.

Table 2 provides a reading on the regional distribution of research funds. It is pretty clear that the bulk of the research funding is spent at the national center programs primarily at UPLB. Some government research undertaken in Manila is included in the national figure. The Southern Tagalog region which includes Los Banos receives the most research attention further exacerbating the regional disparities. Almost 70 percent of the research budget of the Philippines is expended in the Southern Luzon region which includes Manila and Los Banos. These data suggest that from 1961 to 1971 some regions, notably the Visayas, were able to improve their relative positions. We do not have data for 1980 and thus we cannot make a definite statement regarding the effect that PCARR has had on the regional distribution. Our expectation is that the 1980 data will show a more equitable distribution.

The situation with respect to extension is quite different. Only 25 percent of the extension budget is expended at the national level. The discrepancy between the research and extension emphasis is particularly large in the northernmost regions, Ilocos and Cagayan Valley and in the southwest regions of Mindanao.

Table 3 provides calculations based on PCARR data showing expenditures by commodity. The column showing research spending as a percent of the gross value of the commodity in 1980 indicates a high degree of variation in research intensities. Commodities such as pineapples, bananas, citrus fruits and coffee appear to have very little research attention. On the other hand, commodities such as cotton, legumes, tobacco, rootcrops, vegetables and poultry receive relatively high research attention.

Calculations based on the data on commodity shares in research and in value of all commodities show that the congruence or matching up of research with commodity importance has worsened between 1973 and 1980. The correlations

between research budget shares and commodity value shares decreased from .91 in 1973-74 to .73 in 1980. Another statistic, the sum of the deviations between research and commodity shares also increased from .38 in 1973-74 to .49 in 1980.

These data tend to confirm our qualitative impressions. PCARR has generally encouraged a moderately rapid increase in real research investment. It has not, in general, achieved a closer matching of research spending with commodity importance. Some of the expansion has occurred in commodities of minor economic importance. In addition, the substantial reduction in rice research by the UPLB program has resulted in a decline in congruence between research intensity and economic importance.

IV. The Current Program: A Qualitative Assessment

After visiting experiments from Central Luzon to Southern Mindanao and from Panay to Bicol, and after evaporating away interesting but small matters, visitors from another continent retain nine observations.

The yeast is UPLB. Strategically located at the junction of the national metropolis and considerable farming, and given a half-century connection with a major university in the Western World, the agricultural school at Los Banos grew into a university, UPLB, capable of profound research. Presidents of provincial universities employ their honor graduates and then send them to Los Banos where they will acquire "research orientation", a procedure expedited by the scholarship of PCARR. In the provinces a visitor encounters the graduates of UPLB as he would encounter the graduates of St. Cyr if he were to visit the outposts of the French army. Clearly the dispersion or dilution of UPLB would be damaging.

Pay is complicated. In a technological age technocrats demand high salaries, and constrained by government standards the universities and the

Ministry of Agriculture have supplemented salaries with honoraria and allowed consulting fees to be sought. Honoraria are paid to teachers for performing approved experiments, and in the Bureau of Plant Industry two projects are expected for the normal salary and then honoraria given for additional ones. "No report, no honorarium" focuses the mind. As an economist would predict, staffs have turned eagerly to research and to such a source of honoraria as PCARR, easing its task of leading agricultural research. Consulting fees have made academics available for economic development by private firms.

Scientists employed by private firms or autonomous authorities are evidently paid higher salaries rather than paid low salaries plus honoraria, and their fields and laboratories were no less active for lack of the incentive of honoraria.

The observer instinctively feels that honoraria are a poor policy, but admiring the efficiency of incentives, he is uneasy about his instinct. Is his instinct wanting to be a gentleman above grubbing for money? Or, is it the union member's opposition to bonuses controlled by the employer? These are poor arguments against honoraria.

More respectable arguments can be made. Surely the school will find it hard to teach when the staff is away in pursuit of honoraria and fees. Surely the agency will find it hard to fulfill its mission when the incentives are in the hands of someone else. And surely the scientist will suffer pangs as he waters down his fixed stock of time to get more honoraria to buy a larger house. Nevertheless, the system was working in 1980. It allows flexibility in a rigid salary structure which would not otherwise hold scientists in the system.

The Bureau of Plant Industry BPI is competent. Employing competent people to work on governmental experimental farms in the hinterlands is

difficult. A corporate salary, an academic gown or the lights of the city cannot be offered. Further, the BPI has been wrenched by reorganizations. Nevertheless, the BPI produces new varieties of rice that compete with the best. One finds plots at a BPI station well designed and maintained. Some experiments are regional replications of a national plan. In other cases, the design is local; for example, in the Bicol, farmers were recruited at P500, assigned at random, and caused to produce rice by weekly, monthly and seasonal planting and harvest.

Evidently a natural role and sturdy people propel the BPI, and the Philippines are well served.

Confidence gets people to the field. In "To Feed This World" (John Hopkins, 1978) S. Wortman and R.W. Cummings wrote that basic farming skills generated the confidence to go to the field and work with farmers. Philippine scientists have abundant confidence in going outdoors and a persistent tendency to work with farmers or to bring farmers to training centers at the stations. Admirable conferences and manuals tell how to run field experiments.

Confidence in one's competence is necessary in the laboratory, too, and here lies a problem. The observer found laboratories unused and equipment unpacked because it might not work, and the observer guessed that if the scientists were as confident in the laboratory as in the field, a way would be found to push ahead. Conferences and manuals on laboratory experimentation might break the ice.

Erecting a building is easier than using it. This hypothesis would undoubtedly be supported by the presidents of an American university, doggedly trying to man and fill buildings built in palmy days. The hypothesis must be supported, too, by Philippine experience because there were little used laboratories in 1980 with equipment labeled for display rather than

worn by use. In 1971 investigators wrote "Problem 2. Major portions of research funds are spent for capital outlay", and 9 years later one sensed this was still true (The Philippine agricultural research system, 1971).

The leaders are thus wise in the planning and pride they invest in the PCARR scholars whom they hope to develop and keep, making their laboratories hum some day. Then they will only have the problem of getting essential but unglamorous supplies. Steady persistence rather than heady reorganization is required to enjoy this return on the investment in infrastructure.

PCARR is for policy. In 1971 the investigators of the Philippine agricultural research system who recommend the formation of PCARR found a conflict of interest in the National Science Development Board's both performing research and granting aid. Thus PCARR has been careful to keep to its coordinating and policy setting role and eschew research. This takes superhuman self-discipline.

Two pressures push PCARR from policy toward the bench or plot. The first presses on the curiosity of the individual scientist at a desk in a bureau. PCARR expects to relieve this by seconding staff to places where research is done. The second presses on the institution when a priority has been set, and no champion rides forward.

A gravity pulls policy makers downward toward detailed management, delaying and then stultifying scientists afield. The lengthy schedule of submission, review and decision published by PCARR is ominous.

The base of the triangle on the PCARR seal says "cooperation". In the field, workers generally praised PCARR's rationalization of the system. Nevertheless, two groups were found consciously and enthusiastically competing to produce the best variety of an important crop. It seems a credit to the sense of PCARR that their coordination has not eliminated the spur of

competition.

Researchers who are leaders are precious. Regional centers and national ones, too, are being formed from collections of neighboring institutions. The policy is to place a university person, an academic, at the head of each. This is rational in a nation with only 8% of its agricultural researchers holding Ph.D.'s (Manpower resources in Philippine agriculture, forestry and mines research, 1978, PCARR, Los Banos) and with manpower development paramount. Universities are first for teaching, however, and by placing an academic at the head, the Filipinos have produced a challenge for the leader of research, who must shine brightly enough from a subordinate position to assure research orientation. Fortunately, one finds Filipinas as well Filipinos with adequate candle power.

Scholarship is the foundation. "Relevance" is written on the seal of PCARR, and the visitor is struck by the education in management and the attention to planning achievements relevant to the public good. "Excellence", too, is written on the seal because, without excellence in science, the barges of management will sail -- but the contents will be wormy.

Scholarship assures excellence and begins with reading. The deficiencies in libraries were mentioned in 1971. Limited library facilities in many research institutions were still visible in 1980. Scholarship continues with the discipline of writing, criticism and then standard publication of findings in 1980 as they were in 1971.

Scholarship is easily equated with the overnice and impractical. PCARR was created to avoid these faults and assure an impact of research upon farming. Nevertheless, the books of the scholar and his publications are needed for Filipino science to feed upon international science and assure that its results are sound enough to be relevant.

Best Available Document

The international agencies giveth and the international agencies taketh way. When one inquires as to the whereabouts of many key scientists and aculty members, one finds that they are often on leave or have recently re-igned to take a position with FAO, the Asian Development Bank or another international agency. The very agencies which invested in the building of cientific enterprises now appear to be instrumental in their destruction. ilipinos are valued employees in these agencies without doubt. Given the ritical importance of national institutions, one would think that a more oherent policy toward short and long term employment of key individuals ould be consistent with that development.

. Commodity and Program Observations

In this section we offer observations that are necessarily incomplete n nature. They do, however, provide more detailed information and comment han previous sections.

RICE

Rice is of great economic importance in the Philippines and much of the rest of Asia. By the early 1960's an effective Philippine national rice research program had been developed. Breeding programs at UPLB and in the Bureau of Plant Industry notably at Malagaya, were well developed. The fact that a number of important varieties, notably C4-64, were produced by this system in the 1950's and 1960's is masked by the success of the International Rice Research Institute and the publicity that attended it. The national program had, of course, by no means exhausted the large potential for variety discovery that existed in the early 1960's. Nonetheless, it was a strong program with attention to upland rice and intermediate depth rice.

The success of IRRI and the international attention paid to IRRI demoralized the UPLB rice research program. Some of this may have been unavoidable, but some was the product of the attention that naturally attended the early success stories of IRRI. IRRI has made large contributions to Philippines production and in many ways to agricultural research in the Philippines. It has trained many researchers and brought them close to researchers in other countries. Unfortunately the Philippine National programs have responded to IRRI's programs by withdrawing to a secondary role. At UPLB this has taken the form of shifting attention to "cropping system". Research in upland rice has been demoted to a minor role even though upland rice remains important. The BPI appears to have maintained a strong program in the Malagaya station.

Given the importance of rice and the differences in the missions of IRRI and the national program, it would appear the Philippine response to IRRI's presence has gone too far. A strong national program is important to IRRI as well as the nation.

CORN

Corn is the second most important grain in the Philippines. It is important both as a food grain consumed directly and as a feed for the expanding livestock industry.

Most publicly-supported research is at the UPLB College of Agriculture and the Institute of Plant Breeding (IPB). The Bureau of Plant Industry, BPI, does some corn research as do the Philippine Atomic Energy Commission and SMARC. Most of the effort is aimed at breeding high yielding varieties that are disease and pest resistant. There are breeding projects in white corn (for human consumption) and yellow corn (for feed grain). The breeding

projects are important because the low corn production in the Philippines is largely due to a lack of high yielding and disease resistant varieties.

Adverse soil conditions also have been an impediment to increased production in some areas. Recent research in micronutrients indicates that some of these problems can be overcome.

In addition to the usual problems of water and fertility that plague corn, the Philippines have a downy mildew, Sclerospora philippinensis, that destroys seedlings. They also have the distinction of discovering a race T of Helminthosporium maydis, which later caused the epidemic of Southern corn leaf blight in America. Control of these diseases allows the corn to survive to be attacked by corn borers.

In 1976 the Philippines produced about 2,800,000 metric tons of corn for food and feed. This was 43% of the rice production of the nation.

Thus yields of corn in the Philippines were only .87 T/ha in 1977 or less than half the world and a sixth of the American average yield.

Philippine corn yields versus rice and American yields were as follows:

	Corn	Rice
Philippine		
1977, T/ha	.87	1.96
Increase 1957-77, T/ha/yr	.015	.036
American		
1977, T/ha	5.71	4.94
Increase 1957-77, T/ha/yr	.130	.083

The potential for more corn in the Philippines seems great, whether judged by the rate of increase, by the 1977 yield or by comparison with

other nations.

In 1979 an inventory of public research in the Philippines showed P 4.5 million spent on research in corn. This was P 1.60 per ton of corn produced in 1976 and was about 5 times as much as the expenditure on research per ton of rice. At least three commercial concerns in the nation were developing improved hybrid and synthetic varieties.

Opinion is divided as to whether double-cross hybrids can be practical for wide use in the Philippines. The Downy Mildew Resistant DMR1 (yellow) and DMR2 (white) are composites. Tiniguib white flint developed at Southern Mindanao University is said to be resistant also.

In 1979 86% of the money for research in corn was spent at Los Banos in a rice region. This was caused by a concentration of scientists. There is a keen awareness of the disadvantages of developing varieties so far from the environment and pests of the major corn region in Mindanao. A classic problem in research, the attempt to create a center for corn research in Mindanao has been beset by the problem of recruiting staff for a frontier region far from the intellectual center of the metropolis. It is interesting that a substantial commercial effort by the San Miguel Corporation at producing improved corn has followed the same course: research is concentrated near Los Banos and field trials are performed in Mindanao.

The San Miguel corn research problem has a highly motivated and competent research staff. It is too early to predict whether they will be successful in bringing a private firm's incentives into the development of new technology. If the history of other countries is a guide, private breeding programs will probably play a major role in future achievements.

SUGAR

Sugarcane research in the Philippines has a relatively long history. The Victorias Milling sugar mill has had a research program for several decades. Until recently the Canlubang mill near Calamba had a program. Research in the public sector is concentrated in several stations operated by Philsucom.

Our general impression is that the private firms have succeeded in adapting varieties to local conditions but have not been major contributors to the international stock of high-yielding varieties. The public or semi-public research stations (Philsugin and now Philsucom) have apparently been unable to maintain the steady programs required to be major contributors to new technology.

Our impression of the current research programs at LaGranja and Victorias Milling were generally favorable. Effective research programs, perhaps more effective than at any time in the past, appear to be underway. Support for research appears to be available. If these programs can be maintained and strengthened, Philippine sugar production could be increased. The scope for gains in the Philippines appears substantial. It is our impression that the Filipino sugar industry, while managing some important gains, has lagged behind other countries in yield increases.

COCONUTS

With more than half of the world market and a natural comparative advantage in coconut production, the Philippines enjoy some monopoly power for coconut products. Until recently it has been complacent about exploiting monopoly power and increasing production efficiency. Few varietal advances

appear to have been made over the past 50 years or so. Although some improvement in disease control and in management and organization on plantation land have been made, the coconut industry has not, on the whole, been a dynamic sector of the economy.

Two recent developments appear to be changing this. The first is the introduction of dwarf varieties from the Ivory Coast and crosses between Philippine (Laguna tall) varieties and both imported and native dwarfs. It is early to judge the ultimate impact on Philippine coconuts, but it appears likely to be large. During our visit to the PCA station near Davao, we felt that new technology was being developed and modified and were impressed with new research that appeared well designed and responsive to the new genetic resources.

We have mixed opinions about the second development. This is the development of the Philippine Coconut Authority (PCA), which amounts to a "Marketing Board" in the African sense. On the one hand, PCA is supporting aggressive research. On the other, it is pursuing the course of other marketing boards, paying relatively low prices. Prices paid to producers were far below the world market at the time of our visit. This is justified by the PCA, which is presumably accumulating capital to finance replanting to improved varieties. Unhappily, such marketing boards do not appreciate the deleterious effects of low prices. Also they tend to devote their research to buildings, public relations and funds, while replanting and related practices tend to be undertaken inefficiently.

ROOT CROPS

Root crops research include both tropical root crops and white potatoes. There is little overlap in research in these two crop categories.

Most research on white potatoes is at the Institute of Plant Breeding (IPB) on the UPLB campus and the BPI station at Bagiuo, and other is in the College of Agriculture at UPLB and at Mountain State College of Agriculture. The BPI investigates production and utilization of potatoes for the highlands of Northern Luzon. Nine BPI researchers, none with training beyond B.S., are assigned to white potatoes.

The IPB effort is directed toward the introduction of new varieties, breeding, crop protection and development of heat tolerant varieties for the lowlands. Most of this research is directed by a Ph.D., who was trained as a potato breeder and has had some training at the International Potato Center in Peru. Although most IPB work seems well conceived, adaptation of potatoes to lowland conditions may be questionable, given the availability of tropical root crops.

Most research in tropical root crops is done by IPB and the Philippine Root Crop Research and Training Center (PRCRTC). In 1977 the PRCRTC was established at Visayan State College of Agriculture (ViSCA) near Baybay, Leyte to be a national center for research on tropical root crops. It is funded by PCARR and IDRC, with some contribution from such other agencies as the National Science Development Board (NSDB). The PRCRTC is undertaking germplasm collection, breeding, variety trials, protection and utilization. The staff includes 15 researchers and 30 other staff of ViSCA assigned to work on root crops. Most researchers hold M.S. and B.S. degrees. The current program has 53 titles, and despite its short history, it seem effective. Already, new varieties of cassava and yams are undergoing advanced field trials.

The present research is largely in the field. Although the laboratories have been built, the equipment and sometimes the personnel are lacking for

lab work. The field experiments appear well designed and tended. While most of the research is applied, some is concerned with fundamental problems. For example, there is a study of effect of the structure of the canopy on the yield of cassava.

The PRCRTC cooperates with six other institutions: Cagayan State University, Mountain State Agricultural College, UPLB College of Agriculture, Camarinos Sur Agricultural College, University of Southern Mindinao and Palawan National Agricultural College. Most cooperation is part of the program of varietal evaluation. UPLB will do some more basic work in genetics, physiology and biochemistry.

Using root crops for energy is receiving attention. It is hoped that root crops, which can be produced on poor soils, can be used for alcohol. In addition to the difficulties of producing alcohol from root starch, the Philippines has a land shortage not encountered in Brazil.

The results of PRCRTC research are published in Radix, a semipopular research news publication and the Annals of Tropical Research, the technical journal published by ViSCA. Some results are published in the Philippine Crop Science Journal and in proceedings of international symposia.

At PRCRTC the research is integrated into the international research programs on tropical root crops. In 1979, the PRCRTC was host for the 5th International Root Crop Symposium and it hosted the First International Symposium on cocoyam. The director of the PRCRTC is the secretary of the International Society for Root Crops.

In recent years tropical root crop research has expanded. As the PRCRTC program acquires laboratory equipment and staff training, the quality of research should improve. In time, the PRCRTC may contribute research on root crops that will have international importance.

VEGETABLES

Although vegetable research was not reviewed in detail, it is of economic and nutritional importance. In some parts of the Philippines, like the Central Visays, the lack of sufficient vegetables causes vitamin deficiencies.

Vegetable research is concentrated at IPB and some is done by BPI and the UPLB College of Agriculture. At IPB research is mainly in plant introduction and breeding. Cucurbits get the largest share of attention, crucifiers get next, and attention is paid to other vegetables. BPI has a smaller, but more varied, research program that deals mostly with problems of production.

AQUACULTURE

Aquaculture is becoming an important source of food in the Philippines. Fish pens are already commercially important, and fish ponds are beginning to produce.

Aquaculture research, which includes both fish and crustaceans, is dominated by three units; the UP Brackishwater Aquaculture Center near Iloilo, the CLSU Freshwater Aquaculture Center, and the UP College of Fisheries. The Southeast Asia Fisheries Development Center, (SEAFDEC) an ASEAN funded institution located near Iloilo, also contributes to aquaculture research in the Philippines.

The Brackishwater Aquaculture Center and the UP College of Fisheries were not visited. In 1977 the Brackishwater Center had 6 scientists, four with M.S. training and two with B.S. training. At that time, the UP College of Fisheries had 8 researchers, all with B.S. degrees.

The CLSU Freshwater Aquaculture Center is growing. The Center has a well-equipped laboratory. The staff is well trained, two or more with Ph.D.'s and two more on leave for Ph.D. training. The research on high production in fish pounds appears effective.

SEAFDA is an international institution with an international staff from the Philippines, Japan and other ASEAN countries. It is not a large institution. In 1977, there were only 15 researchers at SEAFDC. The Center has reportedly had some administrative problems and has not lived up to its initial promise.

MINOR COMMODITIES

As noted earlier, we observed research expenditures on some commodities that currently have minor or negligible economic significance. Wheat, soybeans and cotton are examples. White potatoes also has large research program relative to its value.

One motive behind supporting research in these commodities is that research can make this commodity commercially imoortant. The other is that researchers see the opportunity to develop a commodity that others are not working on.

Although the first is a reasonable motivation, history has produced few commodities brought to economic significant by research. Every country in Asia has hoped it could become another Brazil in soybeans, and none has succeeded. Surely, one would not expect the Philiooines to produce wheat on a significant scale.

Stretching limited resources thinly over many commodities doesn't make sense.

SOIL

Soil scientists engage in research on crop production and in soil survey, conservation and testing activities. Although soil scientists are found in many agencies, the Bureau of Soils and the Department of Soil Science at UPLB are by far the leading units in soil science.

The Bureau of Soils performs research at labs in Manila and six field stations. The field stations have one to seven researchers, while the central laboratory has 37. In 1977 only 2 Bureau of Soils researchers had training beyond a B.S. Because pay is low, it is hard for the Bureau to get and retain good people. The field stations are far from the field stations of other agencies. This discourages communication about the problems of the regions, makes cooperative research difficult, and reduces the impact of the limited research of the Bureau.

With the demise of the Philippine Journal of Soil Science the opportunity to publish in a national professional journal no longer exists. The Bureau publishes Soils Technical Bulletin, but there appears to be little or no review of papers in this journal.

The Bureau continually updates soil surveys. The published soil surveys are only reconnaissance surveys that contain little or no laboratory data. Although they supply some information to researchers locating experimental sites and generalizing experimental data, their utility is limited. Also, most (if not all) of the old surveys are out of print and difficult to obtain. Although much of the Philippines has been surveyed at the semidetailed (scale of 1/50,000) and this effort is continuing, surveys have not been published. To obtain information about the soils in a region, a researcher must go to the Bureau office.

The basic survey unit in the Philippines, as in the U.S., is the soil series. Soil series are useful in agricultural planning, research and recommending agricultural technologies. Potentially more powerful generalizations can be made using a soil classification scheme that groups soils together according to their chemical, physical and mineralogical properties. In the Bureau of Soils there is interest in adopting the USDA Soil Taxonomy in the Philippines, and a proposal has been submitted through PCARR. It was reported that an American reviewer questioned the availability of sufficient leadership to carry out the project. The adoption of the Soil Taxonomy has been hampered by the lack of mineralogical information; recent purchase by FAO of an X-ray diffractometer for the Bureau of Soils and the UPLB Department of Soil Science makes it possible to obtain the required information.

The interest in adoption of the Soil Taxonomy has been influenced by the Philippine participation in the Benchmark Soils Project. The Benchmark Soils Project is a University of Hawaii AID project to evaluate the usefulness of the Soil Taxonomy in agro-technology transfer.

Much of the funding comes through Hawaii, but the Philippines supplies local leadership and technicians. Until about a year ago the project leader was a UPLB teacher. Currently, the Bureau has the leadership role. Because only two Philippine soils are involved there is little direct gain to the Philippines. There are some indirect benefits, especially in training in use of the Taxonomy.

Bureau of Soil labs test soil for farmers and researchers. There are 29 labs with a goal of 80,000 samples per year. This is only 2,700 samples per year for each lab, a low level of utilization of the facilities.

The Department of Soil Science at UPLB is the only strong soils research unit in the Philippines. The department has about 10 Ph.D. scientists

and is reasonably well-equipped. Its work is widespread, some experiments being as far away as Palawan. The department, however, cannot possibly serve the needs of all of the Philippines.

Mountain State College of Agriculture, the only other teaching institution on soil science, is developing a research program. A recent Ph.D. from UPLB leads four scientists. This department should prove a valuable asset in the highlands of Northern Luzon.

The PHILSUCOM unit at La Granja has more than three soil scientists including one Ph.D. and two M.S. degree holders to work on soil problems associated with sugar cane. They have their own soil testing lab that competes to some extent with Bureau of Soils lab. La Granja is also developing its own soil survey because of the inadequacy of information from the Bureau of Soils.

AGRONOMY

Agronomy is loosely defined and it usually encompasses the studies of the production of grains and forages. This usually includes plant breeding but does not always include soil science.

Agronomic research is the responsibility of BPI, IPB, the Departments of Agronomy and Soil Science at UPLB, as well as many other research units throughout the country. BPI is the largest research organization in the Ministry of Agriculture. There are 20 BPI experiment stations and farms. The Central Experiment Station in Metro Manila has the largest staff, about 50. A few of the Central staff have M.S. degrees, but most BPI researchers have B.S. degrees.

The Maligaya Rice Research and Training Center is a large station with a staff of about 30 and is an important station in the National Rice Program.

Some rice varieties that were very popular in the past, and are still used, came from this station. The Maligaya station is also in charge of rice seed increase. Despite the modest resources, this rice program is functioning well.

The Department of Agronomy at UPLB has a highly trained staff, most with Ph.D.'s. The department has four divisions; Plant Breeding, Crop Production and Management, Weed Science and Seed Science and Technology. These divisions recently replaced the commodity alignments, and the new organization gives the department and the individual investigators more flexibility.

Several national journals exist for the publication of agronomic research: the Philippine Agriculturalist, Philippine Journal of Crop Science and the Philippine Weed Research Journal. Although the Philippine Agriculturalist is a well-edited journal, up to 2 years may pass before a paper is published.

FARMING SYSTEMS

The interest in farming systems is growing. In 1978 and 1979 more projects in farming systems were funded than before. This seems to be, in part, an outgrowth of the interest at IRRI in cropping systems as well as worldwide interest in research adapted to small farmers. The general approach is to take available technology (varieties, fertilizer practices, pesticides, etc.) and develop new cropping schemes that will improve the productivity of the small farmer.

The two largest cropping systems programs in the Philippines are the program of UPLB in the Department of Agronomy and the KABSAKA program in Iloilo, which is an IRRI-PCARR cooperation.

The KABSAKA program is a combination of adaptive research (trials) and extension. Recently the greatest effort has been in extension with the Bureau of Extension (BAEx) supplying the technicians. The goal has been to get farmers to change from the traditional single crop of rainfed rice, possibly followed by one upland crop to a two rice crop. This is possible because of new short-season varieties and the long rainy season in that area.

Dynamic leadership of extension no doubt contributes to the success of the project. The technicians and participating farmers seem highly motivated. Farmers report dramatic increases in income and many are satisfied that the extra effort in management of the new system yields worthwhile returns.

The KABSAKA system is limited to areas with long, rainy seasons and to lower land where water is available longer. There are also some soil limitations. Even with these limitations the KABSAKA investigators feel that the system can be used over much of Panay, and the project is being extended.

Farming systems programs can improve agricultural production, but they do rely on existing technology and may be useful under limited agro-ecological conditions. There is a danger that cropping systems research could starve the plant breeding, plant pathology and soil science programs.

ANIMAL SCIENCE

Animal Science was not reviewed in detail. The only research units visited were the carabeef research farm at Central Luzon State University (CLSU) and the Bureau of Animal Industry unit at La Granja.

The BAI has four stock farms, new units at La Granja, and a slaughter house laboratory. In 1977, the stock farms had from one to four B.S. researchers. The major emphasis of the farms appears to be genetic improvement

of the cattle in their regions. There is some work in artificial insemination.

The carabeef research farm at CLSU is just starting and building its facilities. The work appears well-conceived. The researchers hope that one result will be better use of the grassy hills of Central Luzon, and have promising results with legumes.

The UPLB beef and carabeef research includes the Department of Animal Science, the Dairy Training and Research Center (DIRI) and the ANSA Cattle and Crop Farms in South Cotabato. The work includes breeding, feeding studies and animal health studies.

The total research in beef and carabeef is small compared to the demand and small compared to the potential for the utilization of land that is unsuitable for intensive cropping.

ECONOMIC RESEARCH

Research in agricultural economics is moderately well-developed in the Philippines. The UPLB faculty includes several competent economists. The M.S. programs offered at UPLB are well-designed and produce skills on a par with comparable U.S. programs. The past research of the faculty has been useful.

The demand for Ph.D. agricultural economists in the Philippines is high. Several faculty members are on leave on short foreign assignments. Others have taken longer term positions with international agencies. The taking of leave on short notice is obviously deleterious to teaching and research. The turnover of faculty members moving to other positions is not necessarily bad, although the move to international agencies probably will not increase productivity.

Few economists and scientists move from Los Banos or Manila to regional institutions because incentives are inadequate. Most economists and scientists in the regional institutions are originally from the regional institutions and have strong ties to them. Development of these institutions, however, requires incentives to attract economists and scientists from the metropolis.

Research in Agricultural Economics has generally been oriented to commodities, especially marketing and price studies. The early studies of major commodities have been followed by studies of minor commodities.

Most research by graduate students is applied and generally valuable. In fact, some of the better research is part of graduate programs. The incentive system for faculty research encourages too many easily managed projects that rely on research assistants. Often reports are bundles of tables produced by assistants and inadequately analyzed by leaders.

On the whole though, economic research is viable in the Philippines. If the most recent batch of faculty training abroad returns, some strength lost through leaves will be restored. If this restoration does not occur there will be serious repercussions on the training of economists for the regional centers. (At present it appears that three or four key faculty members may be lost to UPLB. If this happens the program will be seriously weakened.)

VI. The Future

The broad picture that emerges from our survey of Philippine agriculture is:

1. A central research unit (UPLB) has developed research and training of international standing.

2. Outside UPLB the Ministry of Agriculture stations (notably BPI) are generally the most stable, and strongest research institutions. Although they are weak on laboratory work, they are strong on research in the field.
3. Outside UPLB, the academic institutions face challenges as they attempt to become first-rate research institutions. They are burdened by low salaries and by a tradition of being high schools and undergraduate colleges.
4. Presently both the UPLB and the regional institutions have been weakened by their inability to hold the devotion and energy of their staff and to concentrate on research. This is because their salary structures are increasingly incongruent with the market, exposing them to increased national and international raiding.
5. The policy mileau pulls skilled researchers towarc the applied, even extension, end of the research spectrum. There is also a tendency to undertake work on unimportant commodities.
6. At present maintaining the scientific foundation of research and keeping up with scientific frontiers is not given high priority.

These characteristics of the Philippine system are not surprising. The development of effective research systems is hard. Other countries - including the U.S. - have gone through similar phases. On the whole, the Philippine system is in good condition and is one of the strongest in Asia.

As we see it, however, the picture obtained from stucies of returns to agricultural research, and our assessment of the Philiopine system is one calling for continued aggressive quantitative and qualitative imorovements. The Philiopines will rely, as other countries have, on two institutional

structures or mechanisms in achieving future quantitative and qualitative improvements. The first is formal planning and administrative institutions, i.e., PCARR. The second is the local political mechanism. International agencies will have some influence, but will not be dominant.

During the past several years PCARR has certainly been the dominant institutional force shaping the system. It has utilized international assistance and has responded to local political factors.

The organized national interest groups do influence the research programs; sugar and coconut research are obvious examples. As yet, however, strong regional groups pressuring for strong regional research institutions do not appear to have emerged. The "articulation" of clientele interests to research is thus weak. (See Evenson, Waggoner, Ruttan, Science 205:1101, 1979.)

In the long run this articulation of clientele interests guides research and the development of research institutions in appropriate directions, and it is hoped that it will grow stronger in the Philippines. For the foreseeable future, however, PCARR and the research institutions themselves will do most of the guiding. This situation has all the dangers of top-down administration and the tendency for public institutions to serve their own interests rather than those of their public clientele.

In noting this we are not suggesting that PCARR has fallen victim to these dangers. In fact, PCARR has been careful to consider a range of interests and to proceed in the larger public interest. For example, development of regional research has been aided greatly by PCARR, while it has regularized the research programs.

PCARR will oversee the next decade of development and further challenges to regional centers. Because of the basic stability of the Ministry of

Agriculture institutions, they will probably continue to be the major institution outside the UPLB. Some of the regional academic and research centers will realize gains according to their leadership, their ability to move people from metropolitan to the regions, and their development of research orientation.

In the next decade UPLB will have an even more vital role as the graduate training center. It will also have to lead in shoring up the scientific base, building new potential for applied research and maintaining a role in the international scientific community. This will require support for journals and libraries.

In our judgment, the next decade will require substantial support from international sources for the investments called for by the economic potential. Although PCARR can, and probably will, provide leadership and direction, it is unclear that the Philippine government will provide the full support required.

Generally international agencies have provided funds to establish programs and then transfer them to local governments to prove themselves. At a certain point they often wean a country from international support. This point often comes at the stage of the current Philippine research program, and many policy makers feel that the Philippine system should be weaned soon. We see further international support as vital for without it the system may stagnate for a decade as key scientists leave for more lucrative jobs in other national and international agencies. Judiciously placed funding for supplies and libraries will be critical to the development of regional centers, especially because they are not likely to be priority items to the national government.

In summary, the Philippine system has progressed, has leadership, has experience and has an institutional set-up conducive to further development. National and international funds will be well invested in achieving further development.

APPENDIX 1

SOURCES AND PROCEDURES OF CONSTRUCTING THE RESEARCH AND EXTENSION EXPENDITURES SERIES

Principal Sources of Data:

The principal sources of data are public agencies and institutions doing either or both research and extension in agriculture, and those providing research grants in agriculture. The Budget Commission serves as source of reference for estimating data for some period in the series not available from the operating agencies.

The principal and direct sources of data by agency are as follows:

Bureaus of the Department of Agriculture

1. Bureau of Plant Industry, Dept. of Agriculture, Manila
2. Bureau of Animal Industry, Dept. of Agriculture, Manila
3. Bureau of Soils, Dept. of Agriculture, Manila
4. Bureau of Agricultural Economics, Dept. of Agriculture, Quezon City
5. Bureau of Agriculture Extension, Dept. of Agriculture, Quezon City

Commodity Institutes:

1. Philippine Tobacco Administration, Quezon City
2. Philippine Virginia Tobacco Administration, Quezon City
3. Philippine Sugar Institute, Quezon City

Commodity Institutes (Continued):

4. Philippine Coconut Authority (formerly Philcoa and Philcosin), Quezon City

State Colleges and Universities:

1. UP College of Agriculture, College, Laguna
2. University of Eastern Philippines, Samar
3. Central Luzon State University, Nueva Ecija
4. Central Mindanao University, Bukidnon
5. Mindanao Institute of Technology, Cotabato

Research Granting Institutions and Offices:

1. National Science Development Board, Bicutan, Taguig, Rizal
2. National Research Council of the Philippines, Bicutan, Taguig, Rizal
3. National Food and Agriculture Council, Quezon City

Budget Commission, Manila

Procedures of Series Construction:

The series was developed mainly by compiling basic data from the various sources, summarizing them by agency, then by regions. Where necessary, reference data from the Budget Commission were compiled and used as reference in interpolating or extrapolating for some periods with no available actual data from the agency concerned.

Within the agency sources, the data were obtained either from the auditing, or budget offices or both, depending on the agency concerned.

Other common sources include the annual reports, stations and regional reports, etc.

Department of Agriculture

The bureaus of DA that carry on both research and extension activities in Agriculture are the Bureau of Plant Industry (BPI), Bureau of Animal Industry (BAI), Bureau of Soils (BS), and Bureau of Agricultural Economics (BAEcon). The Bureau of Agricultural extension is mainly an extension agency, and does no research.

Accounting and budget records were the common sources of data compiled from the bureaus of DA. One of these and the most common principal source is the "Report of Operations" or Budget Form 133. This contains actual expenditures by quarter for the whole fiscal year by programs and projects. Research directors and other technical personnel provided helpful advice.

Bureau of Plant Industry (BPI). In addition to general "Reports of Operations", BPI Annual Report also indicates expenditures by program and project. From these sources and references we obtained the research and extension expenditures which are described as "Crop Research" for research and "Crop protection services" for extension.

BPI maintains regional experiment stations which carry on research and some form of extension. The biggest and most important of these are Maligaya Rice Research and Training Center (MRRTC), Bicol Rice and Corn Experiment Station (BRCES) and Visayan Rice and Corn Experiment Station (VRCES).

Reports of regional experiment stations and regional offices of BPI were the basis of the regional distribution of research and extension expenditures. The MRTC, BRCES and VRCES data were obtained directly from the respective

accountants and directors in the region.

The scope of BPI research covers all crops but main emphasis since the 50's has been on rice and corn. Other crops specified in the budget allocation are tobacco and abaca.

Bureau of Animal Industry (BAI). Main source of data compiled in Accounting Division was the "Report of Operations" files. From these we obtained the research expenditures which were specified as a project. Extensions were estimated at 75% of "Livestock and poultry development services", and 50% of "Animal diseases and control services".

BAI maintains stock farms, breeding stations and breeding centers throughout the country. Thus in the absence of actual expenditure data reports by region, we calculated the regional breakdown of BAI research and extension expenditures based on the propostion of stock farm, breeding station and breeding centers for each region. There is one stock farm per region, several breeding centers in a region, and a breeding station in almost every province. The stock farm, breeding station and breeding center were each given the same weight in obtaining the proportion for each region. In turn, the regional proportion with respect to stock farm and breeding stations and centers was applied to the total expenditures to get the regional distribution.

Bureau of Soils (BS). Expenditures data were compiled from the Budget Division. The budget officers provided the necessary files of "Reports of Operations" and other financial records. Historical accounts of the research activities of the Bureau were provided by the Research Division Chief which together with a list of projects by year and by location serve as a guide in

our regional distribution of the research and extension expenditures.

As in the case of BPI and BAI, research expenditures are reported under one project/program of the "Report of Operations". But the extension expenditures were obtained from two categories which we calculated as 90% of "laboratory services" in addition to field fertilizer experiments which we treated as extension.

Bureau of Agricultural Economics (BAEcon). BAEcon, which just became a bureau in 1964, was formerly a division of DANR. Since then its activities have been to provide statistical services. Not much research was undertaken until the early 70's.

Bureau of Agricultural Extension (BEAx). The largest extension expenditure is from the BAEx - it being mainly on the extension bureau. Summary of total bureau expenditures from 1958-1973 were obtained from the Accountant through the Director. For the early years from 1952-53 to 1957, and to construct the regional series involved compiling and tabulating by regions from the Accountant's file of records.

Commodity Institutes

In the case of the commodity institutes (Philippine Sugar Institute, Philippine Tobacco Administration, and Philippine Virginia Tobacco Administration) the statement of expenditures provided by accountants includes both research and extension. Separating the two series again involves estimates on the proportion arrived at from the available records and from consultation with knowledgeable personnel. The proportion of research and extension expenditures in these agencies varies from year to year depending on their respective emphasis.

Philippine Tobacco Administration (PTA). The "Audit Report" and the accountant's financial statement were the main sources of data compiled. Research and extension departments in charge indicated that from the 1950's to the early 1970's, the proportion of expenditure allocation was about 50-50.

Research and extension budgets were separated only starting 1973-74. Before 1973 research and extension were combined into one.

Starting in 1960, with the creation of PVTA, PTA was mainly concerned with native tobacco. These native tobaccos are used as fillers in the manufacture of tobacco "sugar".

Philippine Virginia Tobacco Administration (PVTA). This tobacco agency was established only in 1960. It is solely concerned with the Virginia tobacco used in the manufacture of cigarettes. From 1960 to 1965, it was more of an extension agency, with little research.

Emphasis on research started in 1965 with the creation of a "development office" as provided for in R.A. 4155 which was approved in 1964. Extension and training was carried out by the branch offices.

To separate research and extension expenditures, proportions were applied from period to period. From 1960 to 1964 research and extension were 30-70, respectively; 50-50 in 1970-71, and 60-40 in 1972 to 1974.

In 1972 PD 166 provided for the undertaking of research - PVTA just started giving research grants in 1975.

Philippine Sugar Institute (PHILSUCIN)

Philsucin research and extension activities were reported to have commenced in 1955. The period 1955-1961 were the formative years; research and development was about 70% extension and 30% research. From 1962 to 1970

research increased in proportion, to about 70-30.

Data supplied by the accounting office indicated research expenditures by experiment stations, while extension expenditures by mill districts. An example of an extension activity is rain making.

Philippine Coconut Authority (PCA). The present PCA replaces the two predecessor coconut agencies. The first was established in 1953, and called PhilCOA; the second, called PhilCORI, was established in 1964 under NSDB.

Records of both agencies indicate that there was very little research on coconut under Philcoa. Philcorin did considerable research in the late sixties and early seventies, but it was concentrated in the Davao stations.

UnderPCA, starting in 1974, the coconut research was expanded, and the corresponding budget was increased significantly.

State Colleges and Universities

UPCA is the first among the State Colleges and Universities to undertake agricultural research and it was the only one with sustained and significant research programs. Other institutions with some research activities include Central Luzon State University, Central Mindanao University, Mindanao Institute of Technology and the University of Eastern Philippines.

The research and expenditure data of these agencies were obtained from their respective annual reports and from some accounting and budget reports in the case of UPCA.

Granting Agencies

The National Science Development Board, National Research Council of the Philippines and National Food and Agriculture Council are mainly research

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granting institutions.

For MSDB and NRCP, research grants for agriculture were isolated by examining available lists of projects supported. NSDB accounting records of "Statements of Expenditures" indicate that agriculture, forestry and fishery research were combined. Thus, to isolate the pure agriculture research expenditures, we applied the known proportion to the total combined research expenditures, which vary from 85 to 95, an average of 90%, for NSDB from 1966 to 1972. For NCRP, only 20%, on average, of its research grant expenditures, was for agriculture. The agency is more concerned with basic research.

The NPAC research grants are mostly made at UPCA. These are all in agriculture, and mostly on rice and corn. Our data on NPAC research grants was obtained from the receiving institutions like UPCA and some bureaus of DA.

Budget Commission

Data obtained from the Budget Commission on the total expenditures (actual and estimates) of some agencies was used for reference purposes only. For some of the agencies with incomplete reports for some years or periods in the series, estimates were made from the known periods of research and extension proportions against the agency total. Based on these proportions of research and extension to total expenditures, we estimated the missing periods in the agency research and expenditure series from total expenditures reported in BC annual budget documents.

APPENDIX 2

NOTES ON INSTITUTIONS

PCARR

The Philippine Council for Agricultural and Resources Research (PCARR) was established in 1972 to coordinate research programs and to make research more cost-effective in producing new agricultural technologies. In this PCARR has been successful and in addition PCARR has succeeded in encouraging the beginnings of a decentralized research system. Agricultural research in the past has been greatly dominated by UPLB. The new research centers at CLSU, USCA, USM and La Granja have the potential to be very important in the agricultural development of their respective regions.

PCARR has succeeded in remaining as a coordinating body despite the suggestions that PCARR get involved directly in research. One exception appears to be the KABSAKA program in which IRRI funded personnel work under the direction of PCARR. There has also been the suggestion that PCARR personnel be given leaves of absence to conduct research or be given permission to conduct research in areas where no proposals are submitted. The strength of the PCARR role as a coordinating body would likely be reduced if PCARR personnel were in any way competing with other agencies for funding. The idea that it would be good for PCARR personnel to be experienced in research is not a bad idea, however, it is probably more important that coordination of research and participation in research remain separate.

Researchers, however, are not entirely satisfied with PCARR as a granting agency. The most apparent problems are the slow review of research proposals and the delays in the release of funding. The pace of the review process is a minor hindrance compared to the delays in funding. The yearly

dispersment of funds to the research units has been reported to be delayed as much as 6 months. This causes severe hardships for on-going research projects, especially those projects in which field work must be done. Some research organizations have large enough alternative sources of funds to support the PCARR projects until the PCARR funds are released. For some units this is difficult and the delays make it very difficult for researchers and their employees.

VISCA

The Visayas State College of Agriculture (VISCA) was established in 1973 on the site of a small agricultural college near Baybay, Leyte. It has now grown to 1,300 students and is the leading institution in the Visayas Coordinated Agricultural Research Program, VICARP. Also located on the campus are the Philippine Root Crop Research and Training Center (PRCRTC) and the Regional Coconut Research Center (RCRC).

Leadership has been aggressive. In the short history of VISCA an impressive physical plant has been built and is continuing to expand. Funding has been obtained from AID, IDRC and the World Bank as well as from the Philippine government. Although equipment and staff are lagging behind the building, there is vigorous effort in all. The PRCRTC was established in 1977 as a national center for research in tropical root crops. About four years ago the RCRC was established for coconut research for significant copra industry in the Central and Eastern Visayas. In 1978 VICARP was established as a coordinating agency for agricultural research in the same regions. It is intended to coordinate research by the Regional Research Center at VISCA, BPI, BAI, FORI and other agricultural colleges in the region.

The Regional Research Center is the research organization of the college and directs the research activities of the teachers. Some of the teachers also work with the Regional Coconut Research Center and PRCRTC. In number of projects, the research is dominated by rural sociology, socio-economics and corn and sorghum. Research is hampered by heavy teaching loads by most of the faculty. Over one-third of the research projects are research for B.S. theses.

The core staff of PRCRTC and the Regional Coconut Research Center have few teaching responsibilities and account for over half of the research

projects at ViSCA. The PRCRTC has a core staff of 15 and 30 other ViSCA staff contribute to the research. The coconut center has 13 staff. In all of the research units most researchers have M.S. or B.S. degrees with about an equal number of M.S. and B.S. degree-holders.

Research at the coconut center has not progressed far. This year the first nuts are being harvested from the first plantings of rapidly growing trees. Initial problems for the newly-imported Ivory Coast hyprids were caused by the coconut spike moth. While waiting for the trees to mature, the Center has been developing methods for selection of seedlings by farmers and developing a new copra drier. In general the coconut program appears to be well-conceived with modest and realistic ambitions.

The manpower development program of ViSCA is ambitious. Initially staff was hired outside ViSCA, but currently the emphasis is on advanced training for present faculty and on selecting graduates of ViSCA who will be sent for advanced training. Currently, 73 faculty are on study leave, 44 at universities in the Philippines, 24 in the U.S. and 5 elsewhere abroad. Even with enough money, development will be limited by the number of quality ViSCA graduates that can be attracted to the ViSCA faculty. For the next few years, ViSCA will graduate less than 150 B.S. per year. Like other colleges and universities, ViSCA has problems among their highly trained faculty. Some leave after fulfilling their contractual obligations, and it is reported that a few pay the required fee to buy out of their contracts. The major reason for leaving is a higher salary.

Building has provided more than adequate laboratory space (at least for PRCRTC and the coconut center). The space is under-utilized because of lack of equipment and manpower. Also, the lack of a 24-hour electrical service eliminates some laboratory investigations.

Library development is also active. The library has over 24,000 volumes plus over 400 titles of technical journals and bulletins. The present journals are adequate for most current research. The important abstracts are available as are the most important foreign journals. There is a program to obtain back issues.

The researchers at ViSCA have the opportunity to publish in the Annals of Tropical Research. ViSCA has published one volume, and it appears carefully reviewed and edited. The journal will publish papers from ViSCA as well as other institutions.

The ViSCA educational program is growing at a controlled rate. The current enrollment is 1,300. The demand for study at ViSCA is high and one student of 4 who took the entrance exam was admitted.

ViSCA boasts of being second only to UPLB in quality of research and teaching in agriculture. This appears to be a valid boast. ViSCA is already an important center for research and will likely continue to grow in importance.

University of Southern Mindanao

The University of Southern Mindanao (USM) located at Kabacan, North Cotabato, is the site of the Southern Mindanao Agricultural Research Center (SMARC). The president of USM is also the research director of SMARC. The research program at SMARC is the least developed of the research centers visited. The animal science unit has new buildings that are unoccupied and there are only the beginnings of a program. The crop research units have begun to occupy the new (A.I.D. built) buildings but the laboratories are not being used. The lab equipment that has been delivered remains in shipping crates. Some of the new (A.I.D. purchased) equipment is, however, inappropriate for the jobs that need to be done. For example, SMARC has two large grain drills that have no function in their program. Some of the field work is variety trials in cooperation with other institutions like the root crop trials done in cooperation with the Philippine Root Crop Research and Training Center. Other research projects like those in coffee, rubber, corn and sorghum are directed by USM staff. The field experiments were well designed but the effort is very small compared to the size of the USM faculty.

There are several problems that make it difficult for researchers at USM. The size of the college population, now 7,700, puts a large teaching burden on the faculty. The current policy is to restrict enrollment. The lack of library resources, also, makes research difficult. The USM library (including the SMARC collection) does not provide even the basic journals to support a research program. The relatively low level of training of the faculty is another problem. USM has a low percentage of faculty with post-graduate training.

The problem of manpower development of USM has been aggrevated by the Muslim

insurgency in Southern Mindanao. There have been fewer incidents recently but the threat of insurgent activity is still real. This makes it difficult to attract and hold good faculty members.

Researchers at USM can publish their results in a new technical journal published by USM. This journal publishes papers much more quickly than the national journals.

Central Luzon State University

Central Luzon State University (CLSU) located at Munoz, Nueva Ecija is the site of Central Luzon Agricultural Research Consortium. The center directs the agricultural research of the University and coordinates research with BPI, BAI and other agricultural research units within the Central Luzon Region.

Much of the research of CLSU is oriented toward generating technologies that can be used by small farmers. CLSU has a brickmaking project and a demonstration farm where integrated farming and culture systems are evaluated and demonstrated to farmers. CLSU also has a carabeef farm, that is still under construction, where studies are on-going in breeding and pasture systems for the improved utilization of hilly land. Most of the research is done by researchers with B.S. and M.S. training. This research program will likely make a positive contribution to agricultural development in Central Luzon, but is not capable of generating new knowledge for long term continued development.

The strongest research program at CLSU is in the Freshwater Agriculture Center. This research program has a well-trained staff (2 or 3 Ph.D.'s with 2 more in training) and has good facilities. Progress is being made in the development of fish pond technologies. The potential for further development appears to be great.

LaGranja Agricultural Research Center

The LaGranja Agricultural Research Center (LGARC) was established in 1976 to bring together the research units of the Philiopine Sugar Commission (PHILSUCOM), BAI and BPI that were already located at LaGranja. Later the UPLB College of Agriculture unit at LaGranja joined the consortium.

The total research staff at LGARC is 62. There are 2 Ph.D. researchers, 14 with M.S. degrees and 47 with B.S. degrees. The PHILSUCOM unit is the largest and the most highly trained group.

All of the research units have new buildings that are more than adequate for present needs. The BAI buildings have not been completed. The laboratories are quite well-equipped but appear to be under-utilized. For example, the soil testing laboratory will process only 5-600 samples per year in a well-equipped lab.

The PHILSUCOM research unit has a very active program both in breeding and in production technology. PHILSUCOM's breeding program has produced the most popular varieties for use in the Philippines and it is continuing to release new highly promising varieties. The crop production divisions are well-integrated with the extension arm of PHILSUCOM. A current project of the Soils and Plant Nutrition division is to produce a specialized soils map for use by PHILSUCOM extension technicians.

The BPI and UPLB units share the responsibility for research in upland rice, corn, sorghum, wheat tritacale, legumes, vegetables and root crops. The upland rice work is largely evaluation of IRRI varieties. A large fraction of the legume research is in soybeans.

The research of the UPLB unit is mostly varietal evaluation. In addition, the unit is a center for the farm practice training of UPLB College of

Agriculture students. A two-year college training program has been suggested. With the availability of agricultural training at other institutions on Negros it does not seem reasonable that such a program should be pursued.

The BAI unit has only one researcher. Another will be hired soon. This unit will operate largely as a stock farm for improvement of local cattle and swine.

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Table 1

Expenditures on Research and Extension

in the Philippines

Thousands of 1978 pesos

Year	Expenditures		Expenditures as % of Value of Agricultural Production	
	Research	Extension	Research	Extension
1953	4,880	11,500	.13	.30
1961	19,766	50,640	.24	.50
1971	31,720	76,640	.30	.70
1979	52,400	110,000	.45	.91

Table 2

Regional Research and Extension Emphasis

Proportion of Agricultural Research Undertaken by Region

Year	UPCA Manila	Ilocos	Cagayan Valley	Central Luzon	Southern Tagalog	Bicol	Eastern Visayas	Western Visayas	NBE Mineanao	S&W Mineanao
1953	58%	1%	2%	5%	22%	2%	1%	3%	3%	3%
1961	60%	2%	3%	6%	10%	3%	3%	6%	4%	3%
1971	49%	2%	2%	11%	15%	1%	7%	10%	2%	2%
1975	53%	3%	2%	12%	15%	2%	5%	5%	2%	2%

Source: See Appendix 1

Proportion of Agricultural Extension Undertaken by Region

1953	30%	8%	5%	15%	11%	6%	6%	8%	6%	5%
1961	18%	9%	5%	18%	12%	7%	6%	9%	7%	8%
1971	25%	6%	5%	14%	16%	5%	7%	10%	6%	5%
1975	25%	9%	5%	11%	16%	4%	5%	9%	6%	9%

Source: See Appendix 1

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Table 3

Public Sector Research

Commodity	Research Spending as a Percent of Gross Value by Commodity	Commodity Research Share in Total Research Budget		Commodity Share in Gross Value of all Commodities	
	1980	1973-74	1978	1973-74	1980
Crops		.44	.448	.592	.621
Coconut[a]	.125	.072	.058	.084	.087
Corn and Sorghum[a]	.132	.060	.039	.065	.065
Corn	.095				
Fiber crops	.994	.040	.041		
Abaca	.163				.007
Cotton	(High)				
Fruit Crops[a]	.087	.040	.026	.070	.078
Banana	.004				
Pineapple	.003				
Mango	.070				
Citrus	.046				
Other	.250				
Legumes[a]	1.28	.030	.051	.007	.008
Ornamental Horticulture		.002	.014		
Plantation Crops		.006	.011		.042
Rubber	.130				
Cacao	.206				
Coffee	.004				.037
Cereals	.047	.060	.047		
Rice	.034			.187	.169
Wheat	(High)				
Root Crops	.540	.014	.072		.030
Sugarcane[a]	.011	.058	.011	.050	.053
Tobacco	.594	.020	.034		.005
Vegatables	.430	.040	.044		.019
Fisheries[a]	.150	.080	.158	.118	.174
Forestry[a]	.190	.132	.144	.111	.092
Livestock[a]	.080	.170	.067	.177	.112
Beef - Carabeef	.035	.06	.021	.066	
Dairy			.009		
Pork	.070	.04	.007	.052	
Poultry[a]	.400	.04	.005	.047	.041
Pasture		.039	.021		
Socio-Economics		.050	.101		
Soil and Water Res.		.067	.072		

Sources: PCARR and Statistical Abstracts

[a]The correlation between shares in the research budget used in the value of all commodities was 0.91 in 1973-74 and 0.73 in 1980. The nine commodities correlated are identified by "a".

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Assistance to Expand Agricultural Production

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Summary. — Bilateral and multilateral development assistance agencies have devoted major resources to programs to support more rapid growth of agricultural production in developing countries. In this paper I review the effectiveness of assistance activities in land and water development, agricultural research and extension, the reform of land tenure arrangement, and the development of agricultural credit institutions. Investments in several of these activities, particularly land and water resource development and agricultural research, have had relatively high rate of return. Yet in almost all areas there has been a continuous cycling of program priorities and thrusts. There has been a persistent failure to learn from failure — or from success. In the future, more attention needs to be given to the generation of social science knowledge for the design and reform of the institutional infrastructure needed to sustain agricultural development.

Development assistance programs have made major investments with the objective of directly expanding agricultural production. This includes support for investment in land and water development; the design and development of agricultural research institutions; and the design and development of agricultural extension services. Development assistance has also been directed to the design and reform of rural institutions with the objective of releasing the constraints on production or redirecting the income flows resulting from production in a more equitable manner. In this category, major emphasis has been placed on land reform and on the development of rural credit systems.

In this paper, I attempt to assess the implications that can be drawn from the literature on the effectiveness of these several areas of assistance to expand agricultural production.

1. LAND AND WATER RESOURCE DEVELOPMENT

During the 1950s and 1960s, investment in land and water resource development represented a major claim on the development budgets of many developing countries and of the bilateral and multilateral assistance agencies. Among multilateral lending agencies irrigation continues to represent one of the largest components of assistance to agricultural development (Carruthers, 1983).

There were several reasons for the large physical infrastructure investments during this period. A major economic rationale was that public benefits exceed private benefits by such a wide margin that only the public sector could afford to undertake them. Spillover or secondary development impacts were believed to substantially exceed the benefits that could be captured in the form of price or user charges.

There was also a strong presumption that investments in transportation, communication, power, irrigation, and related facilities were a necessary precondition for economic growth. It was assumed that until these facilities were brought to a "critical minimum" level the payoff to private economic activity would be inadequate to induce the investment necessary for sustained growth. This argument has been buttressed by the political appeal of "monumental" infrastructure investments, such as big dams and superhighways.

A further reason for the large share of external development funds allocated to physical infrastructure investment was that highways, rail-

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roads, and irrigation could be planned and developed in "project units" that were amenable to the algebra of conventional cost–benefit calculations. This was in contrast to investments in such activities as research and education, which presented, at both the conceptual and empirical levels, more difficult problems for cost–benefit or cost-effectiveness calculations.

By the late 1960s, the World Bank had financed approximately 50 irrigation projects (Otten and Reutlinger, 1969). These developments were primarily of three types. The most dramatic were the "big dam" gravity irrigation projects. Among those that have received major attention and have absorbed substantial resources are the Gezira scheme in the Sudan; the Aswan High Dam in Egypt; the Indus Basin Project in Pakistan; the Lower Mekong River scheme involving Thailand, Cambodia, Laos, and Vietnam; and the Bhakra Nagal project in India. These projects have all involved public sector investment with major foreign assistance.

There was also substantial interest and investment in the opening up of new lands for settlement. Such projects were often conceived as methods of reducing the population pressure in settled areas by the transmigration of peasants to frontier areas. In Peru, development of the interior areas on the eastern slope was undertaken to reduce the population pressure on the Andean highlands. In Indonesia, transmigration to the outer islands was undertaken to reduce the population pressure on Java. Such projects have also frequently involved substantial commitment of foreign aid and credit and technical assistance.

A third pattern of land and water resource development involved intensification of production on lands already being cultivated. This has meant investment at the individual farm or local community level in land leveling, drainage, pump irrigation, and other improvements leading to more effective soil and water management. This pattern of development may be highly capital-intensive in some economies and highly labor-intensive in others.

In several countries, the development of "big dam" gravity irrigation systems has been of major importance as a source of growth in agricultural output (Hertford, 1970a, b). In Mexico, for example, the expansion of irrigated acreage from 1.5 million hectares in 1926 to approximately 3.5 million hectares in the late 1960s set the stage for the rapid diffusion of new wheat and maize technology. Hertford has estimated that in the absence of irrigation the annual increase in demand for purchased inputs by Mexican farmers would have risen at less than 3.5%, rather than at the annual rate of 9.2% achieved between 1940 and 1965 (Hertford, 1970b, p. 100).

Yet the more typical experience with gravity irrigation projects was disappointing. Costs per man-year of additional employment and per unit increase in output have been high. By the mid-1960s it was becoming increasingly difficult to find projects that met even the "soft" cost–benefit criteria employed by the international lending agencies and the national development assistance programs (President's Science Advisory Committee, 1967; Clark, 1967). A 1969 World Bank review of the performance of eight ongoing irrigation projects indicated that project execution was more expensive than anticipated in the original studies. In most cases, however, the realized rates of return remained positive. Even after revision, the projected rates of return were between 15 and 20% for four projects and slightly higher for two others (Otten and Reutlinger, 1969, pp. 5,6). A more recent review of World Bank experience during the 1970s reinforces the conclusions from the earlier review. Project time to completion usually took longer and costs tended to run higher than anticipated. Increases in project impact on agricultural production occurred more slowly than anticipated. In spite of these problems, over half of the 40 Bank-assisted projects had rates of return in excess of 15%. In many cases, the favorable rates of return occurred as a result of the unanticipated increases in agricultural commodity prices during the mid and late 1970s (Hotes, 1983).

The experience with new settlement projects has also been highly unsatisfactory. An analysis of the performance of 24 new land development schemes in Latin America concludes: "Few spheres of economic development have a history of reputation for failure to match that of government sponsored colonization in humid tropical zones" (Nelson, 1973). There is a record of consistent discrepancy between initial projections and results. Internal rates of return have been grossly overestimated. In India, new colonization schemes have been extended to areas where rates of return have been low or negative to the individual cultivator, to the government and to the national economy (Farmer, 1974). In Africa, where land settlement schemes have frequently been coupled with tractor mechanization schemes, there was also a consistent record of failure (Eicher, *et al.*, 1970).

The third pattern of development, involving intensification of production on lands already cultivated and greater scope for local and farm-level planning and decision-making, has been relatively more successful. A particularly interesting example of such development has

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been rapid expansion of tubewell irrigation in both East (Indian) and West (Pakistan) Punjab (Falcon and Gotsch, 1968). Initially tubewell development proceeded less rapidly in East Punjab than in West Punjab, because of constraints on the drilling of tubewells in canal command areas. When these restraints were lifted and policy was directed toward a system of coordinated groundwater–surfacewater development, there was a rapid growth of tubewells in East Punjab. Falcon and Gotsch estimate that the additional water accounted for about half of the increased output in West Punjab and more than one-third of the increase in crop output in East Punjab between 1953/54 and 1965/66.

The Indus Basin Project in Pakistan represents a useful illustration of a development that involved all three of the elements discussed above — major infrastructure investment, new land development, and intensification of production. It also involved continued collaboration of the two major development assistance agencies, the World Bank and the US Agency for International Development (US/AID). The realization of the potential benefits of the project was delayed as a result of problems that had not been fully appreciated during the initial design and construction phases.[1]

The Bank played a major role in the negotiation of the Indus Basin Treaty that settled the disputes between India and Pakistan over rights to Indus Basin waters. The treaty was followed by commitments by donors and by the government of Pakistan of over $2.5 billion for a program that included the construction of the Mangla and Tarbela dams and related hydroelectric and irrigation water delivery facilities. The cost of completing Tarbela Dam, the largest earth-filled dam ever constructed, exceeded $1.4 billion.

Even before the Indus Basin Treaty was signed, support by the Bank and the United States was enabling the government of Pakistan to expand the area irrigated at about 500,000 acres per year. It became apparent in the 1950s that irrigation investments were failing to realize the potential benefits that had been projected. Initially irrigation infrastructure design and water management practices had been oriented toward expanding the area irrigated rather than achieving optimum crop yields through more intensive water application. This resulted in excessive water loss through canal seepage and evaporation. The seepage caused the water table to rise to the point where waterlogging was a serious problem. The waterlogging and evaporation losses contributed to a buildup of salinity in the soil that resulted in loss of crop production.

To correct the waterlogging and salinity problems the US AID and the World Bank have supported a number of major efforts to improve water management. The initial efforts began in the 1950s with a US/AID-sponsored Salinity Control and Reclamation Project (SCARP). The project involved the use of large government operated tubewells to lower the groundwater level by pumping water and returning it to the surface canals. Its initial success led to its extension to other areas.

By the early 1970s, it was becoming increasingly clear that, as a result of more accurate measurement of the sources of water loss, the SCARP approach was much less effective than the early judgments had indicated. Even more water was being lost in the water delivery system than had been anticipated. The SCARP management demonstrated a persistent lack of capacity to maintain and operate the system of public tubewells effectively (Gotsch and McEachron, 1983, p. 45). By the mid-1960s, it was demonstrated that, except in the area where the groundwater was saline, private tubewells developed for irrigation purposes were more effective than the public tubewells on lowering groundwater levels and reducing water logging (Mohammed and Beringer, 1963). It also became clear that substantial gains could be realized by more efficient farm water management. After considerable delay these findings led to the support by US/AID and the World Bank of a major program to upgrade the quality of the water delivery system and to improve crop and water management practices. These efforts were quite successful. Water losses were significantly reduced. Cropping intensity increased and crop yields were improved.

Crop yields on irrigated land in Pakistan continue to remain low, however, even by Asian standards. It is apparent that the potential gains in production from land and water development have not yet been fully realized. Among the factors that appear to be responsible are the limited success in the development of new varieties of wheat and rice to replace the initial "green revolution" introductions; the persistence of commodity market and land tenure institutions that dampen incentives to produce; and the failure to invest in the education and health of rural people. It is difficult to escape the conclusion that the concentration of both the government of Pakistan and donor resources on "directly productive" investments and the neglect of institutional reform and "social sector" investments have acted to limit the gains from land and water development.

During the 1970s, there was a rather distinct

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shift in land and water resource development efforts on the part of assistance agencies. Increased attention was given to issues of efficiency and equity in project implementation and management. This involved more careful analysis of the technical and economic aspects of (a) the transmission of water to farmers' fields, (b) the allocation of water among farmers, and (c) the efficient on-farm use of water.[2]

As an example, the World Bank's standard package for improving existing irrigation canals in India traditionally contained the following components: (1) lining the main canal; (2) land leveling below the outlet; (3) constructing a field canal network below each outlet to deliver water to suboutlet blocks of 5–8 hectares; (4) rotational irrigation between these suboutlet blocks; and (5) formation of water users' associations at the outlet level. Recently a shift in emphasis has begun to take place, reflecting greater concern about how main systems are actually being operated (Wade, 1982, p. 171). There has been a similar shift in emphasis by US/AID. Several recent AID and World Bank irrigation evaluations (Wade, 1982; Steinberg *et al.*, 1980; Benedict *et al.*, 1982) have cited management as the major factor accounting for differences in project effectiveness. This has led US/AID to place greater emphasis on managerial training for irrigation system managers. Since fewer large irrigation projects are being built because only the expensive sites are left, the emphasis is turning toward more efficient use of those that already exist.

The importance of effective management for system efficiency can be illustrated from recent AID project evaluation studies in Korea and Sudan. The Korean project involved an attempt to achieve efficient and equitable delivery of water to farms in an area that was already intensively cultivated (Steinberg *et al.*, 1980). Three factors were important in the success of the project. One was that the project had available to it an effective Korean engineering and management staff. A second factor was effective organization of the institutions that supplied inputs and services. A third was the organization of farmers into strong Farm Land Improvement Associations. The associations were able to take responsibility for managing water distribution and collecting irrigation fees. They were able to bring pressure to bear on their members for efficient water use and on system management for effective performance.

In contrast to the Korean project, the Rahad Project in the Sudan is an example of a project with many problems. It was undertaken to develop underutilized water resources and extend intensive crop production into an area that had not been farmed intensively with the hope that it would expand production of export crops (Benedict *et al.*, 1982, p. iii). AID's contribution to this project was to supply equipment and spare parts for the construction of the irrigation works and for land preparation. Recently AID has supplied mechanical cotton pickers and vehicles to facilitate the mechanization of field operations. In 1982, the Rahad Project had just completed its fourth growing season, during which cotton yields declined each year and incomes were lower than required to break even (Benedict *et al.*, 1982, p. iii).

The evaluation team identified several causes for the decline in cotton production, which seemed to point to a need for better administration of the corporation which runs the irrigation project. Because of perceived labor shortages, production was highly mechanized. Mechanization weakened the linkage between worker incentives and farm management decision-making (Benedict *et al.*, 1982, p. C-5). One of the problems with the system was that farmers either did not get water or it came at inappropriate times during the growing season. The major problem was not with the system, but with the need to improve the management of the project and increase worker incentives (Benedict *et al.*, 1982, p. 17).

Wade also makes the case that India's irrigation projects suffer from lack of trained managers. At present over 80% of the nonprofessional (non-engineer) staff of an irrigation canal have no training related to the job they have. There is the notion that professional irrigation engineers need some acquaintance with agronomy, but they receive no training in management (Wade, 1982, p. 181).

The importance of effective farmer representation in planning and management of irrigation systems has received emphasis in recent lieterature. When farmers did not get water in Rahad, they had no effective mechanism for dealing with the inefficient system management. In Korea, a strong farmer organization acted to reinforce effective management. Furthermore, farmers have information resulting from their experience that could be tapped instead of hiring expensive engineering personnel (Small, 1982, pp. 4–5). The opportunity cost of the farmers' resources may be less than that of the civil service technical staff.

2. AGRICULTURAL RESEARCH[3]

The capacity to develop and manage agri-

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cultural technology has been increasingly recognized as one of the most important variables accounting for differences in agricultural productivity among nations. The returns to investment in land and water resource development have typically remained low unless accompanied by simultaneous efforts to advance the technology of crop and livestock production.

Historical evidence suggest that those countries that have been successful in generating rapid technical change in agriculture have found it necessary to develop the institutional capacity to conduct the agricultural research and technology development that has enabled them to follow a path of technical change consistent with their own resource and cultural endowments. Those countries that have attempted to rely primarily on borrowed agricultural technology have rarely developed the capacity to adopt and manage the borrowed technology in a manner capable of sustaining agricultural development.

The location-specific nature of agricultural technology, particularly the biological and chemical technology required to sustain more intensive crop and livestock production — of increasing output per hectare — was not widely recognized in the agricultural assistance programs of the 1950s. Support for improvement in agricultural research was dominated by an "extension" bias, or what has recently become more fashionable to term, a "technology transfer" orientation.

It was gradually recognized that the transferability of expertise from temperate- to tropical-region agriculture was severely limited. The scientific knowledge needed to improve both agricultural productivity and institutional performance could only be obtained by the development of location-specific research capacity on the part of both expatriate and indigenous scientists. During the 1950s and 1960s, the several donor agencies made major contributions to the development of national research systems particularly in Latin America and South Asia. By the late 1960s, however, there was a good deal of disillusionment on the part of the donor agencies with the capacity of national systems to organize and manage the resources for scientific research and technology development.[4]

(a) *The emergence of the international institute model*

Between the mid-1960s and the early 1970s, the international research and training institute model emerged, in the perception of the international aid agencies, as the most effective way to organize scientific capacity to generate technical change in agriculture for the developing countries. The international institute model drew on two historical traditions. One was the experience of the great tropical research institutes that played an important role in increasing the production of a number of export commodities, including rubber, tea, sisal, and sugarcane.

The international institute model also drew on the experience of the Rockefeller Foundation in Mexico and the Ford Foundation and the Rockefeller Foundation in the Philippines. The complex of international agricultural research institutes listed in Table 1 evolved directly from two institutions, the International Rice Research Institute (IRRI) and the International Center for Improvement of Maize and Wheat (CIMMYT), established by the Rockefeller Foundation and the Ford Foundation in 1959 and 1963. The Rockefeller Foundation's agricultural sciences program was initiated in 1943 with the establishment of the Office of Special Studies (Oficina de Estudies Especiales) in cooperation with the Mexican Ministry of Agriculture.

The success of the wheat program in Mexico led to conversations between the Ford Foundation and the Rockefeller Foundation about the possibility of collaborating on a program in Asia. After a good deal of investigation, an agreement was reached between the two foundations and the government of the Philippines to establish the International Rice Research Institute in the Philippines. The agreement was signed in 1959. By 1962, the Institute's facilities had been constructed, a staff was being recruited, and the program was underway.

During the late 1960s, the Ford Foundation and the Rockefeller Foundation again collaborated in the establishment of the International Institute of Tropical Agriculture (IITA) in Ibadan, Nigena, and the International Center for Tropical Agriculture (CIAT) in Palmira (near Cali), Colombia. With the establishment of these two new centers, it became apparent that the financial requirements of the system would soon exceed the capacity of the two foundations. Consultations were held between the Ford and Rockefeller Foundations, the World Bank, the Food and Agriculture Organization, and the United Nations Development Program (UNDP) in 1969. Following several informal meetings in January 1971, a formal meeting was held in May of 1971 to organize the Consultative Group on International Agricultural Research (CGIAR). The initial membership included the World Bank, the FAO, and the UNDP as sponsors, plus nine national governments, two regional banks,

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Table 1. *The international agricultural research institutes*

Center	Location	Research	Coverage	Date of initiation	Core budget for 1984 ($000,000)
IRRI (International Rice Research Institute)	Los Banos, Philippines	Rice under irrigation, multiple cropping systems; upland rice	Worldwide, special emphasis on Asia	1960	22.5
CIMMYT (International Center for the Improvement of Maize and Wheat)	El Batan, Mexico	Wheat (also triticale, barley); maize (also high-altitude sorghum)	Worldwide	1966	21.4
IITA (International Institute of Tropical Agriculture)	Ibada, Nigeria	Farming systems: cereals (rice and maize as regional relay stations for IRRI and CIMMYT); grain legume (cow-peas, soybeans, lima beans); root and tuber crops (cassava, sweet potatoes, yams)	Worldwide in lowland tropics, special emphasis on Africa	1967	21.2
CIAT (International Centre for Tropical Agriculture)	Palmira, Colombia	Beef; cassava; field beans; swine (minor); maize and rice (regional relay stations to CIMMYT and IRRI)	Worldwide in lowland tropics, special emphasis on Latin America	1968	23.1
WARDA (West African Rice Development Association)	Monrovia, Liberia	Regional cooperative effort in adaptive rice research among 13 nations with IITA and IRRI support.	West Africa	1971	2.9

CIP (International Potato Centre)	Lima, Peru	Potatoes (for both tropical and temperate regions)	Worldwide, including linkages with developed countries	1971	10.9
ICRISAT (International Crops Research Institute for the Semi-Arid Tropics)	Hyderabad, India	Sorghum; pearl millet; pigeon peas; chickpeas; farming systems; groundnuts	Worldwide, special emphasis on dry semiarid tropics, non-irrigated farming. Special relay stations in Africa under negotiation	1972	22.1
IBPGR (International Board for Plant Genetic Resources)	FAO, Rome, Italy	Conservation of plant genetic material with special reference to crops of economic importance	Worldwide	1974	3.7
ILRAD (International Laboratory for Research on Animal Diseases)	Nairobi, Africa	Trypanasomiasis; theileriasis	Mainly Africa	1973	9.7
ILCA (International Livestock Center for Africa)	Addis Ababa, Ethiopia	Livestock production system	Major ecological regions in tropical zones of Africa	1974	12.7
ICARDA (International Centre for Agricultural Research in Dry Areas	Lebanon, Syria	Crop and mixed farming systems research, with focus on sheep, barley, wheat, broad beans, and lentils	West Asia and North Africa, emphasis on the semiarid winter precipitation zone	1976	20.4
IFPRI (International Food Policy Research Institute)	Washington, D.C., United States	Food policy	Worldwide	1975	4.2
ISNAR (International Service for National Agricultural Research)	The Hague, Netherlands	Strengthening the capacity of national agricultural research programs	Worldwide	1980	3.5

Sources: Crawford (1977), pp. 282–283. Budget data for 1984 were obtained from the CGIAR Secretariat at the World Bank, Washington, D.C.

and three foundations. Membership had grown to 39 institutions by 1980.

The leadership for the Consultative Group is now centered at the World Bank, which provides a chairperson and a secretariat for the group. To provide technical guidance for its work, the Consultative Group established the Technical Advisory Committee (TAC). The FAO provides the TAC secretariat. Technical matters, such as new institute initiatives and program changes at existing institutes, are referred to the TAC for technical review before action by the CGIAR. The TAC develops draft policy statements for the CGIAR'S consideration on priorities within the system and has the authority to initiate investigations and to suggest initiatives and program changes to the CG on its own initiative. Since 1976, the TAC has been charged with the responsibility of organizing comprehensive quinquennial reviews of the programs of the several international research centers and with the periodic analysis of programs that have common elements in the several centers, such as cropping systems or mechanization research. The international research system has grown rapidly. CGIAR-supported expenditures in current dollars rose from only $34.5 million in 1974 to over $175 million in 1984 (CGIAR, 1984).

(b) *Strengthening national agricultural research systems*

By the mid-1970s, it had become increasingly clear that the productivity of the international agricultural research system was severely constrained by the limited research capacity of many national systems and that the adaptation and dissemination of the knowledge and technology generated at the international institutes was dependent on the development of effective national systems. Evenson (1977) demonstrated that the ability to screen, borrow, and adapt scientific knowledge and technology requires essentially the same capacity as is required to invent new technology. Capacity in the basic and supporting biological sciences is at least as important as capacity in applied science.

The outreach programs of the international institutes, even when working through networks such as the international wheat research network, the inter-Asian corn program, and others, did not have the capacity to take on the role of strengthening national systems. The regional commodity networks played an important role in enabling the institutes to conduct research and to test materials and methods under diverse ecological conditions, but they could not assume a larger role without diverting effort from the institute's research programs. By the early 1970s, only a few national systems — those of India, Brazil, and the Philippines, for example — had developed the managerial and professional capacity to absorb, transmit, and adapt effectively the knowledge and technology that were becoming available to them through the international institutes, from developed countries' research systems, and from the stronger developing countries' institutions.

A new consensus regarding the importance of strengthening national agricultural research systems has emerged. This new consensus, shared by both donors and many national governments, has lead to rapid expansion resources devoted to agricultural research during the 1970s (Table 2). As investment has expanded, it has also become apparent that there are serious weaknesses in the methods employed by the donor agencies to support the development of national research systems and in the policies pursued by national governments in developing their national agricultural research systems (Ruttan, 1981, 1982b). Among the problems that have emerged are:

- Excessive investment in research facilities development relative to scientific staff
- Excessive administrative burden, combined with inadequate identification of priorities
- Experiment station location decisions based on political rather than scientific consideration
- Lack of congruence between research resource allocation and economic importance of commodities in regions
- Cycles of development and erosion of capacity in a number of national systems.

(c) *Returns to investment in agricultural research*

The results of a large number of studies of the contribution of research to productivity growth from both developed and developing countries are now available. The estimated rates of return tend to run in the 35–100% range and upward (Schuh and Tollini, 1978; Evenson *et al.*, 1979; Ruttan, 1982a, pp. 242–245).[4]

There has been some skepticism expressed about the results of the rate-of-return estimates. The presentation of the early hybrid corn and sorghum studies in the form of "external" rather than "internal" rate-of-return estimates did result in considerable confusion concerning interpretation of the estimates. A review of the body of literature that is now available impresses one with the increasing sophistication that the authors of the more recent studies have displayed

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Table 2. *Trends in numbers of research scientists and extension workers:* 1959–80

Region/subregion	Research scientists*			Extension workers			Ratio of extension workers to research scientists		
	1959	1970†	1980	1959	1970‡	1980	1959	1970	1980
Western Europe	6,251	12,547	19,540	15,988	24,388	27,881	2.56	1.94	1.43
Northern Europe	1,818	4,409	8,027	4,793	5,638	6,241	2.64	1.23	0.78
Central Europe	2,888	5,721	8,827	7,865	13,046	14,421	2.72	2.28	1.63
Southern Europe	1,545	2,417	2,686	3,330	5,704	7,219	2.16	2.36	2.69
Eastern Europe and USSR§	17,701	43,709	51,614	29,000	43,000	55,000	1.64	0.98	1.07
Eastern Europe	5,701	16,009	20,220	9,340	15,749	21,546	1.64	0.98	1.07
USSR	12,000	27,700	31,394	19,660	27,251	33,454	1.64	0.98	1.07
North America and Oceania	8,449	11,688	13,607	13,580	15,113	14,966	1.61	1.29	1.10
North America	6,690	8,575	10,305	11,500	12,550	12,235	1.72	1.46	1.19
Oceania	1,759	3,113	3,302	2,080	2,563	2,731	1.18	0.82	0.83
Latin America	1,425	4,880	8,534	3,353	10,782	22,835	2.35	2.21	2.68
Temperate South America	364	1,022	1,527	205	1,056	1,292	0.56	1.03	0.85
Tropical South America	570	2,698	4,840	2,369	7,591	16,038	4.16	2.81	3.32
Caribbean and Central America	491	1,160	2,167	779	2,135	5,505	1.59	1.84	2.54
Africa§	1,919	3,849	8,088	28,700	58,700	79,875	14.96	15.25	9.88
North Africa	590	1,122	2,340	7,500	14,750	22,453	12.71	13.15	9.60
West Africa	412	952	2,466	9,000	22,000	29,478	21.80	23.11	11.95
East Africa	221	684	1,632	9,000	18,750	24,211	40.72	27.41	14.84
South Africa	696	1,091	1,650	3,200	3,200	3,733	4.60	2.93	2.26
Asia§	11,418	31,837	46,656	86,900	142,500	148,780	8.55‖	7.28‖	5.06‖
West Asia	457	1,606	2,329	7,000	18,800	16,535	15.31	11.71	7.10
South Asia	1,433	2,569	5,691	57,000	74,000	80,958	39.80	28.80	14.23
Southeast Asia	441	1,692	4,102	9,500	30,500	33,987	21.54	18.03	8.29
East Asia	7,837	13,720	17,262	13,400	19,200	17,300	1.71	1.40	1.00
China	1,250	12,250	17,272	—	—	—	—	—	—
World Total	47,163	108,510	148,039	177,521	294,483	349,337	3.87‖	3.06‖	2.67‖

Source: Judd *et al.* (1983).

*Research scientists estimates include only workers with advanced degrees. An attempt has been made to include only research workers engaged in production-related agricultural research. Research on post-harvest technology is, for example, not included in these estimates.

†1970 data are an average of 1968 and 1971.

‡1974 data are used when more recent data are not available. In other cases, the 1980 data are averages for 1974–80.

§Data for Extension Workers in Eastern Europe, USSR, Africa, and Asia are estimated.

‖Excludes China, for which data on extension workers were not reported.

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in responding to the limitations of some of the earlier studies. The effect of more careful model specification, more complete measurement of costs, and greater caution in estimating benefits appears to have resulted in a downward bias in rate-of-return estimates in a number of recent studies (see Ruttan, 1982a, pp 252–254).

In spite of the deficiencies in research organization and management noted above, almost all of the studies indicate high rates of return to investment in agricultural research — well above the 10–15% (above inflation) that private firms consider adequate to attract investment or that development assistance agencies find acceptable for land and water resource development projects. It is hard to imagine many investments in either private- or public-sector activities that would produce more favorable rates-of-return.[5] African agricultural research appears to be a major exception to the generalizations about high rates of return to agricultural research. African research systems are characterized by high ratios of expatriate to national scientists, high costs per scientist, and low output per scientist (Eicher, 1984; Lipton, undated draft). The indepth analysis to understand fully the low poductivity of African systems is, however, not yet available.

3. AGRICULTURAL EXTENSION

Publicly supported agricultural research systems were firmly established in a number of European countries, in North America, and in Japan during the latter half of the 19th century. Extension services designed to transfer new agricultural technology to farmers were established somewhat later — typically during the first quarter of this century.

Research and extension services were also established in a number of countries in Latin America, Asia, and Africa by national governments and colonial regimes before World War II. The extension services were often quite different from the North American model. In many of the colonial countries, they were directed to the needs of the expatriate-managed plantation sector. In a number of countries, the extension services performed regulatory functions as well as educational and related technology transfer activities.

(a) *The changing role of agricultural extension in development assistance*

When the United States became involved in development assistance during and after World War II, development or strengthening of extension programs represented a major focus. There was a firm conviction among US development assistance personnel and on the part of many US scholars that inefficient resource allocation among "irrational, tradition-bound peasants burdened by the yoke of custom and tradition" was a major constraint on agricultural development. There was also a perception that the enormous differences in levels of productivity between developed and developing countries could be overcome by strengthening the process of technology transfer. These perspectives resulted in an "extension bias" in agricultural development assistance policy during the 1950s.[6] The technology transfer or extension bias was particularly strong in the early US development assistance programs in Latin America (Mosher, 1957; Rice, 1974). By the late 1950s, many developing countries had achieved a relatively high level of extension intensity (Table 2).

By the mid-1960s, there was considerable disillusionment with the impact of agricultural extension programs. It became apparent that agricultural technology was much more location-specific than had been anticipated. And a new generation of scholars began to look upon peasants in developing countries as "poor but efficient" (Schultz, 1964). The attention of development assistance agencies, administrations, and the flow of development assistance funds began to shift from the support of agricultural extension programs toward agricultural research.

By the mid-1970s, concern with the effectiveness of technology transfer programs linking the new knowledge and the new technology emerging from agricultural research was resulting in renewed attention to the problem of agricultural extension. This shift was reinforced by a new set of concerns regarding equitable access to technology and the need to strengthen communal institutions.[7]

(b) *A new focus on extension*

The new focus on agricultural extension owed much to the imagination and energy of the Israeli extensionist, Daniel Benor. From an initial successful effort in the Seyhan Irrigation Project area in Turkey, Benor has evolved an extension model, referred to as the training and visit (T & V) system. The T & V system has now been tested and adopted in a large number of developing countries. The World Bank has been a particularly enthusiastic supporter of the T & V system.[8]

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Benor and his associates have identified constraints that they felt had to be overcome to implement successful extension programs. These include:

- Organizational deficiencies, particularly the lack of a single direct line of technical support and administrative control for the field-level extension worker
- Dilution of effort as a result of diffuse responsibility for education, information, regulatory, and other rural development program responsibilities
- Unrealistic assignments regarding the number of farmers extension personnel were responsible for reaching, combined with lack of adequate transport support
- Inadequate or outmoded training
- Lack of adequate articulation between research and extension
- Inferior status accorded extension workers — "low status, low morale, and low pay"
- Duplication of services.

The basic technique employed in the T & V method is "a systematic program of training of the Village Extension Worker (VEW) combined with frequent visits by him/her to farmers' fields" (Benor and Harrison, 1977, p. 19). The highly regimented schedule of the VEW requires that s/he be involved for one day each week with intensive training related to the specific information he must convey to farmers during a given week (or fortnight). S/he is responsible, in turn, for visiting each relatively small group of contact farmers s/he works with once a week for a half-day or once a fortnight for a full day. "This schedule of visits and training takes up 10 of the 12 working days in the fortnight. During the remaining two days, the VEW will make extra visits to supervise field trials, arrange special extension activities, make up visits missed because of illness or holidays, and complete whatever office work is necessary" (Benor and Harrison, 1977, p. 23). This schedule allows for close monitoring by the supervising Agricultural Extension Office (AEO) and by local farmers, who come to expect visits on a regular basis.

The T & V extension system was first implemented in Seyhan (Turkey). Benor reports that this project increased cotton yields from 1.7 tons to over 3 tons per hectare in three years (Benor and Harrison, 1977, p. 3). After the success of the Turkish program, the T & V system was initiated in 1974 as part of three Command Area Development Projects in India — two in Rajasthan state (Chambal and Rajasthan Canal) and one in Madhya Pradesh. "In Chambal, Rajasthan, India, farmers increased paddy yields from about 2.1 tons to over 3 tons per hectare in two years. Combined irrigated and unirrigated wheat yields in Chambal, Madhya Pradesh (India), rose from 1.3 tons to nearly 2 tons per hectare after one season and have since risen higher" (Benor and Harrison, 1977, p. 3).

Subsequently, in mid-1975, the T & V system was initiated in six districts in West Bengal. Later in that same year, the government of West Bengal decided to reorganize its extension service over the entire state to the T & V system. By 1977, the Indian governments of Orissa, Rajasthan, Madhya Pradesh, Assam, and Bihar adopted decisions to reform their existing extension service to the T & V system. The total cost of three Indian projects, begun from May 1974 through June 1977, was $151.5 million. The World Bank has provided substantial financial assistance to these projects (Cernea and Tepping, 1977, p. 85). Programs modeled on the T & V system have also been implemented in Bangladesh, Burma, Indonesia, Nepal, Pakistan, Sri Lanka, and Thailand (Benor, 1984).

The T & V system has not escaped criticism. The criticisms have typically focused on (a) *organizational constraints*, including the difficulty of meeting the organization and training requirements of the system and the rigidity of the Training and Visit model,[9] and (b) *the contact farmer*, regarded by some critics as a major source of bias in the distribution of benefits from the system.[10] In spite of the extensive experience with the T & V system, it has not yet, as of the mid-1980s, been subject to the kind of thorough evaluation that has been made of earlier assistance for the development of the extension programs.[11]

(c) *Returns to investment in agricultural extension*

In assessing the impact of extension programs, it is important to note some significant differences between the extension investment patterns in LDCs and DCs. Extension programs have expanded at a much slower rate than research programs in the most highly developed regions. In contrast, extension programs expanded at relatively high rates in Africa, Latin America and Asia in the 1950s and 1960s (Boyce and Evenson, 1975). By 1970, the developing countries were relatively extension-intensive (Table 2).

> In terms of dollars, the developing countries . . . spend much more on extension than on research. When the comparison is based on numbers of extension workers per dollar of production . . . the developing countries have relatively high investment levels in extension — almost twice that of the developed countries. The emphasis on extension in

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> the developing countries may make sense, given the relative prices they apparently pay for scientists and extension workers, but it may also be based on the erroneous assumption that there exist easily transferable superior technologies which simply have to be put in practice in traditional agriculture to transform it into a modern sector. (Evenson and Kislev, 1975, p. 26)

During the 1970s, however, extension expenditures and staff growth lagged relative to research. By 1980, however, low income countries as a whole were spending a slightly higher percentage of the value of their product on research than on extension. Because the real cost per extension person year remains much lower than the real cost per research scientist year, the LDC's remain much more extension-intensive than research-intensive, relative to the developed countries, where intensity is measured in terms of person years per $10,000 of agricultural product.

Evidence on rates of return to extension is much less adequate than in the case of research. Huffman identifies eleven major studies, most of which were conducted in developed countries (Huffman, 1978). Of particular significance are several studies of agricultural research and extension in India. These studies have been summarized by Boyce and Evenson:

> First, these studies . . . estimated the contribution of the agricultural research system in India so a direct comparison of the estimated returns to investment in research and investment in extension and the more general rural development program, the Intensive Agricultural Districts Program, is possible. This comparison shows that investment in research has been much more productive. (Boyce and Evenson, 1975, p. 108)

Boyce and Evenson's conclusion that extension yields a low rate of return seems to be fairly widely accepted among agricultural economists. Huffman concludes his survey with the comment that when potential sources of bias are taken into consideration "the rate of return to agricultural extension seems to be modest or better in the United States, modest in India and difficult to assess in the other studies" (Huffman, 1978, p. 974).

The conclusion that rates of return to extension investment are quite low relative to research investment does not negate the importance of public extension programs. There is a strong interaction between research and extension. Evenson and Kislev have shown, for example, that in the Indian districts where intensive extension activities had been carried out under the Intensive Agricultural Districts Program (IADP) the impact of research on crop production was greater than in other districts (Evenson and Kislev, pp. 107–119). This review of experience in donor support of agricultural extension does emphasize the importance of continuing experiments in the organization and management of extension programs. This is an area in which institutional innovation may have a relatively high payoff.

4. LAND TENURE REFORM

Tenure reform has been viewed as essential to the mobilization of labor resources and the generation of productivity growth in both liberal and Marxist development perspectives. Economic logic and economic history combined in the early post-World War II period to produce a remarkable unity in doctrine to the effect that an agricultural sector in which an owner-cultivator system predominates achieves a more efficient allocation of resoureces and makes a greater contribution to national economic growth than under alternative systems.

(a) *Land reform after World War II*

The analytical support for this position drew on a tradition that extended back through Marshall to the classical economists (Jaynes, 1984). The classical economists recognized, that in a world of imperfect land, capital and credit markets, sharecropping represented an improvement over wage labor because of its positive incentive effect. The classical economists also recognized that sharecropping provides the workers with less incentives to work than a fixed-rate tenant or an owner-cultivator would have. The classical perspective was confirmed by Marshall (1920). It was reexamined within the framework of the Hicksian neo-classical theory of the firm in the 1940s and early 1950s (Schultz, 1940; Schickele, 1941; Heady, 1947; Johnson, 1950; Heady and Kehrberg, 1952; Drake 1952; Georgescu-Roegen, 1960). The major conclusion that emerged from this reanalysis of the relationship between tenure and productivity was "that there is no substitute, from the standpoint of sheer productivity, and irrespective of sociological considerations, for an owner-operated agricultural system" (Drake, 1952, p. 549).

This perspective led to a major emphasis on land reform in the technical and economic assistance efforts of a number of national and international development assistance agencies after World War II. The post-World War II commitment by the United States to land reform

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as an instrument of political and economic policy was initiated with the reforms carried out in Japan in 1947 under the authority of the Supreme Commander for the Allied Powers (SCAP).[12] The success of the Japanese land reform was an important factor in US support for land reform in other countries of East Asia in the early 1950s and in Latin America, under the Alliance for Progress, in the 1960s.

During most of the post-World War II period, the analytical deductions were regarded as consistent with historical experience (United Nations, 1951; US Agency for International Development, 1970). The post-World War II land reform experience in Japan, Taiwan, and Korea has been widely interpreted as supporting the proposition that an agrarian structure consisting of extremely small owner-cultivator family farms could be economically viable, reasonably efficient, and capable of sustaining rapid increases in agricultural productivity. Experience from the post-war land reforms in other developing countries, however, did not provide the same degree of support for historical generalizations as the East Asia experience.[13]

(b) *The new land tenure economics*

The lack of consistency between the logical deductions and the empirical observations regarding the efficiency of alternative land tenure institutions gave rise, in the late 1960s and 1970s, to a "new land tenure economics" that attempted to explore the economic rationale for the persistence and relative efficiency of share tenancy. The catalyst for the new land tenure economics was Stephen N. S. Cheung (1968, 1969). Cheung's analysis led to the conclusion that tenure reform is both unnecessary and redundant. And he implies that a more appropriate approach would focus on the development and reform of property rights.

The publication of Cheung's work was followed by an explosive growth in the literature cast within the new land tenure economics paradigm. This literature has, however, led to a substantial qualification of the Cheung conclusions.[14] Cheung's insight that contractual terms, the share arrangements for factor costs and product receipts, for example, are endogenous and that the equilibrium solution is a product of joint maximization on the part of both the landlord and tenant has been generally accepted. But it is now generally understood that Cheung's model achieves its efficiency outcome because it simply assumes away the two problems that were the central concerns of the classical and neo-classical analysis — "the negative incentives of sharing and the difficulty of monitoring effort" (Binswanger and Rosenzweig, 1981, p. 23). By focusing on the issue of the efficiency implication of reform of contractual arrangements, the "new school" also diverted attention from the welfare effects of land redistribution.

The key features of the evolving new land tenure literature have been summarized by Binswanger and Rosenzweig (1984, pp. 1–40). The major implication of this literature is that the persistence of sharecropping rests on a combination of factors including: (a) the difficulty of solving the labor and management incentive problems in a direct labor management system, (b) the persistence of imperfections in input and product markets; and (c) the demand for risk slowing on the part of tenants and landlords.

What options do the inferences drawn from the modeling exercises of the "new land tenure economics" imply for improving the welfare of workers and tenants and the efficiency of the farming system? The answers that the new models generate stress the importance of the development and reform of land, credit, and other factor markets. The models also confirm that in an environment characterized by underdeveloped factor, credit, and product markets, a land reform leading to an owner-operator system will lead to greater efficiency in production than other tenure forms. Thus, the formal analysis brings us back full circle to the more intuitively derived policy implications of the pre-Cheung "old land tenure economics."

(c) *Land reform in Latin America*

The literature of the "new land tenure economics" has a peculiarly Asian flavor. Land reforms in Asia were carried out with the expectation that reforming labor and tenure relationships through elimination of intermediaries, regulations of rental arrangements, and transfer of ownership rights to the tiller — the individual or the family who performs the farm labor — would achieve both equity and productivity objectives. Most of the contributors to the "new land tenure economics" literature have drawn on Asian experience.

There is a very different flavor to the literature on land tenure reform that has risen out of the Latin American experience.[15] Neither the practise nor theory of land tenure reform in Latin America has given much weight to the achievement of productivity objectives through the transfer of land ownership to the tiller. In some cases, Mexico for example, land transfers have been looked on as a device to satisfy the land

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hunger of the peasants in order to reduce the threat of social and political instability in the countryside. In most cases, growth in production was expected to be achieved through the modernization of property rights, investments in physical infrastructure, and the development of market institutions. These reforms were, and continue to be, directed primarily at converting the hacienda or estate sector into a modern large-scale farming sector.

The Latin American experience has been, of course, much richer than the stylized description presented here (Table 3). It seems clear that in a large number of Latin American countries the land reforms have been successful in removing some of the most obvious sources of inefficiency and exploitation associated with the traditional hacienda system. There appear to be relatively few areas, however, where the land reforms have been accompanied by the policies needed to sustain productivity growth in the small-scale peasant sector. And there are even fewer areas where the Latin American reforms have succeeded in resolving the problems of equity in the agrarian structure.

(d) *Future directions for land reform*

The dramatic transformations in land tenure relations instituted in Asia and in Latin America since World War II have largely been completed. Even as severe a critic of Latin American agrarian structure as de Janvry concedes that:

> Today, precapitalist estates with rent in labor services have, for all practical purposes, disappeared in Latin America. Those with rent in kind remain important only in some Central American countries and parts of Brazil . . . . As a result . . . these transitional reforms . . . can be considered successfully terminated . . . but the publicized goal of expropriation and redistribution toward formation of a reform sector has generally been held to a minimum . . . . Since large-scale farms in the commercial sector, with the full backing of state services, tend to be highly efficient . . . the family or cooperative farms created by expropriations of these lands will generally not be able to ensure delivery of an equivalent net surplus on the market . . . without a drastic redesign of agrarian policy toward servicing peasants. (de Janvry, 1981, pp 221–222)

The situation in Asia is quite different. Asian societies had no choice but to look for the small-scale family farms as a source of future productivity growth. Even the larger farms in Asia, outside of a very limited plantation sector, tend to be small by international standards. In most countries — Pakistan may be an exception — there is very little land left in large enough units to support a redistributive reform. The technical and institutional infrastructure must be developed in a manner that is capable of sustaining productivity growth on small farms.

In most Asian countries, the model of agrarian development that is evolving in response to demographic pressures and economic growth seems likely to resemble the systems that has emerged in Japan, Tiawan, and Korea since World War II. In Latin America, the pattern that emerged in the US South during the inter-war and early post-war period, in which a plantation system evolved into a modern farming sector and the surplus labor was absorbed by a growing industrial sector, seems most likely to emerge as a result of successful development. Under both of these patterns of development the evolution of a more efficient system of property rights, if pursued, could continue to make a modest contribution to the enhancement of both equity and efficiency in agricultural production. But it is unlikely in the next several decades that political and economic developments will converge, as they did in a few areas in Asia and Latin America in the first two decades after World War II, that will provide assistance agencies with an opportunity to play a significant role in efforts to reform land tenure institutions or to achieve a more equitable distribution of land resources.

5. AGRICULTURAL CREDIT MARKETS

The development of agricultural credit markets and the provision of agricultural credit have been major program activities in agricultural development by the US Agency for International Development, the World Bank, and the several regional development banks. This emphasis on credit is based on five perspectives. First is the Schumpeterian view, which identifies innovation as the critical element in economic development and credit as the principal instrument that allows the innovator to bid resources away from other activities. A second perspective is based on a view similar to that of market reform. The farmer obtains credit, sells his output, and often gets his job or rents his land from the same middleman and is thought to be exploited in each transaction. A third perspective, closely related to the second, views public credit institutions as providing part of the supervised education and credit package designed to induce traditional farmers to adopt modern inputs. A fourth perspective views credit as an income transfer mechanism to lessen inequities in income distribution in rural areas. A fifth perspective views subsidized credit as an

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Table 3. *Land reforms in selected Latin American countries, 1917–76*

Country	Land reform: Year (1)	Land reform: Type (2)	Land in reform sector (%) (3)	Peasantry in reform sector (%) (4)	Size of reserve (hectares) (5)	Capital and water expropriated? (6)	Form of organization in reform sector (7)
Mexico	1917–34	PKR	6.3	11.3	100–200		Subfamily/family
	1934–40	TF	12.6	25.8	100–200	Yes	Subfamily/family, collective
	1940–76	FR	25.0	18.3	100–200		Subfamily/family
Total	1917–76		42.8	50.0			
Guatemala	1952–54	TF	33.6	33.0	90–200	Partially	Subfamily/family, cooperative
	1954–69	Counterreform	4.8	3.2			
Bolivia	1952–70	TJ	18.2	39.0	24–50,000	No	Subfamily/family
Venezuela	1959–70	TJ	15.7	14.7	No limit	No	Subfamily/family
Colombia	1961–68	PKR			No limit	No	Subfamily/family
	1968–72	TJ			No limit	No	Subfamily/family
Total	1961–72		9.6	4.2			
Chile	1962–67	PKR	—	—	No limit	No	Subfamily/family
	1967–70	TF	9.0	6.0	80 SBHI	Partially	Subfamily/family, cooperative
	1970–73		31.0	14.0			Cooperative, collective
Total	1962–73		40.0	20.0			
	1973–75	Counterreform	9.0	4.0			Subfamily/family
Peru	1963–69	TJ	3.0	7.1	845–12,675	No	Subfamily/family
	1969–76	JF	39.4	24.9	35–1,500	Yes	Cooperative, subfamily/family
Total	1963–76		42.4	32.0			
Ecuador	1964–69	TJ	1.1	3.5	No limit	No	Subfamily/family
Dominican Republic	1963–69	FR	2.0	2.0	No limit	No	Subfamily/family, cooperative

Source: de Janvry (1981), pp. 206–207

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incentive to farmers to expand production in spite of disincentives resulting from market interventions or exchange rate distortions that discriminate against farmers in product markets.

Prior to the 1970s, a large share of the development assistance devoted to agricultural credit programs was directed to Latin America. Since the early 1970s, the support of the development of agricultural credit institutions has been directed more heavily toward Asia and Africa. In this section, I first review some of the lessons from the experience of the 1950s and 1960s and then proceed to discuss the implications of the large programs of the 1970s.

(a) *Credit programs of the 1950s and 1960s*[16]

In Latin America, funds for credit activities made up a relatively large part of externally financed agricultural programs.

> In the ten years 1960 to 1969 the Agency for International Development (AID), the Inter-American Development Bank (IDB), and the World Bank group (IBRD) provided dollar assistance for agricultural credit worth approximately $915 million in Latin America. (Adams, 1971, p. 163)

In the case of AID, over half of the total direct assistance to agriculture in Latin America has gone into credit activities. In addition to this direct assistance, AID has helped channel to agricultural credit institutions substantial amounts of "counterpart funds" and "local currencies" resulting from Program Loans and Public Law 480 sales in several countries. IBRD stressed livestock loans. IDB tended to support colonization and farm settlement programs. AID emphasized technical assistance to credit institutions, supervised credit to family-size farms, and general expansion of loans to agriculture.

During this period, organization of rural credit markets in Asia and Africa differed sharply from those in Latin America. Studies of credit markets in Asia and Africa indicated that informal credit systems (private individuals, money lenders, and merchants) provided a large part of the total rural credit, perhaps over 80% in many areas. The data for Latin America suggested a much smaller role for informal credit.

During the mid- and late 1960s, data and analysis became available that raised serious questions concerning the assumptions on which the credit programs of the 1950s and 1960s had been based (Blitz and Long, 1965; Thisyamondol *et al.*, 1965; Long, 1968a, b; Bottomley, 1963, 1975; Adams, 1971). There was a tendency to grossly underestimate elasticity of supply of savings in rural areas. Savings and capital formation by peasant farmers were shown to be responsive to profitable investment opportunities. In the Philippines, for example, capital formation was more rapid in areas of new settlement (Trinidad, 1964) and on farms engaged in the production of commodities experiencing rapid growth in productivity (de Guzman, 1964). In the 1950s and 1960s, Taiwan was quite successful in mobilizing voluntary savings by raising interest rates. This experience was repeated in Korea in the late 1960s (Adams, 1978).

The most obvious effect of failure to maintain positive real rates of interest in credit markets was the exaggeration of credit needs and the erosion of the purchasing power of credit portfolios. Other effects include the concentration of credit in the hands of relatively few users; failure of fragmented financial markets to allocate financial resources efficiently; undermining of the vitality of financial markets; and the politicization of financial markets.

The experience of the ACAR program in Brazil is a useful illustration of some of these effects. The ACAR (Associacão de Crédito e Assistencia Rural) was established in 1948 under the joint sponsorship of the state of Minas Gerais and the American International Association.[17] In 1960, ACAR became an independent, solely Brazilian agency. ACAR began as an experimental effort to test the conviction that a program of supervised credit similar to that developed by the US Farm Security Administration would lead to both better living conditions in rural areas and increased agricultural production. The program as it evolved during the first few years included four activities: supervised credit, general farm and home extension education, medical care and health education, and distribution of materials. Approximately 80% of the total activity was, in the early years, accounted for by supervised credit and general extension.

A 1957 evaluation by Mosher concluded that the ACAR program had exerted a substantial impact on the levels of living and the agricultural resources of the families with which it had worked. The program had not, however, had a measurable impact on agricultural production in either Brazil, the state of Minas Gerais, or "even the Municipalities (countries) in which the program has operated" (Mosher, 1957, p. 71). Later evaluations by Wharton (1960), and by Riberio and Wharton (1969) confirmed the contribution of the ACAR program to the welfare of the individual families who have participated in it. It has been particularly effective in reaching small

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farmers, and it established an enviable record for effective administration and flexibility in response to the changing needs of the farmers it served. As an example of a combined package of supervised credit and extension, the ACAR program was clearly one of the model programs anywhere in the developing world

At the same time, the performance of the ACAR program as an instrument of agricultural development was disappointing. Part of the difficulty centered around the issue of concessionary credit. The nominal interest rate charged on ACAR loans ranged from 6 to 8%. The annual rate of inflation in Brazil fluctuated between 15 and 25% in the 1950s and averaged slightly more than 30% during the 1960s. At such rates of inflation, persons securing ACAR loans were, in effect, receiving very substantial income transfers through the negative real rates of interest in the formal credit market. The interest rate subsidy reinforced the incentive resulting from exchange rate distortions for ACAR farmers to overinvest in capital assets. The interest rate subsidy also helps to explain Wharton's earlier finding that farmers in the largely subsistence areas (Corvelo) achieved greater gains in productivity than farmers in the more commercial farming area (Uba). The commercial farmers were in a better position to follow a strategy of maximizing net worth than the subsistence farmers.

The ACAR program illustrates two important problems that have continued to plague credit development programs: (1) The policies that were adopted to reduce the cost of credit to farmers were inconsistent with the development of institutions capable of mobilizing savings in rural areas. (2) The costs of extending and servicing users' loans were high relative to the value of loans extended. In addition, inflation contributed to the erosion of the financial resources allocated to the credit program.

(b) *Agricultural credit programs in the 1970s*

The emphasis on agricultural credit by the US Agency for International Development is illustrated in Table 4. AID support for agricultural credit programs since the early 1970s has leveled off or possibly decreased while agricultural credit became more important in the portfolios of the World Bank (1975, pp. 72, 85).

There has been, until fairly recently, surprisingly little research directed to evaluating the results of agricultural credit programs. The very comprehensive AID *Spring Review of Small Farmer Credit* (1973) contained about 60 papers describing credit programs. But there was no paper that systematically assessed the farm-level impact of the credit programs. During the last 10 years, the number of impact studies has increased. A critical review of these studies has been conducted by David and Meyer (1980). They classify the studies into three groups: (a) descriptive, (b) econometric and (c) programming — based on the methodology used in the studies. A common pattern seemed to emerge from the studies. "Borrowers had larger farms than non-borrowers . . . . Operating expenses and investment per hectare were higher for borrowers, but production differences were less marked. Moreover, net farm income per hectare, when reported, was roughly the same" (p. 207). The results are similar to the ACAR program discussed earlier.

(c) *Credit system viability*

During the last decade, there has been a growing interest in evaluating the viability of the specialized farm credit institutions (SFCI) supported by external donors. A common feature of these programs has been the provision of credit to farmers at subsidized rates of interest and access to concessionary rediscount lines from central banks. This has driven a wedge between the mobilization of rural savings and the provision of credit on favorable terms to farmers. The result has been that the specialized farm credit institutions are dependent on the continuation of donor or national government support for their existence (Bourne and Graham, 1984). When such support is withdrawn, the capacity of the agency erodes. A "natural history" of the performance pattern of specialized farm credit institutions developed by Von Pischke (1980) is outlined in Figure 1.

It is quite remarkable that the lessons learned from the more recent farm-level and credit system impact studies tend to confirm the lessons learned from the studies in the 1950s and 1960s of the ACAR program. Among these lessons are the following:

- Credit is fungible. Subsidized production credit can and is used to sustain current consumption levels, invest in consumer durables, and invest in land and relatively low productivity capital inputs.
- When credit is made available at below market interest rates (sometimes at negative real rates) it must be rationed by lenders. When credit is rationed, it flows to the larger borrowers. Programs designed to subsidized credit for the poor end up

Table 4. *AID agricultural credit projects (millions of dollars)*

	1950–72	1974–80	1974–80*
Grants	69.5	90.0	344.4
Loans	636.9	131.0	263.9
Grants and loans not separated		45.8	331.7
Total	706.4	266.8	910.0

Source: Larson and Vogel (1981). The data are from AID, *History of AID Programs in Agricultural Credit*, Spring Review of Small Farmer Credit, Vol. XVIII (Washington, D.C.: June 1973); and AID, Summary Computer Listing of Agricultural Credit Projects (Washington, D.C.: June 1981).
*Additional projects containing an agricultural credit component for which amounts allocated to agricultural credit are not shown separately in AID summary statistics.

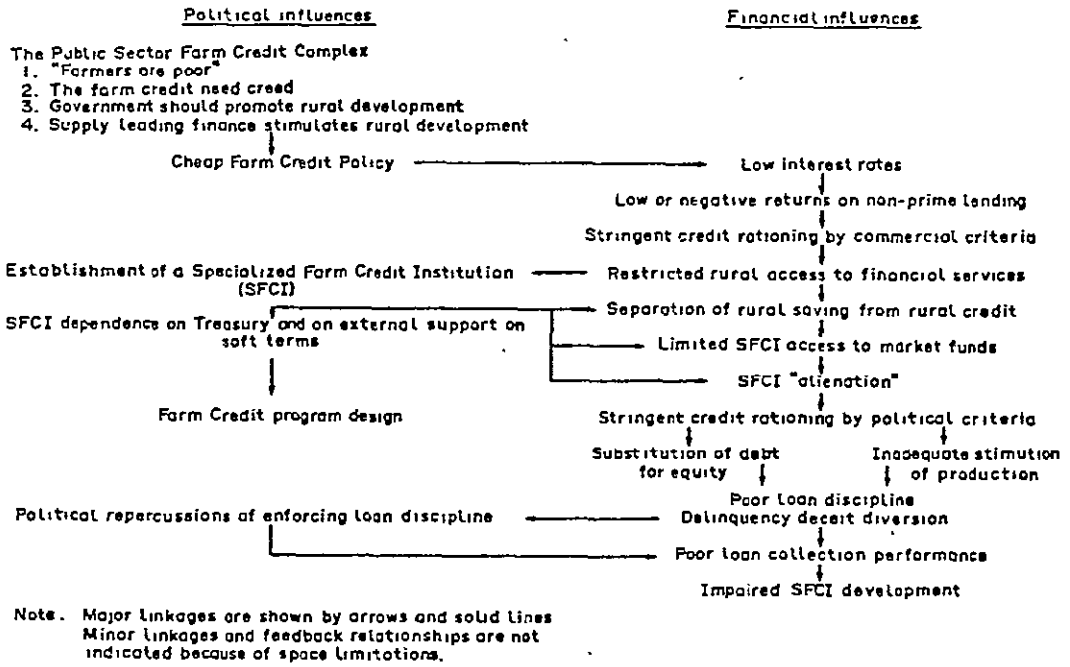

Figure 1. *A performance pattern of specialized farm credit institutions in low-income countries.* Source: Von Pischke (1980).

making loans less available to them than if a market rate of interest were charged.

— Subsidized credit projects often contribute to a decline in the viability of agricultural credit institutions. If agricultural credit institutions are to be viable they must solve both the problem of credit mobilization and the problem of credit access. Excessive concern with the issue of credit access has made it impossible to solve the problem of mobilizing voluntary financial saving.

Why, if these lessons have been apparent for so long, did both bilateral and multilateral assistance agencies engage in such rapid expansion of support of specialized agricultural credit institutions during the 1970s? The answer must

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be found in the economics and politics of development assistance (Adams and Graham, 1981; Kane, 1984). From the donor's perspective, it takes less effort and less skill to transfer money at below market rates to national agricultural credit institutions than almost any other form of development assistance. It is technical assistance "extensive" rather than technical assistance "intensive." There are similar advantages from the perspective of the recipient country. Because money is fungible, it provides the recipient country with foreign exchange with very few effective constraints on its use. Furthermore, lending money at below the market rate of interest, particularly when it can be divorced from a simultaneous savings mobilization effort, also requires relatively little skill on the part of LDC institutions. And, the concentration of benefits in the hands of larger borrowers may have more political advantages than disadvantages. The benefits of the subsidy are highly concentrated and the costs are both hidden and diffuse.

6. SOME CONCLUSIONS

In this paper, we have reviewed the literature on the impact of assistance to expand agricultural production through programs and investments in (a) land and water development, (b) agricultural research, (c) agricultural extension, (d) land tenure reform, and (e) agricultural credit markets. There are other areas that we have not attempted to review. These include the development of product market institutions, including cooperative marketing organizations, and price support or stabilization programs.

Perhaps the most striking observation that emerges from this review is that of the continuous cycling of program priorities and thrusts. Most of the program areas that have been reviewed have experienced one or more such cycles. Extension programs, for example, were emphasized in the 1950s, deemphasized in the 1960s, and emerged again as a major area of development assistance in the 1970s. Assistance for agricultural research emphasized the building of national systems in the 1950s and 1960s, the development of the international system in the 1970s, and a new emphasis on strengthening national systems in the late 1970s and 1980s.

A second striking feature of the programs that have been reviewed is the failure to learn from failure. Credit programs are a major example. The failure to achieve effective articulation between the engineering aspects and the management aspects of irrigation projects is another.

In spite of these problems, the rates of return to several areas of investment, when effectively carried out, are very high. The payoff to agricultural research has typically been very high and the payoff to land and water development, particularly in situations where rapid technical change is also underway, has at times also been high.

The reform of land tenure arrangements and the development of effective rural credit institutions are also important for agricultural development. Both areas are subject to severe program distortions resulting from the bias in the distribution of political resources. Opportunity for effective assistance by external agencies in these areas is highly dependent on indigenous demand for economic and political reform.

Greater attention to issues of institutional design and reform implies larger investments by the donor community in social science research. There has been a pervasive tendency on the part of assistance agencies to assume that the knowledge needed for institutional design and reform — of water resource management institutions, for incentives to adopt new technology, or for the organization of productive agricultural extension services, for example, — could be made available to developing countries through consultation and technical assistance. One of the lessons that the assistance community learned in the 1950s and 1960s is that biological technology in agriculture is relatively location-specific — it must be invented or developed in the agroclimatic region where it is to be used. This same lesson applies with equal force to institutional design and reform (Hayami and Rutten, 1985, pp. 94–114).

Throughout history, improvements in institutional performance have occurred primarily through the slow accumulation of successful precedent, experience, and expertise. Institutional change was generated through a process of trial and error much in the same manner that technical change was generated prior to the invention of the research university, the agricultural experiment station, or the industrial research laboratory. With the institutionalization of research in the social sciences and related professions, it has become increasingly possible to substitute social science knowledge and analytical skill for the more expensive process of learning by trial and error. The development assistance agencies have been slow to acquire the capacity in social science research needed to strengthen their own programs or to support the development of social science capacity in developing countries.

There is also a major theme that emerges from our review of assistance to agricultural develop-

ment. That is the dynamic interrelationship between technical and institutional change. Technical changes capable of generating large new income streams at relatively low cost have been an essential condition for the success of other agricultural development programs. Similarly, investments in physical and institutional infrastructures have been essential in enabling countries to realize the contributions to economic growth opened up by advances in agricultural technology. In the absence of technical change, incentives for physical and institutional infrastructure investment have been weak. But, inadequate attention on the part of development assistance agencies to the institutional design and reform continues to represent a major source of failure in assistance for agricultural development.

NOTES

1. For a more complete treatment of the history of the Indus Basin Project see Nulty (1972), Johnson *et al.* (1980), USAID (1982), Falcon and Gotsch (1968), Gotsch and Brown (1980), Painter *et al.* (1982).

2. See, for example, the annotated bibliography prepared by Ellingson and Easter (1982).

3. This section summarizes material treated in considerably more detail in two previous reviews (Arndt *et al.*, 1977; Ruttan, 1982a). Other useful studies include Moseman (1970); Committee on African Agricultural Research Capabilities (1974); Drilon (1976, 1977), Trigo *et al.* (1982), and UNDP/FAO (1984). The Trigo *et al.* study is based on a series of studies conducted under the project on National Agricultural Research Systems in Latin America by the Interamerican Institute for Agricultural Cooperation (IICA). For an attempt to document the growth in resources allocated to the support of agricultural research by national governments and assistance agencies, see Boyce and Evenson (1975) and Oran and Bindlish (1981).

4. Many of the issues involved in the success and failure of donor support for national agricultural research systems are illustrated in the Indian experience (Ruttan, 1982a, pp. 90–96; Brass, 1982).

5. The contribution of research to increased agricultural productivity has been studied primarily by two methods. The estimates listed under the "index number" subheading in Table 2 were computed directly from the costs and benefits of research on, for example, hybrid corn. Benefits were estimated by using accounting methods to measure the increase in production attributed to hybrid corn. The contribution of research was usually measured as the residual after all other factors that contributed to increased production were accounted for. The calculated returns represent the average rate of return per dollar invested over the period studied, with the benefits of past research assumed to continue indefinitely. Benefits are defined as the benefits retained in the form of higher incomes to producers or passed on to consumers in the form of lower food prices. The estimates listed under the "regression analysis" subheading are computed by a different method, which permits estimation of the incremental return from increased investment rather than the average return from all investment. Further, this method can assign parts of the return to different sources, such as scientific research and extension advice. Because regression methods are used, the significance of the estimated returns from research can be tested statistically. The dependent variable is the change in total productivity, and benefit is defined as the value of the change in productivity. The independent variables include research variables, which reflect the cost of research and the lag between investment and benefit. The objective of the regression procedure is to estimate that component of the change in productivity that can be attributed to research.

6. Moseman (1970, pp. 69, 71) argued that the "extension bias" was partially based on the successful transfer of hybrid corn technology from the United States to Western Europe under the Marshall Plan. This transfer was successful because climate in Western Europe is reasonably close to that in the corn-producing areas in the United States, and there was indigenous human capital in the form of agricultural scientists and technicians in Europe to conduct adaptive research. For a review of the literature of the 1950s and 1960s on agricultural technology transfer, see Hayami and Ruttan (1971, pp. 169–237).

7. In spite of the deemphasis on extension, the US Agency for International Development was, in the mid-1970s, continuing to allocate close to $100 million per year in support of agricultural extension activities (Stavis, 1979, p. 12).

8. The "Training and Visit System" has been described in Benor and Harrison (1977). See also the reviews by Stavis (1979), Lowdermilk (1981), Cernea *et al.* (1983) and Moore (1985). In 1984, the World Bank issued a revised version of the 1977 publication (Benor *et al.*) and a more detailed training manual (Benor and Baxter).

9. The evidence on these concerns appears mixed. George Axinn, commenting on experience in Haryana (India), notes:

> On the positive side: discipline seems to be holding up. The agricultural development officers are visiting eight groups of farmers fortnightly on a regular schedule — with 80 to 100 farmers per group . . . . The Circle Officers visit eight ADOs regularly. And the subject matter specialists do conduct regular training — every other Friday for each group of

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> ADOs, getting some training from research workers and others in between . . . Leadership and top management — at least in Haryana State of India — seems to be vigorous, disciplined, skillful, and getting on with the tasks well. (Quoted in Lowdermilk, 1981, Annex II)

Later, however, Axinn points to a noticeable lack of a reward system for performance within the T & V system and speculates that this may lead to a decline in the momentum of the program (Lowdermilk, 1981, Annex III).

10. Benor suggests selection by the extension worker in consultation with local officials. This may be the best way of choosing contact farmers who are most in line with the T & V system's criteria for socioeconomic status, credibility, influence, and role in the community. However, Anne Van de Ban of the Agricultural University, Netherlands, expresses this concern:

> I am afraid that too often the contact farmers are those farmers who are already interested in cooperating with the extension service. This means that these are farmers with a better education and more resources than the average farmer. In such a situation it is not sure that the other farmers will follow their example. (Quoted in Lowdermilk, 1981: Annex III)

11. For case studies of the operation and impact of T & V programs in several Asian countries, see Cernea *et al.* (1983). For a more critical assessment, see Moore (1984). It is useful to compare these assessments with the more rigorous assessment of the Intensive Agricultural Districts Program by Evenson and Kislev (1975, pp. 107–119).

12. Much of the history of US support for land reform in East Asia can be written around the remarkable career of Wolf Ladejinsky (Walinsky, 1977). For reviews of the land reform efforts and accomplishments of the 1950s and 1960s, see Feder (1965), Raup (1967), Ruttan (1969), Warriner (1969), US Agency for International Development (1970), Dorner (1971), and de Janvry (1981).

13. According to Feder (1965), "the best visible result of the Alliance (for Progress) seems to be the enactment of a large number of land reform laws, which have become effective instruments not for carrying out large scale reforms but for stalling them" (p. 652). Kusum Nair (1962) argued that "though since 1947, India has enacted perhaps more land reform legislation than any other country in the world, it has not succeeded in changing in any essentials the power pattern, the deep economic disparities, nor the traditional hierarchical nature of inter-group relationships which govern the economic life of village society" (p. 196). Ruttan (1969) noted that "a careful review of land reform efforts in Southeast Asia . . . would not reveal a single example of a successful land reform program when evaluated in terms of contributions to growth of productivity or production" (p. 593). In his review of land reform in South Asia, Herring (1983) comments that "the remarkable aspect of the land reform model is its persistence in the face of widely recognized failures (p. 17). Montgomery (1972) in a review of land reform experience concluded that "the outcome of land reform programs is strongly affected by administrative arrangements for their implementation. In a study of 25 countries, arrangements for devaluing administrative functions to local noncareer officials produced significantly better results for peasant welfare than arrangements using professional administrators, whether in a centralized or decentralized administrative system" (p. 62). Lipton (1974) emphasized the effects of inaction of reforms that have had the limited objective of tenancy reform rather than full real land redistribution, "landlords may well see unenforced or unenforceable tenancy reforms as an effective substitution for land redistribution" (p. 276).

14. The "new land tenure" literature has been reviewed by Binswanger and Rosenzweig (1981) and by Jaynes (1984). Among the important contributions to the reevaluation of this literature are Bardhan and Srinivasan (1971), Stiglitz (1974), Newbery (1975), Reid (1976), Newbery and Stiglitz (1979), Rosenzweig (1978), and Bell and Zusman (1976, 1980).

15. See, for example, the literature reviewed by Feder (1965), Dovring (1970), Dorner (1971), Eckstein *et al.* (1978), and de Janvry (1981). A remarkable feature of the Latin American literature is that there has been an almost complete failure to confront the arguments of the "new land tenure economics."

16. This section draws very heavily on the major review of agricultural credit programs conducted by the US Agency for International Development in 1972 and 1973 (USAID, 1973), on the review of the materials prepared for the US/AID agricultural credit review by Donald (1976); and on the discussion of agricultural credit programs by Hayami and Ruttan (1985).

17. Information on ACAR was drawn from Mosher (1957); Wharton (1960); and Ribeiro and Wharton (1969).

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AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: Parastatal Divestiture and Overcoming Constraints to Private Sector Growth **Date:** Tuesday, June 3
Lead Instructor: Meissner **Session #:** 2
Co-Trainer(s): **Time:** 10:30-12:00 pm

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OBJECTIVE(S): At the end of this session participants will be able to:

- o Identify possibilities of private sector participation in activities related to marketing and processing farm products and production inputs.
- o Develop concrete action programs for AID missions.

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ABSTRACT:

- o Origin of the term "privatization", definition of privatization methods, and review of accomplishments to date.
- o Overcoming constraints to the privatization of state-owned enterprises.
- o Incentives for the creation of new privitely-managed marketing and agri-businesses.
- o Jamaica Commodity Trading Corporation Case Study.

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READINGS: Required/Optional

- o Marceau, Ian, "Privatization in the Agricultural and Agribusiness Sectors," Paper presented at the AID International Conference on Privatization, Washington, February 17-19, 1986. X /___
- o Meissner, Frank, Jamaica Commodity Trading Corporation Case Study, 1986. X /___
- o Ghai, Yash, "The State and the Market in the Management of Public Enterprises in Africa," Public Enterprise, Vol. 6, No. 1, 1986. X /___

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PRIVATIZATION IN THE AGRICULTURAL AND AGRIBUSINESS SECTORS

by

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Presented at the U.S. AID International
Conference on Privatization,
Washington, D.C.
February 17-19, 1986

Canberra, A.C.T. 2601
Australia

January 1986

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Introduction

The most frequently recognized interventions by government in the agricultural economies of developing countries are the operations of marketing boards through which States attempt to exert monopoly control over production, pricing and marketing of agricultural products, especially food staples. These organizations have been dealt with in a companion paper by this author. There are many other, less well-known interventions which occur, carried out by statal or parastatal organizations implementing governmental policies through legal coercion.

In most developing countries, the heavy hand of government is found in the markets for agricultural production inputs such as seed, fertilizer, chemicals, farm equipment, fuel, irrigation water and land. Services such as extension and research and development (to the limited extent that they exist) are much more often than not the province of governmental ministries or parastatals. Provision and operation of infrastructure, the transportation, water supply, product storage and communications systems critical to effective agricultural economies are almost exclusively by governments, and in most LDCs, are heavily tilted toward urban interests at the expense of the rural sector. The importation of production inputs from more developed nations is often hampered by shortages of foreign exchange, resulting from external factors in export markets for agricultural and mineral products and worsened by the general incompetence of those who "manage" the

parastatals controlling export enterprises in many countries. Government-dictated currency exchange policies result in over-valued currencies which discriminate against export products in international markets while multiple exchange rates and tariffs, applied selectively by governments seeking to protect infant industries and to foster import substitution discriminate against rural interests in favor of urban areas where there is the need to create employment and to bestow favors to buy-off potential political opposition.

The parastatal organizations have, in most developing nations, access to financial resources at very low (or no) cost. They borrow with government guarantees, which lower their risk to investors and give them an advantage over the private sector in gaining access to domestic credit. They are usually free from public or private scrutiny in their operations, rarely being required to account for the expenditure of funds or to disclose losses. Profits are usually required to be returned to the Treasury, but this is a rare event. Being, as are the marketing boards, labour sinks, providers of sinecures to relatives, friends and political cronies of ruling elites and sources of enrichment for corrupt politicians and bureaucrats, the parastatals are not designed to operate as efficient economic entities with a motivation to make profits. Rather, they are political entities used by governments, through their regulatory powers, to reward political support and to punish opposition. Their regulatory powers provide opportunities for the seeking of

special benefits and favours by the politically influential. The small farmers, the key to effective economic development in many countries where agriculture is the engine that, properly fueled, would drive that development, are not among the politically potent.

The outcome of the selective use of the privilege and regulatory powers of the parastatals is that special interests important to the government benefit. Agro-industrial interests, urban-oriented and protected by tariffs and exchange-rate inflation, get low-cost agricultural products as raw materials as a result of low prices paid to farmers by marketing boards. Employers in industry and government get low-cost urban labour paid in large part by cheap food procured from the farmers. Governments get tax receipts extracted from farmers in the form of the low prices, to transfer to development projects benefitting urban interests. Bureaucrats and politicians get wealth and power by dispensing privilege. The small farmers, the drivers of the development engine, get very little incentive to produce marketable surpluses and, practising normal risk-aversion, retreat into subsistence and barter. Where the withdrawal is not complete, the small farmer enters the informal (illegal) economy, relying for inputs and sale of products on the private traders that operate, usually with impunity, parallel to and in competition with the parastatals.

The involvement of these inefficient enterprises in the agricultural and agribusiness sector markets for inputs, capital

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and products of course results in price distortions and misallocation of resources and contributes to economic inefficiency. Therefore, from an economic viewpoint, the parastatals are harmful and should, in the opinion of some, be abolished forthwith, to be replaced by private sector activities.

However, because they contribute to maintaining governments in power, the parastatals often contribute to stability in inherently unstable areas. They are therefore politically effective and have been and are likely to be retained by governments acting in their own self-interest, regardless of their economic inefficiency.

International donor organizations therefore are faced with the problem of how to improve the effectiveness of development assistance in the face of the parastatals' continued existence, at least in the short term. The problem becomes one of improving the economic efficiency of the recipient governments' policies while recognizing that these policies will continue to be implemented through parastatal organizations.

The Dimensions of the Problem

In many developing nations, the parastatals number in the hundreds. In those countries in which agriculture and agribusiness are significant contributors to G.N.P, many of the parastatals are concentrated in those sectors. Although the data on parastatal involvement by sectors in developing countries are poor and there are no reliable quantitative data

on the amounts of investment by public and private enterprises in agriculture or agribusiness, the scope of parastatal involvement is illustrated by the following.

o In a 1983 World Bank report on state-owned enterprises (SOEs), Mary Shirley reported that in the early 1980's, the non-financial SOE share of total domestic credit in developing countries ranged from a low of 7.2 percent in Jamaica to 91.5 percent in Indonesia. These statal and parastatal organizations (including agricultural and agribusiness enterprises) were responsible for more than 25 percent of domestic credit in (then) Upper Volta, Ivory Coast, Niger, Somalia, Mali, Senegal, Bangladesh, Bolivia, Gambia, Benin, Burma, Guinea and Indonesia. Fifty percent of 1980 government tax revenues in Brazil were transferred to state-owned enterprises, while between 1976 and 1980 the government of Peru assumed foreign debts incurred by SOEs in an amount totalling 31 percent of the total foreign public debt of that nation in 1980.

o In a 1981 World Bank report on Sub-Saharan Africa, Elliot Berg and others examined the procurement and distribution of agricultural production inputs in 39 countries of the Sub-Saharan region. They reported that:

-- With respect to fertilizer supply, in only four countries, Kenya, Zimbabwe, Swaziland and Mauritius was there private-sector supply. In nine countries, there existed mixed private-public supply. In the remaining 26 countries, fertilizers were procured and distributed by the public sector.

-- The same pattern applied to seed supply, chemical supply and farm equipment supply.

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Since in almost all countries of the region these agricultural inputs are imported, it is obvious that the roles of the state enterprises in most nations are pervasive throughout the factor markets from the national arena down to the individual farmer. When combined with the marketing parastatals, it becomes evident that the involvement of government is pervasive throughout the agricultural and agribusiness sectors.

It is noteworthy that while most nations of the Sub-Saharan region experienced decreases in per capita agricultural production during the period 1969-71 to 1977-79, increases were achieved in Kenya, Swaziland and Mauritius, three of the countries where the private sector dominates the procurement and distribution of agricultural inputs.

Issues in Privatizing the Agricultural and Agribusiness Sectors

In addition to the involvement in these sectors by the marketing boards, discussed in a companion paper by this author, governments intervene using statal and parastatal enterprises in all facets of the agricultural industries of developing countries. The issues for consideration in privatization of the agricultural and agribusiness sectors are as follows.

Production Inputs. Involvement in the procurement and distribution of physical inputs, seeds, fertilizer, chemicals and equipment by state enterprises is pervasive. The argument made by the proponents of this situation are that in developing countries with poor infrastructure and means of delivery, limited resources and scarce foreign exchange, it is necessary for effective delivery of inputs to those producers most

important to the economy that centralized coordination be undertaken.

The question that arises concerns the relative efficacy of private or centralized governmental procurement and distribution in stimulating agricultural output in developing nations. The fact that the Sub-Saharan nations in which the private sector is ascendent increased their per capita agricultural output while those with extensive governmental involvement experienced per capita decreases strongly suggests that the proponents of centralism are incorrect. Experience in recent years in fertilizer distribution by private traders in Bangladesh provides further evidence that private-sector handling of production inputs can be undertaken successfully in developing countries.

The issues to be dealt with in privatizing procurement and distribution of production inputs are:

- o methods of devolving to private traders the monopoly powers of the parastatals;
- o mechanisms for facilitating access of traders to the capital needed to finance procurement and marketing of inputs. Of particular importance is access to foreign exchange at real exchange rates;
- o the role of government in providing the transportation and communications infrastructure necessary to facilitate access of traders to rural market centres.
- o the proper role of government in facilitating availability of credit enabling farmers to buy production inputs at non-subsidized market prices.

Capital Resources

The available data show that in many developing countries the statal and parastatal enterprises, having access to cheap (or free) capital and enhanced borrowing power due to governmental loan guarantees, consume a large proportion of the domestic and foreign credit available.

Since access to capital by private businesses and their farmer customers is crucial to privatization of the agribusiness and agricultural sectors, the key issues to be addressed are:

o ways of decreasing the unfair advantage of the parastatals over private interests in credit markets;

o removal of barriers, including artificial exchange rates, to the availability of the foreign exchange required by the private sector to purchase production inputs from abroad.

Land and Capital Investments.

Given the availability through the private sector of the necessary inputs and financing, the remaining key to privatization of the agricultural and agribusiness sectors is the sanctity of property rights. Without the guarantee of long-term interest in the land required to farm and the capital goods needed by entrepreneurs to engage in business, privatization will fail.

Therefore, the issue here is the development of ways to guarantee the rights in property or in the use of property by the individual in the private sector. Thus the issue is that of guaranteeing either the right to ownership and reasonably unfettered use or the right of access to resources over the long term for reasonable purposes.

Options for Privatizing the Agricultural and Agribusiness Sectors

The options available for privatizing these sectors are as follows.

o With respect to production inputs:

-- devolution to the private sector of the present monopoly powers of the parastatals can be accomplished only by governments making policy decisions to do so. The case of Mali and the removal of the monopoly powers of the grain parastatal OPAM provides a model. The key to the donors group's success in inducing the government of Mali to change its policy to a free market stance was the provision of guaranteed financial assistance in buffering the privatization process. A similar approach of conditional inducement could be used for other parastatals.

-- facilitation of access by the private sector to the financial capital required to fund procurement and distribution of agricultural inputs by agribusiness can be achieved by removing restrictions on the ownership of or access to the foreign currencies needed to purchase these inputs abroad, where necessary. Of importance here is the requirement that artificial exchange rates maintained by many countries be abolished.

-- concerning the provision of infrastructure, especially transportation and communications, a recent survey of the situation in Sub-Saharan Africa by this author has shown that the likelihood of privatization of these services is extremely remote. Therefore, to facilitate privatization of other components of the agribusiness sector, the most feasible

option is to use conditional aid to change the urban-tilted policies of most governments to ones which more equally share resources with rural regions.

-- to provide farmers with access to credit adequate to enable them to purchase production inputs at market prices, the most attractive option is the establishment of rural credit programs, charging market interest rates and backed by governmental loan guarantees. To assist in the early stages, donors could consider concessional assistance to induce this policy change.

o With respect to capital resources:

-- to decrease the competitive advantage of the remaining parastatals in credit markets, they should be required to borrow at market interest rates and should not be protected from their own poor management by government loan guarantees.

-- the removal of barriers to private acquisition of foreign exchange has been discussed above.

o With respect to land and capital investments:

-- constitutional or at least statutory protections against expropriation of private property should be put in place and protected by appropriate judicial procedures;

-- where private ownership is not appropriate, statutory rights of usage of resources under leasehold or other legally enforceable forms should be established. This is common practice in the U.S. where forest lands are often publicly owned but guaranteed private use has allowed a long-term forest products industry to develop.

JAMAICA COMMODITY TRADING CORPORATION (JCTC):

A Candidate for Privatization? 1/

by

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"We most seize the commanding heights of trade... The state can do better than private entrepreneurs. By buying in volume we can negotiate better prices; by shipping in large volumes, costs can be lowered."

Michael Manley,
Prime Minister of Jamaica, 1972 2/

"These government guys always think they can do better. How can they? If they were better than me, they would be trading."

Private Trader 2/

"Reagan Administration officials have declared that the extent of United States assistance for some developing countries will depend on their efforts to transfer public assets and programs to private industry."

New York Times, February 20, 1986 3/

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Abstract

1. In the Beginning there was Jamaica Nutrition Holding (JNH)
2. From JNH to JCTC
3. Growing Professionalism
4. Conclusions
5. Roads Ahead

Figure 1 - Organization Chart of JCTC

1/ Paper prepared for presentation to the International Conference on Marketing and Development, to be held in Istanbul (Turkey), September 1-4, 1986.

2/ Quoted by John Freivalds, The Good, the Bad and the Underrated, Foreign Trade, June 1985.

3/ Martin Tolchin, US Links some Foreign Aid to Privatization, New York Times, February 20, 1986, A13.

ABSTRACT

During 1972-80, when Prime Minister Michael Manley was in power, the Government played an active role in the economy. In agriculture some 75 government agencies were involved in financing, marketing, export, input supply, price controls, subsidies, import licensing, direct ownership as well as participation in commercial operation of agricultural enterprises and services.

Shortage of qualified manpower made it difficult for MINAG to effectively supervise or regulate these operations. Existing farms were not adequately maintained. As a result, valuable rural properties deteriorated. Since November 1980, when Prime Minister Seaga took over, a gradual privatization of many public sector activities were being energetically pursued. A Structural Adjustment Program (SAP), prepared with IBRD assistance, helped define objectives and set general agricultural policies aimed at achieving a better and more efficient allocation of resources. The Agro-21 program, initiated in 1983, provided specific policy guidelines for identification of suitable alternative means to manage and operate some of the Government's own properties and organizations such as sugar factories, AMC, Agricultural Marketing Corporation, crop boards, the Jamaica Commodity Trading Corporations (JCTC)...

The current Government specifically aims to attract new agricultural investments from private local or foreign sources as well as bilateral and multilateral development agencies.

This paper is a case study of JCTC, one of the candidates for privatization.

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1. IN THE BEGINNING THERE WAS THE JAMAICA NUTRITION HOLDINGS (JNH)

Prior to establishment of JCTC in 1972 domestic and international trade was carried out by local and foreign private companies. When Mr. Manley became Prime Minister in 1972 he contended that big private commodity importers, such as Pillsbury and Central Soya were allegedly making "excessive profits" by importing grain, using wheat to make flour or animal feeds.

When Mr. Manley became Prime Minister, he idealistically believed that the state, by buying in volume, could negotiate better prices and by shipping in larger volumes lower costs. He was therefore instrumental in the creation of Jamaica Nutrition Holdings (JNH). JNH was given monopoly on imports of agricultural commodities. Its first offices were set up in New Kingston with a lot of enthusiasm but no expertise. On the first trade handled by JNH, the buyer thought he had made a terrific deal. Imagine his dismay when he found out the difference between metric and short tons.

Soon thereafter, traders, who dealt with Jamaica, started to wonder about the business style of JNH's first managing director: fancy offices and china, stylist furniture and secretaries. It was a little too luxurious for a government bureaucrat. On one occasion, the Director flew to New Zealand to negotiate purchases of butter. Given New Zealand's surpluses and its desperation to sell them, traders there would have raced to Jamaica overnight to get any business.

Once a bureaucracy gets going there is no way to stop it. JNH grew, hired more people and moved to even larger offices. New subsidiaries were formed: Jamaica Building Supplies (JBS), Jamaica Pharmaceutical and Equipment (JPE), and Jamaica Textile Imports (JTI). JNH also began to import leather, newsprint and to act as a bilateral negotiating arm for the government.

2. FROM JNH TO JAMAICA COMMODITY TRADING CORPORATION (JCTC)

In 1981, rather than reshape JNH, Prime Minister Seaga decided to consolidate its functions into a newly formed Jamaica Commodity Trading Company (JCTC), a multiple purpose public agency aimed to:

(a) put the country in a position to benefit from opportunities created by government-to-government relations;

(b) diversify sources of supply so as to reduce dependence on traditional trading partners thus providing a basis for greater economic independence;

(c) provide savings from bulk buying, improved credit facilities, lower shipping charges;

(d) improve the value obtained from prudent use of the country's scarce foreign exchange;

(e) get better prices to consumers; and

(f) stabilize prices of basic commodities.

With this broad mandate JCTC became the sole importer, through its subsidiaries, of:

(a) basic food items, drugs, medical supplies and equipment;

(b) high cost high-volume building materials raw materials and intermediate goods for textile and footwear manufacturing;

(c) fertilizers, agricultural chemicals and tools; educational materials and equipment; and

(d) special orders from public and private organizations.

The change of name from Jamaica Nutrition Holdings (JNH) to Jamaica Commodity Trading Corporation (JCTC) did not change the attitudes of some of the politically appointed executives. Major commodity suppliers of Jamaica noticed irregularities in trading practices. Yet government officials, overseeing JCTC, did not come to this realization for some time. To them, JCTC was an above-board government trading and shipping operation that was replacing the profit oriented and allegedly inefficient way of doing things of the private sector.

The illicit transactions became public through a front page exposure in the Washington Post. As a result, the government ordered a "no holds barred" investigation. It yielded sufficient documentation to get substantial out-of-court settlements from foreign companies involved, as well as to get a judgment against the Managing Director and a Washington broker.

Frauds in shipping and in commodity buying were involved. JCTC officials had told the Washington broker to fix all freight for Jamaica, in return for a portion of a "kick back." On the commodity side, JCTC's manager created two dummy trading firms in Belgium and Liberia. All commodity purchases were conducted through these firms for a commission. The 1981 yearbook of Jamaica Commodity Trading Company dryly noted, "the company was informed of the allegations of dishonest practices of Mr. Dexter Rose and Mr. Sedley Pyne, ex-employees of JCTC. Following intensive investigations in the US and locally, JCTC filed a number of civil suits in the District and Supreme Courts of Washington, D.C., to recover amounts improperly earned by the two former employees and other individuals."

In May 1981, pre-trial settlements were reached in all the suits, except the one filed against Rose and Pyne. The total settlement figure was US$1.2 million. The case against Rose and Pyne went to trial in July 1982, and the jury awarded JCTC a total of US$358,000 in compensatory damages and US$500,000 in punitive damages.

JCTC was unable to recover any money from these individuals.

3. GROWING PROFESSIONALISM

The adverse publicity, accompanying the suits against D. Rose and S. Pyne, made it clear that a public entity, handling US$250 million annually --an enormous amount of money within the context of the Jamaican economy-- had to be run by professionals rather than political cronies. Thus the first two Managing Directors of JCTC were civil servants, without previous trading experience. The third was O.K. Melhado, descendant of a long line of private traders.

Jamaica's economic situation continued to worsen. Means had to be found to obtain goods the country needed. Barter, which had been merely talked about as an intellectual curiosity, became an economic necessity.

Apart from bauxite and alumina, Jamaica had little to offer for sale. The first major barter involved bauxite, to be added to the US strategic stockpile, in exchange of surplus US butter and skim milk powder.

Exchange of alumina for Chrysler trucks was performed in the following manner: The Bauxite and Alumina Trading Company gave 50,000 tons of alumina to Metallgesellschaft, a German firm. MG sold the alumina to a refiner, and passed on the sales revenues --minus a commission-- to Chrysler's European American Bank. EAB sent part of the money to the Bauxite and Alumina Trading Company. The rest financed a letter of credit made out to Chrysler, which then shipped trucks to Jamaica. Title to trucks was taken by JCTC, which sold the vehicles to a local distributor.

In another 3-year trade agreement, JCTC bartered 170,000 tons of alumina for 811 trucks worth US$6 million. Soyameal was bartered for Guyanese rice, bauxite and alumina for Soviet cars....

JCTC owned 60% of a soybean processing plant on the island. Due to Jamaica's fragile economic position the plant was not operating at capacity. Together with its US joint venture partners, JCTC proposed to buy soybeans in excess of Jamaica's needs under a long term credit from the US government. The soybeans would be processed in Jamaica and the soyameal exported to Caribbean markets. The dollar sales of the soyameal would then be used to purchase the $2 million worth of fire fighting equipment needed on the island; the imported soybeans would be paid off with a long term P.L. 480 and GSM 102 commodity credit programs.

Like many other proposed barter trades, this ingenious transaction did not come off; the foreign exchange savings were simply not as large as initially anticipated.

All these endeavors got JCTC a lot of publicity. A story on its Chrysler trade was featured in Fortune magazine. Dollar savings were realized from some more routine transactions. JCTC was able to import pharmaceuticals at an overall cost to the country of about half of the previous expenditures. The reduction in cost allowed the government to remove some subsidies on drugs while reducting consumer pricea from 20 to 30%.

JCTC had to use Jamaican bottoms to move imported grain. While JCTC might make a good FOB Gulf purchase of grain, the shipments often arrived late, causing substantial barge demurrage charges. Yet, the use of Jamaican ships provided the trade-off in that a significant portion of freight was paid in Jamaican dollars. Furthermore, there was greater flexibility in scheduling 1/.

JCTC also coordinates activities with suppliers and joint venture partners. JCTC's soybean processing plant joint venture had begun operating in 1978. Local import substitution and subsidies were then order of the day. After Jamaica's conservative Primer Minister Edward Seaga took office, he ordered all import substitution businesses re-evaluated. If they were not making a contribution to the economy, they would be done away with JCTC's Board thus reviewed the joint venture known as Jamaica Soya Products Industries. A local accounting firm was assigned the task of evaluating the economic impact of the plant, while a technical consultant checked operations. The studies showed that the venture was making a positive contribution to the economy. Yet operating deficiencies were uncovered. Subsequent management contract negotiations with the firm enabled JCTC to get a more favorable agreement.

4. CONCLUSIONS

JCTC made several positive contributions to the Jamaican economy. The US Department of Agriculture (USDA) considers JCTC's management of PL-480 and GSM-102 contracts to be exemplary, because they:

1/ Caribbean shipping is characterized by small volumes which are sensitive to minor changes. In 1983 Carnation Company experienced an unexpected surge in sales of its animal feeds throughout the region. Previously, all feed sales to smaller Caribbean islands were done by a feed company located in the Dominican Republic.

"They closed the cement plant" was the reason given to the Carnation for the sudden spurt in its feed sales.

Surprisingly enough the cost of transport was the linkage between sales of cement and feed. The inefficient state owned cement plant in the Dominican Republic has been closed under pressure from the IMF and other financial institutions. When export sales of cement to the Caribbean stopped, so did the 1,000 ton "island hopper" that had called on smaller islands. The Dominican feed firm had been able to "piggyback" 100-ton feed orders on cement ships, when no other shipping was available. The container ships, which called on small islands, originated in Miami; they did not call on Santo Domingo, but went to Jamaica. That made it possible for Carnation to become competitive with its feed sales in Jamaica.

(a) increased use of funds through monitoring and moving across commodities as required by credit available;

(b) provided a professional procurement team that obtained good prices and shipped efficiently; and

(c) satisfied Washington that the goods were going intact to end users:

Shipping costs were reduced. Diversification was not achieved as initially visualized. Yet, the tender systems, used for procurement, gave a wide group of suppliers opportunity to quote and provided them with alternative supply. As succeeding governments entered into countertrades, contracts with the USSR, JCTC managed the transactions.

As a result, by the mid-1980's Jamaica has wide commodity procurement experience, that would never have been developed without JCTC. Foreign exchange has also been saved and prices stabilized.

It was constantly necessary to "restrain" the political directorate of both Prime Minister Manley and Seaga governments, which saw JCTC as a convenient way to solve problems and as a panacea to import difficulties.

JCTC performed best when run as a tight, professional operation, concentrating on a small group of items, which account for large foreign exchange purchases.

A small trading operation in world terms, JCTC was astute enough to use talents of other trading organizations to make things happen. JCTC combined its efforts with US trading firms like I. Joseph of Minneapolis, which helped shape some of creative but complex Counter-trade schemes. There have been many shortcomings. JCTC spread its activities too far afield, diluting its capabilities.

There have been the continues struggles.

On the importation side alone it would be difficult for anybody to handle a wide assortment of goods including raw materials (rice, wheat, corn, soyameal and oil, milk solids, flour); finished goods (pickled cried and canned fish, pickled and corned beef, chicken necks and backs, pigs tails); and lumber (southern yellow and white pine, mahogany, cedar, plywood).

And there has been the perennial struggle with incompetence and dishonesty of some of employees. They are easily tempted to kim off part of the huge sums of money they handle. The adverse publicity caused JCTC by the Rose-Pype case is not readily forgotten.

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5.ROADS AHEAD

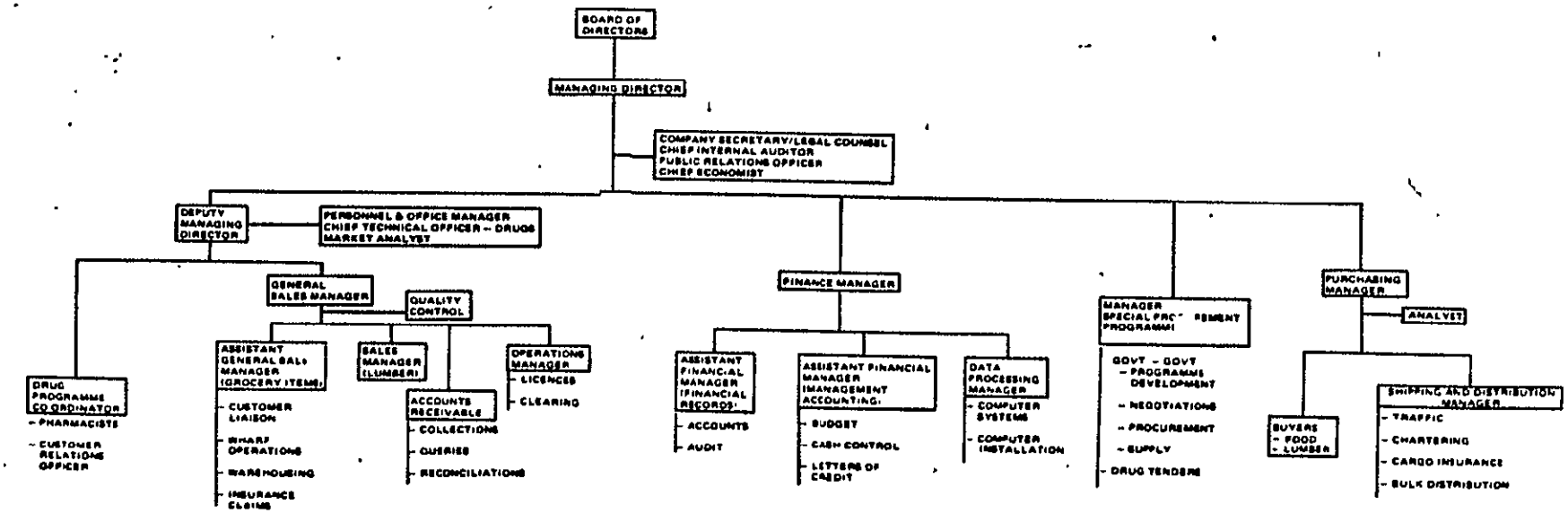
> "We in the company (JCTC) do not regard ourselves as having any absolute right to existence. We believe that we must constantly justify ourselves by our performance."
>
> O. K. Melhado, Third General Manager
> Jamaica Commodity Trading Corporation 1/

By mid-1986 the surging privatization wave is only making ripples on the macro-economic surfaces of the Third World. So far developing countries have made very few hard-headed performance audits of their statals and parastatals.

Much of the published "evidence", for or against privatization, is anecdotal: it reads well, is amusing, and thin on pragmatic action proposal. JCTC is a case in point.

There is little objective evidence to show whether the Jamaican government is getting a sufficient bang out of the buck invested in the swollen bureaucracy of JCTC to justify its continued operations. Prime Minister E. Seaga, a leading proponent of private enterprise, is skeptical. If an election were to be held in 1986, Mr. Michael Manley would likely win. He has already announced that he would continue the policy of seizing "the commanding heights of trade."

Figure 1. ORGANIZATION CHART OF JCTC



THE STATE AND THE MARKET IN THE MANAGEMENT OF PUBLIC ENTERPRISES IN AFRICA:

ideology and false comparisons*

by Yash Ghai

It is suggested that the current favour in which privatisation of public enterprises is held, is based on a number of misleading conceptions of both the public and the private sector and their performance within economies, particularly of African countries. It is argued that analyses that focus on profits as a measure of efficiency obscure the diversity of purposes which lie behind the establishment of public enterprises and are inappropriate in markets which are highly uncompetitive.

In the World Development Report 1983[1], the World Bank states that public enterprises are a matter for concern in all countries and identifies three important causes for concern. Firstly, public enterprises make large and growing claims on the budget; secondly, they are among the major borrowers in foreign currency markets, and, thirdly, they do not give value for money, as evidenced by the losses they incur.

The remedies proposed by the Bank are inspired by the market. Thus it regards improvements in the organisation of the enterprises as of minor importance: the major problem is seen to lie in the relationship between the enterprise and the government, as it is this which represents the wider departure from the norms of decision-making within the market. The Bank puts forward two basic solutions the privatisation of public enterprises (or other forms of private management through joint ventures, management contracts or leasing arrangements), and the introduction of the methods and the discipline of the market in those that cannot be or are not privatised.

While the Bank is correct in pointing to the general poor performance of public enterprises, I find its analysis unsatisfactory on a number of scores. Its framework is misleading, reducing a complex reality to simple verities and sharply drawn polarities. It focuses on the financial issues and thereby obscures the diversity of purposes that lie behind the establishment of public enterprises. Its use of profits as a measure of efficiency is mistaken in markets which are highly uncompetitive Its use of the market as a touchstone not only belittles the social and political purposes of public enterprises but also, through the idealisation of the market, demonstrates a misunderstanding of the historical reality and operation of the market in Africa. For the same reasons, its solutions are seriously flawed. The supposed dichotomy explicit

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in its analysis between a public sector regulated by the state and a private sector regulated by an autonomous market is illusory There is little reason to believe that the government will, or should, step back from the management of the economy, or that the management can be successfully achieved through indirect measures. The choice is more likely to be between a regulated public sector and a regulated (private) market, with all the problems of regulation. One has only to contemplate the consequences of the other alternative, the unregulated market, to realise the rationale of the public sector The Bank's analysis ignores the context of the international economic system within which the economies of Africa function, and their domestic social and political context. Public enterprises and the way they operate are ultimately the consequences of the relations between the social forces in a society If you roll back the state in its more visible manifestations, these forces will come back in another form, less accountable and perhaps even more irresponsible.

WHY PUBLIC ENTERPRISE?

In the current mood of enchantment with the market and privatisation, the purposes for which public enterprises have been established tend to be overlooked[2] A primary reason for public enterprises in underdeveloped countries was the deficiencies and consequences of the market[3], which, with its tendency towards equilibrium, was unlikely on its own to provide the momentum towards development, state intervention, in some form, was considered to be essential. This tendency of the market is accentuated in the absence of domestic entrepreneurship and adequate private investment resources. Second, the market would reinforce the existing patterns of the production of goods and services, which served the needs of the wealthy and privileged elites, and subordinated the national economy to the international Third, the market is dominated by foreign economic forces, and would leave key decisions on investment, production, pricing, etc to outside corporations The consequent foreign direction of the economy could in theory be tackled by state regulation although in practice this has proved problematic, in part because good regulation requires a well functioning market which did not exist and which cannot generally arise without the state playing a supportive role[4]. The other consequence — the marginalisation of indigenous ownership and control — could scarcely be remedied without public ownership[5] Public enterprise had the potential to redefine the relationship of the local economy to the outside world It could also provide a fairer basis than the market for the distribution of production and benefits, and for achieving goals. The private sector in Africa, with its monopolies and protections, and linkages abroad, was hardly likely to be the engine either of domestic accumulation or of the efficient utilisation of economic resources.

The supporters of public enterprise would do well, however, not to be taken in by official rhetoric[6]. The national political leadership which came to power on independence were unlikely to adopt a «hands-off» policy towards the market[7]. The colonial economy they inherited was an administered, not a liberal economy, when the king was neither property nor contract but the administrative licence For another the market provided a challenge to the politicians who themselves had no independent base in it Some form of control over the allocation of resources that the market would otherwise effect appeared crucial to the consolidation of political authority. The state itself came to be viewed as a resource, providing the wherewithal for new bases of property and economic power[8]. Control seemed easier through ownership than through regulation Public ownership was a more vivid response to nationalist aspirations, it became the means to absorb the growing urban unemployed in the economy, it opened up fresh opportunities for plunder and patronage, and constituted another lever for bargaining with the transnationals[9].

THE FRAMEWORK FOR MANAGEMENT

Discussions of the framework for management in public enterprises normally either focus on the legal forms of the enterprise and the departures in practice from them, or the environment for the management of public enterprise is compared to that for the private sector.[10 11]

FORM

I think there are several reasons for the focus on form[12] Public enterprise, whether arising out of nationalisation or new investment, is brought into existence by legislative measures (which lend importance to form) The political theory of public enterprise — at least as developed in Britain by Morrison[13] — was dependent on the form That theory, which has a powerful appeal, runs as follows. Public enterprise is necessary, because of market imperfections, to achieve some key social and economic purposes. The purposes cannot be defined by the market, they must be defined by the political leadership, by Parliament in macro-terms, and by the executive in operational terms Public bodies, using public resources for public purposes, must be accountable for the performance of their functions. But this accountability must be so exercised that it does not impinge unduly upon the management of the enterprise. If the purposes could not be defined directly by the market, the modes of operation could and should be. In that context, the autonomy of the enterprise came to be emphasised as an essential requirement, the management had to be freed from detailed political control as well as the system of bureaucratic administration. This was to be achieved by the establishment of its own distinct corporate personality. The assets that it was to use were to be vested in it, and its board was to be responsible for the management of the enterprise. The enterprise was to be subject to the ordinary law The ways in which and the reasons for which the government would intervene were carefully defined. The minister could give general directions when the national interest was at stake, but ministerial control was to be secured primarily by his powers of appointment and dismissal of the board, and the accountability of the enterprise was to be secured by annual reports by the enterprise, which were to be subject to audit, and subsequent executive and parliamentary scrutiny Many countries now use companies for public enterprises. A company shares many characteristics with the public corporation· distinct legal personality, ownership of its assets, separate budgets and recruitment, and no state immunities, although Parliament's role as gatekeeper and supervisor is diluted.

It is surprising how frequently this theory has been invoked by ministers when making a case for the establishment of a new enterprise even where, in practice, little remains of the autonomy of the enterprise, and when the ideologies of the ruling parties, emphasising central political and economic control, do not accommodate such autonomy[11] In general, it seems to be accepted that a distinction between policy and management, i e, day to day matters, is viable But the commitment to this distinction is weak. The invocation of the Morrisonian theory has been more in the establishment of enterprises than in their operation The attractiveness of the theory is that it appears to mini-

mise political control, avoids partisan uses of economic power and promises little disruption of the operating norms and methods of the industrial and commercial worlds (It is also attractive to a Parliament fearful of the extension of executive powers). The theory also serves a function in the evasion of political responsibility — when things go seriously wrong, «the autonomous public enterprise» can be made to take the blame.

In short, the legislation has only a limited relationship to the practice. Although legally the owner of its property, the enterprise has less and less control of its deployment or disposal A new decision-making structure for its policy and operations emerges which bears little resemblance to the legislative scheme. On the other hand, the enterprise, in part due to inefficiency and in part in order to control its supervising ministry, may also withhold or distort information it is legally required to provide In practice, there seems to be no significant difference as regards autonomy or performance between the different organisational forms, and in places like Tanzania the forms have become increasingly irrelevant even in the law, as legislation now refers to the «parastatals» (i e enterprises with at least 51% government equity) cutting across legal forms [15]

In general, one can say that in practice executive control is detailed but often intermittent, and informal rather than formal, there is a lack of clarity about the purposes of the public sector and policy for individual enterprises, there is considerable confusion as to who has the responsibility for what (at both the level of the government and the level of the enterprise). The overall impression in many countries is of massive government intervention but little control, primarily because the interventions are not related to any overall policy towards the public sector.[16]

In most countries, problems of the public sector are discussed primarily as if the heart of the matter was the appropriate division of responsibility between the government and the enterprise The result is that often there are swings back and forth between a high degree of control and a high degree of autonomy. Controls have nevertheless grown on an *ad hoc* basis. The inadequacy of one kind of control leads to the establishment of others and a formidable array of controls is created, cutting across ministries and frequently working at cross-purposes Most governments do not have the capacity actually to exercise these controls, and, indeed, few make any assessment of their capacity to exercise a control when they set it up While in some cases this incapacity leads to bottlenecks and the misallocation of resources, in many instances the controls are, in fact not exercised at all.

ANALOGY WITH THE PRIVATE SECTOR

The comparison with the private sector seeks to highlight other peculiar features of public enterprises. The management of the private sector companies is said to be guided by one basic goal — the profitability of the enterprise while public enterprises have multiple objectives which are not always articulated and are frequently difficult to balance. Such a description does not give an accurate picture so far as the large private firms are concerned, for although profits are important, they can only be achieved by balancing various intermediate goals There is now considerable evidence that the managers of large (private) firms pursue a number of objectives — personal, organisational and social — which are not directly concerned with profit maximisation They too need to balance many interests, short term with long term, shareholders with employees, profitability with social and environmental responsibility [17]

The machinery for reaching decisions in public enterprises is said to be certainly more complicated than in the private sector The authority to make decisions is shared between the board and management on the one hand, and the parent ministry, the Treasury, and some public enterprise bureau or secretariat on the other [18] The greater complexity in structures for decision making in the public sector is the result of the multiple goals and the responsibility of the government to define social objectives — but it is also the consequence of institutions seeking to extend their authority beyond that required for that purpose Due to the nature of governmental concerns relating to activities of the public enterprise, decisions tend to be taken at a higher level than prescribed by the regulations.[19]

The third important difference is said to lie in the discipline to which public and private enterprises are subject Private enterprises are subject to a tougher discipline, because the standards for accountability and assessment are clearer and the sanctions for failure firmer. The dilution of business with politics in the public sector weakens the control system, as do the limitations in the competence of those who, in substitute of the market, sit upon judgement on its performance

There is no doubt that the contrasts between the public and private enterprises are so overdrawn as to be misleading. When we consider a country like Kenya with its rather weak bourgeois-entrepreneurial class, we find, primarily, two kinds of private firms — the small scale indigenous enterprise, engaged in agricultural production or petty commerce, and the subsidiaries of foreign transnational corporations which dominate manufacturing, finance, plantations and commerce [20] The correct analogue of the public enterprise, with its large scale and capital intensive operations, is not the small entrepreneur (who far from being pushed out of the market by the public enterprise, is in fact a beneficiary of its promotional activities)[21] but is the subsidiary of the foreign transnational corporations [22]

The relationship between a subsidiary and its (foreign) headquarters is not markedly dissimilar to that between a public enterprise and the government It depends on the size of the transnational, the number of its subsidiaries, the nature of its products and industry, the degree of horizontal or vertical integration, the business styles in the country of the transnational, the policy and legislation of the host state, etc [23] The very logic of the transnational, however, pulls it towards a tight control over its subsidiaries The strength of a transnational lies in its ability to plan and integrate its operations on a global basis, to contract production in one subsidiary and expand it in another, to determine its marketing strategies (and especially its intersubsidiary transactions) and control the flow of financial resources within the corporate group to minimise tax liability and interest charges The optimum use of its resources also impels a turn towards centralisation of policy Consequently, in practice, the subsidiaries enjoy severely restricted autonomy,[24] and even that is often more apparent than real, since it is exercised by staff either seconded from headquarters or firmly tuned to its priorities and needs

The decision-making structure of a subsidiary is therefore frequently as split and truncated as in a public enterprise As a rule, decisions about investments, capital borrowing, repatriation of profits, recruitment of top executives, research and technology and intra-firm transactions will be made at headquarters, frequently a transnational will interpose a regional office between the headquarters and the subsidiaries and thus a third centre of decision making. A further complexity will arise from the organisation of product divisions at each centre, so that none will necessari-

ly be a coherent or monolithic unit In each situation, there is considerable scope for manipulation, withholding or distortion of information, by-passing hierarchies etc. And just as in public enterprises, the decision-makers at the higher level may be imperfectly informed of market and commercial factors, so the headquarters of a transnational may lack adequate knowledge of the economy and market in the country of a subsidiary.

A typical method of control is the approval of the headquarters of the capital and operating budget of the subsidiary, from which the subsidiary cannot deviate. The investment proposals of the subsidiary are appraised by the headquarters by criteria in which the primary consideration may not be the profitability of the subsidiary, but the overall impact on the profits and growth of the transnational as a group. Supervision is also exercised through a system of frequent and extensive reporting A part of the required information may not be relevant to the operations of the subsidiary but important to the headquarters for its global operations. Many a public enterprise manager would empathise with the British manager of a US subsidiary who complained of too much reporting »The whole thing has gotten out of hand. They keep us from doing our job by making us send home half a ton of paper to prove that we are doing it«[25] Studies in Kenya illustrate other constraints on the management of the subsidiary — the local national environment, the pressures to be a good corporate citizen, and to reach an accommodation with the indigenous political and commercial classes[26]

Evaluation of the performance of the subsidiary cannot be simple· responsibility for a number of key decisions affecting the policies and performance of the subsidiary lies with the headquarters, and the activities of the subsidiary are frequently determined by the overall needs of the corporate group and not necessarily the financial profit of the subsidiary Many of the contracts of the subsidiary are with its headquarters or fellow subsidiaries and are not on arms-length terms, and either favour or disadvantage a subsidiary on a non-market basis. The best-known use of the intra-firm transaction is transfer-pricing which means that financial indicators cannot be a fair measure of performance, even with some discounting which some firms employ[27] In practice, transnationals use a variety of measurements — growth of sales, market shares, productivity, labour relations — as well, but then it is not always clear to the subsidiary managers what weight is attached to these different factors, and subjectivism appears to play an important part[28] Private firms are not therefore in a qualitatively different position from public firms as far as complexity of performance evaluation is concerned. They differ, however, from public firms in that they attach a good deal more importance to evaluation and seek to relate it to the purposes envisaged for the subsidiary.

How much more subject to market competition than public enterprises are foreign subsidiaries? Only a small proportion of public enterprises in under-developed countries are monopolies,[29] few could be said to be sheltered from competition, though poor performance in the face of competition does not generally lead to the bankruptcies or takeovers that might happen in a private firm. On the other hand, a foreign subsidiary may be even less open to competition (and much more capable of restrictive practices due to its global reach) than a public enterprise It may also be supported by its headquarters in times of poor performance if its operation are important to the global strategy of the transnational As far as Africa is concerned, there is ample evidence that foreign subsidiaries are frequently in a monopoly or oligopolistic position (and displace incipient local entrepreneurial efforts) and secure concessions from the government to prohibit or restrict external competition[30] Foreign subsidiaries may seek dominance of the market by predatory price-cutting,[31] while intra-firm transactions enable them to by-pass domestic and international markets[32]

An important difference, however, which the legal form is intended to overcome but does not, is the background and skills of the operators The boards of public enterprises in Africa are better regarded as extensions of the government than as reservoirs of managerial skills and experience The minister, or even the President, may be the chairman of the board and most of the economic ministries are represented either by ministers or permanent secretaries (in fact frequently by junior surrogates). It is difficult to imagine that they can forget political or bureaucratic interests while serving on the board. An influential minister or civil servant can stifle enterprise initiative at an early stage, or force it into action that is contrary to its own good sense Indeed, the boards are sometimes justified as mechanisms for the coordination of government policy!

The vulnerability of the management is aggravated, but not caused, by this kind of board If the board is an extension of the government, then management is an extension of the bureaucracy Although one justification for the separate corporate form of the enterprise is its need to harness outside skills and expertise, in almost all African countries, the management is recruited from the bureaucracy. The recruitment is through secondment, so that the »manager's« career prospects are tied to the bureaucracy, and his real boss remains the permanent secretary. The bureaucratic rather than the business style of decision-making dominates.

The consequences that stem from these difference are aggravated by the restricted options, in terms of structural changes or strategies, available in the public sector to meet contingencies.

When problems arise, there is more emphasis on »trouble-shooting«, on keeping a basically unsound system going and less on finding deeper solutions, on the prevention of crises before they arrive and on their solution if they arise[33]

STRATEGIES FOR REFORM

Public enterprises are now widely regarded as having failed to fulfil the goals expected of them. While it true that their record is bad, it is not uniformly so, they have helped to train indigenous managers, to reorient the economy, to reduce the dominance of foreign capital, and to build the infrastructure. Nevertheless, from the right wing, they are accused (without much consideration for their broader social goals, indeed sometimes because of them[34]) of financial profligacy and irresponsibility, of loss making and waste, and from the left as tools of the incipient bourgeoisie to plunder the state, oppress the peasant and collude with foreign and international capital[35] The left wing does not, however, abandon faith in the progressive potential of public ownership, but seeks a social revolution for the realisation of that potential The right wing wants to remove the non-market features of the operations of public enterprises, either by privatisation or the introduction of market surrogates in the public sector.

I have time to discuss, other than briefly, only the proposals for privatisation. Privatisation, it would seem, if one surveys countries as different as the UK, Nepal, Zaire, Bangladesh, Pakistan, Thailand, Peru Kenya and Sweden is an idea whose time has come. The arguments in its favour are,[36] (i) rolling back the frontiers

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of the state and subjecting the enterprises to the market and thus competition will enhance individual choice and freedom, (iii) the market discipline will lead to greater economic efficiency and effectiveness, (iii) it will reduce the pressure on state finances for investments, (iv) it will free the government from the incubus of loss making enterprises, (v) it will free ministers to concentrate on important policy formulation and implementation; (vi) it would lead to genuine public ownership as the shares will be offered to and bought by the public, (vi) and it will lead to more realistic levels of wages by breaking up powerful public sector unions It assumes that suitable mechanisms exist to implement the transfer of enterprises to the private sector, and the government has the capacity to regulate any undesirable activities that the privatised but still large and powerful enterprises might be tempted into.

A very brief review of the experience in the country where privatisation has gone furthest so far — the United Kingdom — illustrates some difficulties with these rationale and assumptions, before we turn to the likely consequences of privatisation in Africa. It has been hard to sell enterprises which have not established a record of profit-making; and so the government has had to write off their debts, sack hundreds of employees and pay redundancy money, guarantee pension rights — in other words, fatten the calf at enormous additional expense to the state.[37] It has also had to retain many of their monopolistic or market privileges after privatisation as an inducement to purchase, and thus forfeit the advantages of competition. The major buyers of enterprises (with one or two exceptions) have been large institutions and the trend as regards shares in individual ownership is towards their purchase by the institutions reinforcing the already heavy concentration of share ownership.[38] There have been enormous problems in the proper valuation of the assets of the enterprises and the price at which to sell the shares, despite a Stock Market and a network of financial institutions which pride themselves on their sophistication.[39] There remains a strong suspicion that state resources have been transferred at considerable undervaluation.[40] Vast sums have been expended on lawyers, accountants, bankers and stock brokers.[41] Enormous ministerial and parliamentary time has been taken up by the process of privatisation, leaving to government and Parliament only limited time for other policy issues. The assumption that this is temporary and that in future the ministers will have more time for other policies is likely to be belied by the very nature of most of the privatised enterprises. They will remain powerful economic organisations and crucial to the general well-being of the country, and ministers will need to deal with them on a regular basis.[42] The regulatory framework established for British Telecom gives no reason to believe that ministerial time will be released, nor indeed that the size of the bureaucracy monitoring it will diminish.[43]

The British experience demonstrates that privatisation os not a simple process of the legal transfer of resources Nor is it simply a matter of the state deciding what to do with its resources. Public enterprises are complex organisations in which the interests of the management, consumers, employees, competitors and society interact So privatisation can become the arena for intense controversy and conflict. That is not in itself of course an argument against privatisation but it points to the delicate balances that may have to be struck.

The rationale and the assumptions are at best of limited relevance in Africa. The market is already uncompetitive and inefficient Privatisation will decrease, not increase, competition The governments will not only have to fatten many calves, but will in addition have to agree to a regime of protection and privilege for the new owners of the privatised enterprises.[44] Few African countries have a financial network which might provide some guarantee of fair dealing and probity in the transfer of assets or ensure a proper value for them. Even more than in the UK, privatisation is likely to involve the transfer of resources from one section of society to another It will reinforce the growing inequalities that now characterise communities in many parts of Africa In addition, it will lead to further loss of control over and indigenous ownership in the economy, as many of the purchasers are likely to be foreigners (although it could also accelerate their acquisition by the local bourgeoisie on a selective basis) Deprived of profit making enterprises and still hanging on to unprofitable ones it cannot sell, the government will be even less able, through its public sector, to promote social and regional development or an equitable distribution of benefits. If Africa's experience with public enterprise has frequently been unfortunate, there is little in her history to suggest that the market has served her well, or that it now has the capacity to solve her problems.

Past experience does not make one sanguine about governments' ability to regulate the private sector in a fair or effective manner.[45] The difficulties of regulating and monitoring the private sector (and the economy) are no less daunting (if different) than the running of public enterprises The difficulties of regulating the private sector arise from many factors,[46] the lack of expertise in the government to formulate standards and to monitor compliance with them, the paucity of information about costs and marketing, the size, complexity and costs of administration; the fragmentation of governmental authority with increasing possibilities of conflict and inconsistency among aims and results, and the multiplication of exceptions and instances of uneven administration that threatens the effects of regulation. African administrative systems, more than most, rely on wide and unfettered discretion in ministers and officials which is allowed to be exercised in secrecy The path to collusion and corruption is opened The governments will be drawn into a closer embrace with industry, and may more readily become its captive, to the detriment of the community.

The criticism of the prospect of privatisation does not mean that Africa must remain for ever saddled with inefficient or corrupt enterprises, nor that privatisation must be avoided in all instances. Privatisation must be undertaken cautiously and carefully, not rushed through as a newly fashionable shibboleth The rationalisation of the public sector, the increase of efficiency and the tightening of discipline must also go on. Whether this is best done through the introduction of market discipline and its modes of operation by the use of market surrogates is less clear to me. That would appear to negate the rationale, objectives and methods of state ownership and management of the economy.[47]

FOOTNOTES

1. For a fuller exposition of the World Bank view, see Mary Shirley, **Managing State-Owned Enterprises** (1983) World Bank Staff Working Papers No 577. Similar themes were set out earlier in the Bank's report **Accelerated Development in Africa** (1980)

2. Almost every book or article on public enterprise begins with a ritual recitation of the reasons for public enterprise See Fernandes and Sicherl (eds) **Seeking the Personality of Public Enterprise** (1981), and more specifically for East Africa, see R. H. Green, pp, 62—64 in Yash Ghai, **Law in the Political Economy of Public Enterprise** (1977).

3. See G Dalton, **Economic Systems and Society** (1974). By market here I mean the system for exchange under commodity production.

4 For an illustration of this argument in the Asian context, see G Myrdal, »Operational Controls Over the Private Sector« **Asian Drama** Vol II (1968).

5 See Issa Shivji, **Class Struggles in Tanzania** (1975); Pheroze Nowrojee, in Ghai (1977) op. cit. p 161ff; Richard Mellon, Chap. 16 in LeRoy Jones (ed) **Public Enterprise in less developed countries** (1982).

6. See Shivji, op. cit, R Sobhan, »Public Enterprise and the Nature of the State« **Development and Change** (1979 vol 10, pp 23—40 and Yash Ghai, op. cit. p. 15ff. (1977).

7. For a stimulating discussion of the relationships between markets and politics, see C E. Lindblom, **Politics and Markets** (1977). See R H. Bates, **Markets and States in Tropical Africa** (1981) for the political manipulation of agricultural markets in Africa.

8. In recent years there has been much writing on this. For a stimulating historical and comparative sketch of the role and use of the state, see G. O'Donnell »Comparative Historical Formations of the State Apparatus and Socio-Economic Change in the Third World« **International Social Science Journal** (1980) 717—29.

9. Ghai, op cit. p. 15ff (1977).

10. See, e. g. the various essays in W. Friedman and J. Garner, **Government Enterprise** (1970); R Pozen, **Legal Choices for State Enterprises in the Third World** (1976) and Ghai, op. cit. p. 206ff.

11. E. g V. V. Bhatt, »Institutional Framework and Public Enterprise Performance« **World Development** (1984) Vol. 12 pp 713—721. M. Shirley, op. cit., Y. Aharoni, ch. 4 in LeRoy Jones op. cit.

12 See Yash Ghai, »Law and Public Enterprise« in V V. Ramanadham, **Public Enterprise in Developing Countries** (1984).

13 For a good example of his views, see H. Morrison, **Socialisation and Transport** (1933).

14. See Pozen, op. cit., A Killick, **Development Economics in Action** (1978), on Ghana and Ghai, op. cit., p. 206ff. on Tanzania, for example.

15 Ghai, ibid. p. 258n.

16. Ghai, ch. 10, in G Ram Reddy (ed) **Government and Public Enterprise** (1983).

17. This point is put in popular and readable form by J. K. Galbraith, the **New Industrial State** (1967). See also Mornis, R **The Economic Theory of Managerial Capitalism** (1964); R. Dricker, **Corporate Governance** (1984 and K. Hopt and G. Teubner (eds). **Corporate Governance and Directors' Liabilities** (1985).

18 See the hair raising account in M. M. Wahba, »The Egyptian Public Sector: The Control Structure and Efficiency Considerations« **Public Administration and Development** Vol. 3 No. 1 (1983) 27—37, which leads one to marvel that any decisions are ever taken at all.

19. J. Heath, **Management in Nationalised Industries** (1980).

20. S. W. Langdon, **Multinational Corporations in the Political Economy of Kenya** (1981), pp. 31—43. Useful material on transnational corporations in Kenya is also contained in R. Kaplinsky (ed.), **Readings on the Multinational Corporations in Kenya** (1978), N. Swainson, **The Development of Corporate Capitalism in Kenya** (1980) and D. Gachuki, **Regulation of Foreign Investment in Kenya 1963—81: An Empirical Study** (1982) Ph. D. thesis, University of Warwick.

21. P. Nowrojee, in Yash Ghai, (ed) op. cit. (1977).

22. For a stimulating discussion which considers the government in UK in relation to nationalised industries as a holding company, see John Heath. op. cit.

23. Lars Otterbeck, **The Management of Headquarters — Subsidiary Relationships in Multinational Corporations** (1981), passim. See also M. Brooke and H. L Remmers, **The Strategy of Multinational Enterprise** (1978), pp. 19—124, and J. M. Stopford and L. T. Wells, **Managing the Multinational Enterprise** (1971), esp. ch. 8.

24. »[A]n ideology of decentralisation was masking a reality of centralisation«, p. 68 Brooke and Remmers, op. cit.

25. Brooke & Remmers, op. cit. p. 51.

26. See for example, Langdon, op cit., passim, but for a summary p. 34—36; Swainson Kaplinsky, Gachuki, op. cit.

27. See P. Yember, **Transfer Pricing and Performance Evaluation in Multinational Corporations** (1982) for the triangular relationship among transfer pricing, subsidiary autonomy and performance evaluation.

28. Brooke & Remmers, op. cit. pp. 115—124.

29. V. V. Ramanadham, **The Nature of Public Enterprise** (1984), pp. 90—107.

30. For Kenya, such evidence is provided by Langdon, op. cit., 35—41; R. Eglin, »The Ologopolistic Structure and Competitive Characteristics of Direct Foreign Investment in Kenya's manufacturing sector« in Kaplinsky, op. cit.

31. See Langdon, op. cit. passim.

32 Helleiner, **Intra-firm Trade and The Developing Countries** (1981).

33. Heath, op. cit.

34. The World Bank's Publications are a good example.

35. See Shivji, op. cit., P. Evans, **Dependent Development: The Alliance of Multinational, State and Local Capital in Brazil** (1979).

36. Not all of these are offered in relation to underdeveloped counries For the UK, see a useful summary in D. Steel and D. Heald (eds.), **Privatising Public Enterprises** (1984), ch. 1. For Latin America, esp. Peru, see William Glade in Ram Reddy (ed) op. cit. For Kenya, see the **Review of Statutory Boards** (The Ndegwe Committee) (1979) and the **Report of the Committee on Public Expenditure** (1982).

37. See Steel and Heald (eds.) op. cit. passim The House of Commons Committee on Public Accounts found that the Government was in a deficit of £12 million as a result of the sale of its shares in British Aerospace (after allowing for write-offs and the costs of floatation. (HC, 10th Report of Committee of Public Accounts, Session 1981-82, para. 4).

38. On the floatation of British Aerospace, there were 158,000 individual shareholders Ten months later the number had fallen to less than 27,000, a reduction of 83 %. For those shareholders who took up less than 100 shares, the number had declined from some 44,000 to 3,300, a fall of 93 %. Committee of Public Accounts, ibid., para. 29. This is the general trend in other privatisations as well, except that in Britoil, whose shares suffered a sharp discount immediately on floatation) the number of individual shareholders increased from 35,800 to 40,000 six months later, although the number of small shareholders with less than 2000 shares declined from 35,424 to 28,994, a fall of 18 % Committee of Public Accounts, Session 1983-84, p. 14.

39. For details see 10th Report of Public Accounts (Session 1981-82) Sales of Shares in British Aerospace; Sales of Government Shareholdings in other publicly owned companies and in British Petroleum Ltd., and its Report in Session 1983-84 Sale of Government Shareholdings in Britoil and Associated British Ports (6 Feb 1984).

40. This is evident from the premiums at which the shares were traded immediately after floatation as well as the general (but not universal) level of over subscription Details are to be found in the two reports of the Public Accounts Committee (note 40). The Public Accounts Committee concluded that »large profits [had been] made at the taxpayer's expense« para. 27 (10th Report.)

41. The cost of floatation of British Aerospace was £5.6 million, of BP, Amersham and Cable and Wireless £21.3 million; of Britoil £12.5 million and the Associated Ports £2.6 million. The Public Accounts Committee, (ibid) from which these figures are taken, was critical of the methods of floatation.

42. D. Heald, »Will the Privatisation of Public Enterprises Solve the Problem of Control?« **Public Administration** (1985) Vol. 63, pp 7-22.

43 See report of the National Consumer Council (UK), **Controlling Public Utilities — Lessons from the Privatisation of British Telecom** (1984).

44. There is already a close, symbolic and corrupt relationship between ministers and officials and transnationals: C. Leys, **Underdevelopment in Kenya: The Political Economy of Underdevelopment** (1975) See Langdon op. cit., Shivji, »Capitalism Unlimited: Public Corporations in Partnership with Multinational Corporations«, **The African Review** (1973) 359—381, P Evans, op. cit.

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45 See for example, Killick, op. cit. chapter entitled State as Controller. That even more developed economies than the African have difficulty in regulating the private sector, see Myrdal, op. cit. See also T. J. Biersteke, »The Illusion of State Power. Transnational Corporations and Neutralisation of Host-country Legislation« **Journal of Peace Studies** 17:3 (1980) p

46 Myrdal, op. cit., Killick, op. cit., L. E Preston, »Market Control in Developing Economies«, **Journal of Development Studies** (1968) p 481.

47. There is no time to discuss other remedies. Another remedy frequently advocated is the management contract whereby the state hands over the running of public enterprises to an external organisation, usually a transnational African experience with these contracts has been far from happy See Ghai, in **Africa Guide** (1984) pp 38—42.

THE MANAGEMENT OF INTERLINKAGES

Edited by Ricardo Acosta Suárez

An attempt to provide an understanding of how public enterprises can deal effectively with their interactions in the economic, social and political domains Drawing some insights from general systems theory, sociology, political theory and economics, the book proposes a conceptual framework for the management of interlinkages, illustrating this framework with some concrete experiences.

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AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: Working Groups | **Date:** Tuesday, June 3
Lead Instructors: Pray, Meissner | **Session #:** 3
Co-Trainer(s): Core Staff | **Time:** 12:15-12:45 pm

==========

OBJECTIVE(S): At the end of this session participants will be able to:

- o Apply concepts and learnings from today's sessions to group and individual action plans for presentation on Friday
- o Suggest questions of special interest/relevance for tomorrow's sessions

==========

ABSTRACT:

With specific reference to team/individual projects:

- o Suggest role of agricultural research and extension systems in proposed policy interventions and describe any changes in the agricultural research and/or extension systems that may be appropriate
- o Suggest private sector related interventions that may be appropriate to your projects

==========

READINGS: Required/Optional

- o None.

AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: Methods of Policy Analysis **Date:** Tuesday, June 3
Lead Instructor: Norton **Session #:** 4
Co-Trainer(s): **Time:** 1:30-2:30 pm

==========

OBJECTIVE(S): At the end of this session participants will be able to:

- o Understand alternative methods of agricultural policy analysis.
- o Decide which methods to employ for a given situation.

==========

ABSTRACT:

The following main questions will be presented and discussed:

* How is a 'policy diagnosis' developed at the sector level ?
* What are some specific numerical measures that are useful in such a diagnosis ?
* How does agricultural pricing policy fit in a macroeconomic context ?
* What are the circumstances in which more formal modeling approaches are appropriate ?

Some of the policy-relevant measures to be discussed include nominal and effective rates of protection, domestic resource cost coefficients, and the intersectoral terms of trade. Pricing policy will be presented in the context of trade, exchange rate and fiscal policy.

==========

READINGS: Required/Optional

- o Norton, Roger, "Haitian Agriculture: Production Costs and Pricing and Fiscal Structures," pp. 19-31. ___/ X
- o Norton, Roger, "Policy Issues in Mexican Agriculture," World Bank, July 1984, pp. 1.1-2.23; 3.20-4.13; 4.17-5.6. X /___

HAITIAN AGRICULTURE: PRODUCTION COSTS AND PRICING AND FISCAL STRUCTURES

Roger Norton

HAITIAN AGRICULTURE: PRODUCTION COSTS AND PRICING AND FISCAL STRUCTURES

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November 1985

HAITIAN AGRICULTURE: PRODUCTION COSTS AND PRICING AND FISCAL STRUCTURES

Roger D. Norton[1]

1. Introduction

As a case study, the main interest of this paper lies in its assessment of comparative advantage when the data base is weak, and its analysis of the role of fiscal and trade policies in determining agricultural pricing policy. The study also develops a quantitative characterization of the fiscal system in Haitian agriculture.

With a per capita GDP of $334, in 1983 Haiti ranked lowest in incomes among the countries of the Western Hemisphere. Although per capita GDP rose slightly during the 1970s, fluctuations rather than steady growth have been the rule.

Agriculture still is the largest single sector in the Haitian economy, unlike the case of most other countries in Latin America. It is estimated that 57% of the labor force is in agriculture (1980), and 73% of the population lives in rural areas (1982). About one-third of GDP (at factor cost) originates in agriculture (1982), and agriculture has accounted for nearly one-half of commodity exports over the past five years. Table 1 shows the sectoral structure of GDP.

The available data do not permit firm judgements about growth rates in agriculture, but all indications are that agricultural production per capita has been declining for the past twenty-five years. The best judgement is that production probably has grown slowly in absolute terms, but that it has declined by one percent a year or more in per capita terms. The same statement may be made about real factor incomes in the sector.

TABLE 1. HAITI: SECTORAL DISTRIBUTION OF GDP AND EXPORTS, FY52-84
(Percentage shares)

	FY52-54	FY62-64	FY72-74	FY77-79	FY82-84
Gross Domestic Product					
Agriculture	50	50	43	36	34
Mining	-	2	2	1	-
Industry	13	14	17	18	19
Services	37	34	38	45	48
Merchandise Exports					
Agriculture	90	68	39	37	43
Mining	-	10	8	8	-
Industry	10	22	53	55	57

Sources: World Bank Economic Reports;
Haitian Institute of Statistics (IHSI)

There are a few exceptions to the declining or stagnant trend, notably rice, mangoes, goundnuts, and some vegetables. The increasing gap between consumption and domestic production of staple foods has been met by rising volumes of imports, particularly of wheat and oilseeds. The current dollar value of food imports rose by 24% per year from 1971 to 1981, although they

declined in 1982.

There are a few large farms in Haitian agriculture, but it is overwhelmingly a sector of smallholders. Most farmers own at least par the land they work, but 59% of the farms have one hectare or less of la (Table 2) according to the 1971 agricultural census. Ninety percent of farms own three hectares or less. Farming technologies are extremely rudimentary in almost all cases; plows are rare, and some farmers do no even have hoes. There are historical reasons for the circumstances of technology, but the fact is that Haiti's agriculture is one of the leas capitalized in the world. Rural wages reflect the correspondingly low productivity of labor, averaging about US$1.40 per six-hour day (1984). While capita GDP for the country as a whole was US$334 in 1983, for mos rural families per capita incomes averaged about US$125 in that year.

Haiti's terrain and rainfall are quite variable in spite of the limited geographical extent of the country. In the major farming areas rainfall ranges from 600 mm/year to 2,000 mm/year and altitude from sea level to 1,600 meters. Most of the country is mountainous and steep an soils are easily eroded. The annual loss of soil is estimated at 10,00 15,000 hectares per year, out of a total cultivated area of some 900,00 hectares. Soil erosion is caused by tree cutting, slash-and-burn agriculture on slopes, and inadequate erosion control measures. It is major problem in the sector. The cultivated land is approximately equa divided between plains and mountains. Less than a fifth of the cultiva area (some 180,000 has.) is considered to be irrigable, and of that are only 45,000 has are considered to be fully irrigable. Another 40,000 h have the infrastructure for irrigation but are in need of substantial rehabilitation.

TABLE 2. DISTRIBUTION OF FARM LAND IN HAITI, 1971

Size Range (in carreaux)	Farms		Area	
	Number	%	Thousands of carreaux	%
less than 1 cx.	437,995	71.1	217.9	32.5
1.01 - 3.0 cx.	146,890	23.8	271.2	40.5
3.01 - 10.0 cx.	29,650	4.8	146.3	21.9
more than 10 cx.	2,175	0.3	34.0	5.1
	616,710	100.0	669.4	100.0

Note: one carreau = 1.29 hectares

Source: Agricultural Census of Haiti

Haiti's principal crops, in order of area occupied, are corn, sorghum, coffee, beans, rice, bananas, pigeon peas, cassava, sweet potatoes, and sugarcane (see Table 3). Mangoes also are important but no estimates are available for the area occupied by mango trees. Most cultivation is done on an intercropping basis, even for coffee, bananas and sugarcane. There is very little organized livestock raising, but goats and chickens are commonly raised informally by the farm family. Haiti's swine herd, which was substantial, was eradicated in the early 1980s as a consequence of an outbreak of African swine fever, and a program is now underway to rebuild the herd.

Haiti's major agricultural export is coffee. On a much smaller scale there are exports of cacao, sisal and sisal products, mangoes, essential oils, rum, and, before the eradication of the swine herd, pork. Coffee exports have shown no distinct trend, but they are influenced by a pronounced bi-annual cycle in production and by the hurricanes which strike Haiti with some force two or three times a decade, on the average. Some of the minor exports have increased in volume in the past decade, especially mangoes. In past eras Haiti was a major exporter of other crops such as sugar, indigo, and bananas. The cost-of-production analyses carried out for this report suggest that Haiti still is a low-cost producer, by world standards, of many crops, and therefore the potential exists for greater exports and for import substitution.

Nutrition levels in Haiti are low; recent estimates suggest that the average daily calorie intake is 1901 and the average daily protein intake is 41 grams. These figures represent deficits with respect to the FAO/WHO standards of 14% and 32%, respectively. Malnutrition is widespread, especially in rural areas. Outside of the cities the average daily calorie

TABLE 3. PRODUCTION, AREA, AND YIELDS OF PRINCIPAL CROPS (1978)

CROPS	TRANSVERSAL REGION			SOUTHERN REGION			WESTERN REGION			NORTHERN REGION			TOTALS		
	AREA has.	YIELD tons/ha.	PRODUCTION tons	AREA has.	YIELD tons/ha.	PRODUCTION tons	AREA has.	YIELD tons/ha.	PRODUCTION tons	AREA has.	YIELD tons/ha.	PRODUCTION tons	AREA has.	AV.YIELD tons/ha.	PRODUCTION tons
Corn	74,438	0.82	61,039	69,953	0.66	45,272	53,018	0.99	52,488	36,334	0.67	24,344	233,743	0.78	183,143
Sorghum	66,687	0.84	56,017	38,051	0.62	23,524	41,902	0.96	40,226	10,055	0.33	3,318	156,195	0.79	123,085
Rice	29,680	4.00	118,720 a/	5,920	1.50	8,880	4,680	1.40	6,552	42,800	1.80	77,040	83,080	2.54	211,192
Beans	21,554	0.60	12,932	23,536	0.47	11,190	28,460	0.59	16,791	16,128	0.72	11,612	89,678	0.59	52,524
Pigeon Peas	24,829	0.40	9,932	18,567	0.37	5,651	17,744	0.36	6,388	7,240	0.48	3,475	68,380	0.37	25,446
Vigna Beans	14,029	0.35	4,910	6,420	0.35	2,243	9,839	0.29	2,853	8,886	0.45	4,000	39,174	0.36	14,006
Banana	22,164	6.55	145,174	25,369	5.07	133,641	14,953	6.77	101,232	19,006	6.90	131,141	81,492	6.27	511,188
Sweet Potato	18,179	4.34	78,897	16,427	4.30	70,491	15,715	4.16	65,374	12,209	4.08	49,813	62,530	4.23	264,575
Cassava	19,474	3.90	75,948	15,845	3.93	62,351	12,732	4.00	50,928	14,909	4.30	64,109	62,960	4.02	253,336
Yam	8,779	1.77	15,448	11,909	3.69	43,928	6,178	3.44	21,252	6,777	2.56	17,349	33,643	2.91	97,977
Sugarcane	23,881	41.90	1,000,614	8,170	49.90	407,683	14,450	60.50	874,225	12,670	56.30	713,321	59,171	50.6	2,995,843
Coffee	18,196	0.25	4,549	45,697	0.25	11,474	40,047	0.25	10,012	33,679	0.25	8,420	137,619	0.25	34,455
Cocoa	178	0.25	45	3,105	0.30	932	188	0.25	47	632	0.25	158	4,103	0.29	1,182
Cotton	-	-	-	2,819	0.37	1,037	4,419	0.36	1,577	1,340	0.36	483	8,578	0.36	3,097
Sisal	10,780	1.00	10,780	1,760	1.00	1,760	7,740	1.00	7,740	15,320	1.50	22,980	35,600	1.22	43,260
Vetiver	-	-	-	5,180	2.00	10,360 b/	-	-	-	-	-	-	5,180	2.00	10,360
Peanuts	8,872	0.77	6,831	7,770	0.85	6,629	17,560	0.70	12,292	12,860	0.63	8,102	47,062	0.72	33,854
Coco	-	-	1,300	-	-	49,645	-	-	10,159	-	-	1,336	-	-	62,440
Mango	-	-	136,151	-	-	61,491	-	-	85,129	-	-	55,756	-		338,527
Orange	-	-	10,020	-	-	15,810	-	-	7,969	-	-	29,351	-		61,150
Grapefruit	-	-	7,573	-	-	23,999	-	-	31,720	-	-	20,212	-		83,504

a/ Paddy rice.

b/ Tons of vetiver roots.

Source: Haiti, Minstry of Plan, DATPE, Schema d'Amenagement, Complexe Primaire, 1984.

and protein deficits are estimated at 40% and 50% respectively. The average life expectancy at birth has been estimated officially at 52 years, but it probably is less than that by five or six years. It is a common experience that agricultural workers are unable to work past their middle and late thirties, out of undernourishment and cumulative exhaustion.

Although absolute labor productivity is low, in relative terms, the analysis in this study indicates that the average Haitian farmer is a very efficient producer. In spite of malnutrition, his productivity is high relative to the resource base he has to work with, which is meagre. This attribute translates into the fact that Haiti is potentially competitive on world markets in most of its principal crops. Domestic marketing channels have been studied and judged to be efficient as well (Roe, 1978). This efficiency of the sector relative to its resources is its main strength and would suggest that with more appropriate policies the largely negative trends of recent decades can be reversed. Other promising factors for the future are the potential for (eventually) extending the fully irrigated area by a factor of four-fold; the suitability of Haiti's climate and soils for crops like bananas, sugarcane, mangoes and a high grade of coffee; and the agro-climatic possibilities for double cropping and even triple cropping in many areas. In the major crops, Haiti's varieties are largely those of two to three hundred years ago, and fertilizer is used only in the most limited quantities (4 kg/ha. on average). Therefore the potential for productivity increases via better research and extension and use of inorganic fertilizers is considerable.

In this study, two aspects of Haitian agriculture are analyzed: i) the cost structure of the sector, and its implications for absolute and comparative advantage, and ii) the fiscal and pricing system of the sector.

The analysis of this latter topic shows how price incentives are influe by a variety of government policies, and it also is a small-scale case study in the possibilities of fiscal reform. The analysis of the first topic is a kind of case study in evaluating the competitiveness with da of variable quality.

2. Agricultural Production and Its Cost Structure

2.1. Production Levels

The available estimates on agricultural production in Haiti are qu divergent, but there is a general consensus that food production per ca has been declining. The national accounts estimates indicate that betw 1955 and 1982, real agricultural GDP expanded by only 1% per year, whic means a decline of over 1% per year in per capita terms. The counterpa to this decline is the fact that food prices have tended to rise more rapidly than prices in general. Perhaps the only exceptions to the declining per capita trend in supply have been rice, potatoes, groundnu mangoes, tobacco and vegetables.

Recently the results of a nation-wide aerial photography program l become available, for the year 1978, and they provided the most reliabl estimates to date of areas cultivated and probably of production as wel These results are shown in Table 3 for the major crops. In terms of ar cultivated, the most important crops are, in order, corn, sorghum, cofi beans, rice, bananas, pigeon peas, cassava, sweet potatoes, and sugarc. In terms of volume of production, the most important are, again in ord sugarcane, bananas, mangoes, sweet potatoes, cassava, rice, maize, sor and yams.

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n all important crops, yields remain at or among the lowest in the ean region. They are particularly low in the case of coffee, for yields are 3 to 3-1/2 times higher in El Salvador, Guadalupe and , and more than two times higher in Cuba and Nicaragua. They also ry low by regional standards in corn (Table 4). One of the limiting s is the relatively low rate of use of modern inputs, occasioned by s' lack of cash and also by an inadequate fertilizer distribution . Another limiting factor is the weakness of the institutional ltural system in general and in particular with regard to research tension. In this section, the cost of production of a few key crops iewed with a view to determining those crops in which Haiti may have arative advantage, or is closest to having a comparative advantage. eterminations can serve as useful guides to pricing policy and ms directly oriented toward increasing production.

Procedures and Data

ield level cost-of-production studies have been carried out for 1982 83 by two study teams. For the northern region, 1983 data were ed for more than 100 representative cropping activities by a team red by the French government and published in ODN and FAC, ltures et Paysans du Nord et du Nord-Est d'Haiti, Paris. These data sed on extensive use of questionnaires and field interviews. For all s, 1982 data were compiled for more than 40 representative cropping ties by the Haitian firm Capital Consult S.A., in a study sponsored German government, and published in Capital Consult, Promotion des issements dans L'Agriculture, Port-au-Prince. These two studies are in sources of the cost data used in this report. A third recent

TABLE 4. COMPARATIVE ANNUAL YIELDS BY CROP, 1978

Country	Rice	Corn	Beans	Sugarcane	Coffee
Cuba	2.09	1.25	0.71	53.29	0.54
El Salvador	3.51	2.14	0.81	77.48	0.89
Guadalupe	--	1.20	--	47.89	0.95
Haiti	2.54	0.78	0.59	50.63	0.25
Mexico	3.28	1.33	0.59	71.87	0.75
Nicaragua	2.92	0.92	0.77	60.79	0.66
Dominican Republic	2.67	2.10	0.82	62.35	0.31

Units: MT/ha.

Source: Schema d'amenagement du Territoire, Ministry of Plan, Haiti, and Table 4.

study is available, based on research and extension work,[2] but its cost estimates for the "traditional" technologies appear far too low to be realistic. That study is useful for comparing improved and traditional technologies, but not for assessing the costs of production.

One of the principal questions to arise in calculations of comparative advantage concerns the shadow pricing of inputs and outputs. For the most part, the only inputs of any significance are labor and land, so the question is reduced to one of labor, land and outputs. Some evidence on the labor market has been reviewed and it is concluded that prevailing wages appear to be very close to market equilibrium wages. Some distortions may be introduced by the fact that family labor has somewhat limited mobility in the short run (although the family may move out of rural areas in the longer run), and therefore family labor may have a low opportunity cost in the short run. This circumstance leads to the observed fact that family labor sometimes will work on its own farm at a return to labor which is lower than the market wage. This fact is consistent with the presence of occasional labor shortages, which occur at periods of peak labor demand. It is difficult to evaluate the quantitative importance of this family labor phenomenon, but to illustrate its possible importance the costs of production in traditional regimes have been evaluated at two wage rates: the market wage and 80% of the market wage. It should be borne in mind that market wages vary significantly by locality, and in compiling the costs of production the wages of the corresponding localities have been used.

Even though most agricultural land in Haiti is owner-operated, there is an active market in the rental of land. Even were there not a rental market, land would have a well-defined opportunity cost, as defined by its

returns in alternative cropping uses. The opportunity cost of land of is difficult to measure, but the pervasiveness of the rental market in Haiti means that estimates are available, by locality, of the annual marginal value product of land. For this inquiry, it has been assumed there are no significant distortions in the rental market for private This study is somewhat unusual in including annualized land costs, for normally they are not included in comparative advantage studies.

As regards prices for outputs, the procedure has been to use international prices as measured by Haiti's c.i.f. import prices. Som care must be used in defining these import prices. The appropriate shipping form of the product is taken into account. For grains, this that the price of importing in sacks is the relevant price, for Haiti not have facilities for unloading in bulk. In this chapter, internati prices are compared directly with costs of production, and not with producer prices, for there are no reliable data on the latter.

Production costs have been compiled for different farming regimes typically traditional and improved. Within the category of traditiona farming, in some cases the estimates have been compiled separately for monoculture cultivation and crop associations (intercropping combinati or crop consortiums). The latter are in fact the predominant form of farming in the more traditional areas. In agriculture, it is importan recognize that there is not a single cost of production. Rather, in a countries there is a supply function, usually with hundreds of thousan millions of points on it. The supply function may rise significantly the range of actual quantities produced, reflecting the fact that production costs vary widely within the sector. This is usually the c in developing countries, and many of those producers who have high cos

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tion cannot simply go out of agriculture. One option is to migrate
poor areas of cities, but in the medium term most rural families
to remain in agriculture. Because their costs of production are too
or them to be competitive, they remain in subsistence or
subsistence agriculture.

osts of production are reported separately for the different
pal farming regimes, and comments on their implications for questions
parative advantage are offered subsequently. Comparative advantage
ordinal concept. Above all, it refers to a ranking among products
egard to their viability in international trade. In this chapter
gs are established but also some inferences are developed regarding
solute profitability of trading particular crops at prevailing world
prices. Because of the tenuous nature of many of the data used,
alternative methodological approaches have been employed.

he first measure of comparative advantage used is the nominal
tion coefficient (NPC). This coefficient is simply the ratio of the
ic price -- appropriately defined -- to the border price of a good.
incipal source of appeal is its simplicity and comprehensiveness:
rms of protection and market distortions should be reflected in
. In the Haitian case, its difficulty lies precisely in its reliance
ces, for producer price data are not compiled. Some rough estimates
ducer prices have been developed, but they are based on estimated
er prices plus assumptions about average marketing margins. These
tions are founded in a marketing study (Roe, 1978), but nonetheless
ust be taken as rough approximations. In the field surveys which
ted the data on costs of production, farmgate prices are reported by
ty, and they are used in the tables to calculate measures of economic

profits at prevailing domestic prices. However, these price estimates are not reliable indicators of national average prices, for they are based on spot observations in narrowly defined localities. It is well known that prices in general, and rural prices in particular, vary enormously over time and space.

The estimates of costs of production are more reliable than the local farmgate prices, for the reason that the input prices (wages and land rents) are more stable spatially, and those prices were estimated with the aid of supplementary survey information. Agronomists are accustomed to developing crop budgets for different locales, and so there are opportunities to check the figures on costs of production against the professional judgement of other experts, but the same cannot be said for local product prices, which are much more volatile. For these reasons, the second two measures of comparative advantage are based on cost data rather than on producer price data.

By combining the cost data and border price estimates, it has been possible to develop measures of economic profit at international prices. The opportunity cost of land is included in the list of input costs that are taken into account in this measure of economic profit. It is not a measure of financial profit in, say, exporting, for family land and labor are valued explicitly, and marketing margins are not taken into account. Nevertheless, the economic profit (per hectare and per unit of labor) at border prices should give useful indications of crop rankings in the comparative advantage sense. In monoculture activities, the profit per hectare is a better guide than the profit per man-day, because land is more scarce than labor in Haiti.

The third measure is the domestic resource cost of earning or saving a

dollar of foreign exchange in exporting or import substituting. This measure is tied to the use of foreign exchange as a numeraire, but it has the advantage of distinguishing between imported and domestic inputs, which neither of the other measures does. It is defined as

$$DRC = \frac{C^d - c^m}{P^w e}$$

where

C^d = cost of domestic

C^m = cost of imported inputs

P^w = world (border) price of the good

e = exchange rate

All three measures can be computed at alternative exchange rates, say the existing one and an estimate of an equilibrium exchange rate. For the DRC, when the exchange rate is varied, the cost variable C^m is adjusted accordingly. In an agricultural economy like Haiti's, imported inputs can be defined as all inputs except land, labor, and seeds, as a fairly good approximation. No attempt has been made to correct for subsidies on inputs, for it is reported that much of the subsidized fertilizer is re-sold at a market-clearing price before it reaches the final user.

In the immediately following section the data on production costs are reported and discussed, along with the related calculations of economic profit. Then in the succeeding section the three measures of comparative advantage are presented and reviewed.

2.3. Estimates of Production Costs

2.3.1 Corn

Table 5 shows the cost estimates for corn. Three different farming

TABLE 5. COST ESTIMATES FOR CORN PRODUCTION IN HAITI

	Traditional Farming, North		
	Monoculture a/	Associations b/c/	All d/
Cost/ton	205	162	173
Yield/hectare	0.54	n.a.	n.a.
Labor inputs:			
a) Total per ton	141	132	134
b) Per hectare:			
total	79	52	59
harvest	14	12	13
other	65	40	46
Shares of costs (%):			
Labor	84	82	83
Land	13	14	14
Profit/hectare:			
1) at local output prices	2	22	17
2) at border prices e/	2	25	19
Profit/man-day at border prices e/	.03	.48	.32
Cost/ton with labor at 80% of market wage	171	129	140

n.a. = not applicable.

Units: Cost/ton and profit in $US.
Yields in tons/hectare.
Labor inputs in man-days.

a/ St. Raphael, Plaine du Nord, Dondon.
b/ In the crop associations, unallocated inputs and costs are assig in proportion to corn's share in the total revenue of the associ
c/ St. Raphael, Plaine du Nord, Terrier Rouge, Dondon.
d/ The averages for traditional farming are calculated with weights crop associations (which are predominant) and 25% for traditiona
e/ At a border price of US$220/ton.

Sources: Compiled from ODN and FAC (1983) and Capital Consult (1982)

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s are included: traditional monoculture, traditional crop ations, and improved farming. The estimates for the first two s are from four areas in the northern region, and the estimates for ed practices are in the Cul-de-Sac plain near the capital (West). The unit production costs vary significantly by regime. They are for the improved technology (which includes fertilizers, emicals, and some mechanization). They also are lower for the crop ations than for monoculture under the traditional technologies. s expected, labor and land costs comprise the great bulk of tion costs, especially in the more traditional technologies. From a ological viewpoint, it is interesting to note that omission of land would, in these cases, lead to an understatement of total costs by 15%.

n all production regions, Haitian corn can be produced at a lower han imported corn, which cost $220/ton in 1982 and $249/ton in 1983, Port-au-Prince, in sacks. (Haiti does not have bulk unloading ties.) Some reports have compared the c.i.f. price with the u-Prince consumer price (e.g., Mushkin 1983 and Kite and Pryor 1973), e appropriate comparison is with producer prices, for marketing s must be added in both cases. For serving the population of u-Prince, imported corn would have a lower transport cost than most c corn would, but for serving the rest of the country domestic corn have the transport advantage. And in either case, marketing and e costs are reflected in the consumer prices. In the absence of a ed study on the spatial structure of consumption and the structure of ing, the most relevant comparison of prices involves c.i.f. prices oducer, or farmgate, prices (costs). When this procedure is

followed, the conclusion regarding corn is that Haiti is competitive with imported sources of supply, even at the low yields which characterize traditional cultivation practices. This conclusion differs from that of other studies which have compared c.i.f. prices with domestic consumer prices.

The profit per hectare reported at the bottom of the table is first calculated with respect to the farmgate prices prevailing in each locality and then with respect to international (c.i.f.) prices for 1982. In both cases, it is an economic profit, after all inputs have been assigned a cost, including land and family labor. For the marginal categories of producers, the first category of profit tends to be very low (even negative in some individual cases), and the second kind of profit is yet lower. For the inframarginal producers, the profit is higher. The inframarginal producers generally also face higher land rents, explicitly or implicitly. For the seven traditional localities surveyed for the data in Table 5, the land rent averaged US$20 per hectare per crop season (1-3 crop seasons per year). For the two localities using improved techniques (in the Cul-de-Sac region), the land rents were US$62 per season (two crop seasons per year).

2.3.2. Rice

The cost data for rice are shown in Table 6. The most striking fact about those costs is their enormous variation over agricultural regime. Unit production costs/ton under the traditional techniques are as much as three times the costs under modern techniques. Correspondingly, the price of rice varies strongly over localities and years. In the northern localities the 1983 price of rice was two times the price in the Artibonite in 1982. This price variation permitted positive profits in some cases of traditional cultivation, but those techniques are far from being profitable

TABLE 6. COST ESTIMATES FOR RICE PRODUCTION IN HAITI

	Traditional Farming, North 1983		Irrigated Cultivation	
	Swamp Cultivation a/	Rainfed Cultivation b/	North 1983 c/	Artibonite Valley 1982
Cost/ton	754	794	473	261
Yield/hectare	0.61	0.65	1.36	3.83
Labour inputs:				
a) Total per ton	277	380	196	49
b) Per hectare:				
Total	169	247	266	186
Harvest	36	31	77	69
Other	133	216	189	117
Shares of Costs (%):				
Labor	66	65	57	55
Land	25	23	26	18
Profit/hectare:				
1) at local output prices	37	-47	354	452
2) at border prices d/	-82	-154	14	667
Profit/man-day at border prices d/	-0.49	-0.62	0.05	3.59
Cost/ton with labor at 80% of market wage	654	691	419	234

Units: Costs and profit in US$.
Yields in tons/hectare.
Labor input in man-days.

a/ Plaine du Nord, Camp Louise, Dondon, Haut Maribaroux.
b/ Camp Louise.
c/ St. Raphael.
d/ Using the 1973-82 average border price of US$486/ton.

Sources: See Table 5.

at international prices. In fact, a modest expansion in the Artibonit rice production, along with improvements in the channels of rice marke probably would displace much of the rice produced by more traditional means.

According to Mushkin (1983), the c.i.f. price of imported rice wa US$420/ton in 1982 and US$576/ton in 1981. A 1973-82 average was US$486/ton. These figures indicate that Haitian irrigated rice is marketable at world market prices, especially that grown in the Artibo but that swamp rice and rainfed rice are not. As regards the structur production costs, the labor share of costs is lower for rice than it i corn, and the land share is higher.

2.3.3. Coffee

Table 7 gives the cost estimates for coffee. Again, there is considerable variation according to cropping technique. Yields are ve low by international standards, and hence the labor inputs per unit of output are very high. Nevertheless, Haiti remains a competitive produ of coffee. The world market price, f.o.b. Haiti, averaged $2,375/MT i 1981 and 1982, and the price to Haitian producers averaged $1,175/MT i those years. Prices were higher in the preceding four years, and lowe before that. In all years since the mid-1970s, Haitian farmers have received a higher price for sales to the domestic market than for sale the export market.

For the sample farms, in Table 7 the yields are lower than the national average. It is apparent that at least in these cases no mode inputs are used in coffee production. Labor and land together account all of the production costs. Nominally, fertilizer is subsidized for on coffee, but in practice the subsidized fertilizer is diverted mostl

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TABLE 7. COST ESTIMATES FOR COFFEE PRODUCTION IN HAITI, 1983

	In Crop Associations		
	Coffee a Major crop	Coffee a Minor crop	Monoculture
t/ton a/	364	851	430
lds/ha b/	.16 (2.11)	.03 (0.39)	0.14 (1.84)
or inputs: c/			
) Total per ton	375	433	337
) Per hectare:			
Total	60	13	47.2
Harvest	44	7	25
Other	16	6	22.2
res of costs (%): d/			
Labor	51	61	60
Land	49	39	40
fit/hectare:			
) at local output prices	37	6	163
) at border prices e/	46	9	105
fit/man-day at border rices e/	0.77	0.69	2.22
t/ton with labor 80% of market wage	327	747	378

ts: Cost/ton and labor rent/ha in US$.
Yields in tons/ha.
Labor inputs in man-days.

Including the annualized cost of planting.
Annualized yields (over 13 years) are given first, and then total yields over the plant's life are given in parentheses.
Annual, including annualized planting labor.
Shares of annualized costs.
At a "border price" (for producers) of $1,175/ton; see text.

ces: See Table 5.

other crops. In any case, the amounts of fertilizer used in Haitian agriculture are very small. From a farmer's viewpoint, one of the advantages of having a coffee bush is that its harvest may be sold in advance to raise cash. Such sales are frequently made, usually two to three months in advance of the harvest. This practice in effect adds a premium to the price of coffee and encourages farmers to grow it when they might not solely on grounds of profitability. The costs of establishing the coffee trees are amortized over the tree's productive lifetime the purpose of compiling for the data in Table 7, and likewise the labor figures include annualized planting labor.

2.3.4. Sugarcane

The costs of sugarcane are shown in Table 8. These cost estimates of $8 to $10 per ton are based on mixed cropping (crop associations), which is a common practice with cane in Haiti. Other estimates based on cane monoculture lie in the $6 to $7 range, per ton. Generally, there is much less variation in cane costs/ton and profits/ton than there is in other crops. To compare these cane costs with costs in other countries, adjustments must be made for the processing costs. The normal procedure is to divide the cane cost by the percentage content of sucrose in the cane, and the result is then called the field cost of producing raw sugar. The most recent estimate of the average sucrose content of Haitian cane is 6.59%, for 1980-84. (This marks a significant departure from the sucrose content of 8.04% estimated for 1970-74.) From Table 8, then, the field cost of Haitian raw sugar ranges from US$121/MT to US$152/MT. It must be emphasized that much of Haiti's cane is grown in crop associations, and there are no data available on the costs of cane associations.

For comparison, a recent World Bank study of cane production in 56

TABLE 8. RECENT COST ESTIMATES FOR SUGARCANE PRODUCTION IN HAITI

	Quartier Morin (North) a/	Plaine du Nord (North) b/	Les Cayes (South) b/
Cost/ton	8	8	10
Yield/hectare	42	46	65
Labor inputs:			
a) Total per ton	2.7	3.7	1.9
b) Per hectare:			
Total	113	169	124
Harvest	54	60	85
Other	59	109	39
Shares of Costs (%):			
Labor	52	56	20
Land	14	10	27
Profit/hectare:			
a) at local output prices	210	232	186
b) at border prices c/	312	335	314
Profit/man-day at border prices c/	2.76	1.92	2.53

Units: Cost and profit in US$.
Yields in tons/hectare.
Labor input inputs in man-days.

a/ From ODN and FAC (1983); costs are based on mixed cropping (crop associations).
b/ From Capital Consult (1982); costs are based on mixed cropping.

c/ Evaluated at a "border price" of $15.40 per ton of cane. This corresponds to an f.o.b. price of sugar of 14¢/lb. (15¢ world price), a 12:1 cane-to-sugar conversion ratio, and the assumption that under normal conditions cane growers would receive 60% of the value of the sugar contained in the cane.

Note: Other calculations based on monoculture cane indicate that those costs are in the range of $6 to $7 per ton.

countries gives the following 1982 field cost figures for raw sugar for lowest-cost cane-producing countries (per MT):3

1.	Malawi	US$114
2.	St. Kitts	120
3.	Kenya	129
4.	South Africa	139
5.	Mauritius	150
6.	Fiji	153
7.	Brazil (center-south)	155
8.	Australia	158

The average cost for the 56 countries surveyed is US$193/MT.

The surprising result of these considerations is that Haiti is a relatively low-cost producer of cane, at least in monoculture cultivati From this finding it does not necessarily follow that Haiti should expa its cultivation of cane beyond that necessary to meet domestic demands fulfill its share of the U.S. quota. The question is one of comparati advantage, not absolute advantage. Specifically, in the case of cane is the question of competition with rice and bananas for the same land. rice in irrigated areas and bananas in humid rainfed areas. Although competition is reflected in land rentals, the question is complicated two important externalities which affect Haitian agriculture. One is question of the extensive soil erosion. The erosion question affects issue of coffee vs. foodgrains in the hilly areas, but it also means t the labor intensity of crops in the plains is an important considerati The greater the employment possibilities for hired agricultural labor the plains, the less the pressure on marginal farmers to plant more fo crops on steep slopes. Although sugarcane is a fairly labor-intensive

rice is more so.

A second externality which is relevant is the susceptibility of as to theft. Nutrition is so low in Haiti that theft of crops has on major proportions, especially in the north. Owing to the nature e crop, large stands of bananas are uniquely vulnerable to this em, whereas rice and sugarcane are not. In this case, the externality in favor of cane. Finally, there are questions of processing ıency, and Haiti does not rank as highly in that as it does in ıency of field production. Nevertheless, an important conclusion of ost analysis is that it is economically efficient for Haiti to attempt pand its cane production sufficiently to raise the mill rates of ıty utilization to acceptable levels. Under optimal conditions, this ısion would occur through increases in yields rather than increases in cultivated.

2.3.5. Bananas

Cost estimates for bananas are shown in Table 9. As in the case of crops, banana cultivation has been undertaken in both traditional and ıved ways, and the improved techniques are the much more profitable of wo. In comparison with other crops, bananas are relatively table, at both local and border prices. Land costs form a high ırtion of total unit costs, so bananas represent a relatively efficient ıf land resources. The profits/hectare on the crop associations cannot aluated without information on the other crops in the association, but ırofits/man-day can be. By that standard, again bananas appear to be ıf Haiti's more profitable crops.

Estimates of Comparative Advantage

TABLE 9. COST ESTIMATES FOR BANANA PRODUCTION IN HAITI

	Traditional Cultivation, North		Improved Cultivation, Plaine de l'Arcahaie c/
	Monoculture a/	Associations b/	
Cost/ton	96.9	59.1	84.6
Yield/hectare	4.06	1.85	15.4
Labor inputs:			
a) Total per ton	37	28	n.a.
b) Per hectare:			
total	93	32	n.a.
harvest	26	8	n.a.
other	67	24	n.a.
Shares of Costs (%):			
labor	61%	42%	32%
land	31%	56%	14%
Profit/hectare:			
a) at local output prices	330	148	1,750
b) at border prices d/	384	170	1,811
Profit/man-day at border prices	4.13	5.31	n.a.
Cost/ton with labor at 80% of market wage	85.1	54.1	79.2

a/ Bord du Mer/Limonade, Quartier Morin, Plaine du Nord.
Source: ODN and FAC, 1982.
b/ Dondon, Grande Riviere/Bahon, Grison Garde, Grande Bassin.
Source: ODN and FAC, 1982.
c/ Source: Capital Consult, 1982.
d/ Since bananas are potentially an export crop, the relevant border price is the f.o.b. price reduced by a marketing margin. In this case the f.o.b. export price has been taken to be 12.5¢/kg ($2.07/bunch) on the basis of information from the Dominican Republic. The marketing margin is estimated at 25% of the export price. That leaves a producer-equivalent border price of 9.4¢ per kg.

TABLE 10. COMPARATIVE ADVANTAGE INDICATORS FOR HAITIAN AGRICULTURE

		Maize		Rice		Bananas		Coffee		Sugarcane	
		Traditional	Improved	Swamp	Irrigated, Artibonite	Traditional, Monoculture	Improved	In Association	Monoculture	Quartier Morin	Les Cayes
Profit/ha	(1)	19	300	-110	702	384	1,811	46	105	332	374
	(2)	40	479	-63	998	539	2,434	67	138	485	619
Profit/man-day	(1)	0.32	2.07	-0.60	3.59	4.13	n.a.	0.77	2.22	2.94	3.01
	(2)	0.62	3.30	-0.33	5.10	5.80	n.a.	1.12	2.92	4.29	4.98
DRC	(1)	0.88	0.57	1.57	0.47	0.51	0.29	0.56	0.36	0.57	0.64
	(2)	0.72	0.45	1.31	0.37	0.42	0.23	0.47	0.30	0.47	0.51
NPC	(1)	1.25	1.25	1.20	1.20	n.a.	n.a.	0.5	2.0	0.84	0.84
	(2)	1.05	1.05	1.00	1.00	n.a.	n.a.	0.42	2.4	0.70	0.70

Note: (1) indicates valuations at border prices, under the prevailing exchange rate.
(2) indicates valuations at border prices with a 20% devaluation.

As discussed above, this study employs three measures of comparati advantage: net economic profit, including all costs of land and family labor; the domestic resource cost (DRC) of earning a (net) dollar of foreign exchange; and the nominal protection coefficient. The measures applied to the different techniques of cultivation. Following these procedures, the comparative advantage calculations are shown in Table 1

Owing to the fact that the estimates of domestic producer prices a rather crude, a better indication of comparative advantage can be gaine from the profit measure and the DRC. By both of these measures, banana under improved cultivation turn out to be the crop with the greatest comparative advantage. According to the DRC measure, monoculture coffe next, followed by irrigated rice, and then improved maize and sugarcane close. However, at present, very little of the coffee is grown under monoculture, and very little maize is grown with improved techniques. Hence, taking into account all measures, the crop rankings are bananas, irrigated rice, coffee, sugarcane, and maize. Bananas and rice are sufficiently profitable[4] to suggest the potential for exports. Sugarcane also is sufficiently profitable that import substitution and fulfillment of the Haitian share of the U.S. sugar quota would appear t economically justified.

The rankings by profitability per ha. are different in that sugarc and improved maize move ahead of coffee. These rankings are based on classifying land as the most scarce factor in Haitian agriculture. Th explain why coffee production appears to be in decline, even though it a favorable DRC.

The calculations in Table 10 show that, at world prices, Haitian agriculture tends to be efficient even under traditional techniques of

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vation. Improved techniques are yet more efficient. Rice and maize ises in point. In other words, Haiti has the potential to be titive internationally in a number of crops, but that potential is not alized in many cases. Perhaps the greatest surprise is the finding Haiti is a low-cost producer of sugarcane.

The Pricing and Fiscal Systems in Haitian Agriculture

The Pricing System

In Haiti, both macroeconomic and sector-specific policies influence ultural prices. The macroeconomic triad of fiscal, monetary, and -related policies has counterparts at the sector level. Fiscal policy riculture consists of taxes, subsidies, and government interventions create rents for the public sector and the private sector. The ultural counterparts of monetary policy are the credit allocation lines and the interest rates on agricultural credit. Trade-related ies refer to tariffs, import licensing, export taxes, and the exchange These policy areas overlap; for example, tariffs and export taxes g to both fiscal and trade policy.

The sector-specific pricing policies are represented by the istered prices, which are relatively few. At the producer level, the of sugarcane for centrifugal mills is fixed by fiat, but cane ssed by more traditional means is not subject to controls. Also, the tute for Agricultural and Industrial Development (IDAI) sets the icer price of cotton, although cotton now is a relatively minor crop, ying some 8,580 hectares in 1978, or about 0.9% of the cropped area. At the consumer level, prices are administered for flour, sugar,

vegetable oil, milk, and lard, but the per capita consumption of the last two items is very small. Flour and sugar are somewhat more important in the average diet, but they are not principal items. It is estimated that the annual consumption of wheat flour is 8.8 kg. per capita, or 2% of the average total food intake by weight. Sugar consumption (not including sugar in its traditional forms) is about 11.7 kg. per capita, or 2.8% of the total intake.5

The prices of the most important items in the national diet (cassava, corn, sweet potatoes, sorghum, rice, legumes, vegetables, and fruit) are determined entirely by supply and demand -- subject in some cases to the influence of trade policies. Overall, administered prices do not play as significant a role in Haiti as they do in many other countries, but for a few products their levels depart considerably from market equilibrium levels. The ex-factory prices of flour, sugar, and vegetable oil are well above international norms, and the producer price of cotton is well below the international norm. In the cases of flour and sugar, trade policy is coordinated with the administered prices, for imports are effectively prohibited or limited to small quantities. (Since the Dominican Republic devaluation in 1983, however, this prohibition is being undercut by contraband Dominican sugar.)

Credit policy has relatively little impact on the pricing structure of Haitian agriculture, since institutional credit accounts for such a small share of the sector's credit requirements. Fiscal policy is much more significant from a pricing standpoint. First, the export tax rates are high, and since the dollar prices of Haiti's exports are determined in world markets, the export taxes significantly reduce producer prices in gourdes. This effect is particularly noteworthy for coffee, but it also is

true for cacao, sisal, essential oils, and other products. Second, domestic flour and sugar taxes contribute to the high domestic prices of those goods. Third, in the case of flour and sugar, the administered prices are, in effect, instruments of fiscal policy; they appear to be set largely with a view to possibilities for raising revenue fom parastatal processing plants.[6] Also, fiscal policy in Haitian agriculture has consequences for income distribution, in part because of ts effects on prices and in part because of the private rents it creates. Fiscal policy is reviewed in some detail below.

In the area of trade-related policies, the most important instruments are import licensing, tariffs, export taxes, and the exchange rate. Tariffs are administered with frequent exemptions, but they do affect prices for grains. For wheat and oilseeds (fairly large items in the food import bill) there is no explicit tariff but rather an "implicit tariff" through the pricing policy on processed products. Regarding the exchange rate, Haiti has followed a fixed rate policy with respect to the dollar since 1919 and until recently, the official exchange rate approximated a parity rate. In recent years, Haitian inflation rates have been higher than those of its major trading partner, the United States, and therefore the gourde now appears slightly overvalued. This fact must be taken into account in evaluating the prices of Haitian agricultural products.

The recent changes in the real exchange rate have had impacts on the agricultural sector. For producers, the overvalued exchange rate reduces the income derived from export products and import-competing products, biasing production toward traditional crops for the domestic market. Coffee is cultivated predominantly by smallholders, so in this case the exchange rate policy adversely affects the incomes of smallholders. Within

the agricultural sector, the fiscal consequences of the overvaluation l to a net gain for the treasury. Export tax revenues are reduced by the overvaluation, but that loss of potential revenue is more than compensa for by the increased profits in the parastatal flour mill alone. Thus within the sector, the exchange rate policy has a positive effect on pu revenue, but a negative effect on producer incomes as well as distortio cosequences for resource allocation (and hence for long-run growth prospects).

When export taxes are taken into account, the effects of the excha rate policy are reinforced. Government policies thus have the net effe of holding producer prices well below their market equilibrium levels f export crops and cotton.

For grains, the overall pricing picture is a bit more complex. Th overvalued exchange rate makes imported grains artificially cheap, but i is offset by tariffs and restrictive licensing practices. The net effe is to raise domestic grain prices, at the producer level, above border prices for rice and sorghum. The corn price would be about equal to th border price under an equilibrium exchange rate, and between 1978-80 it below the border price equivalent. Imported yellow corn is used almost exclusively for poultry and animal feed, but by substituting it for domestic maize in these uses it influences the supply-demand balance for maize in human consumption.

Other forces are also at work in the grain markets. Flour, which c serve as a substitute for domestically grown food grains at the margin, priced well above the c.i.f. equivalent, and hence its availability does not serve to reduce food prices. Consumed mostly in cities and towns, flour also is present to a lesser extent in rural areas. Sorghum is a

r special case; it is largely a subsistence crop grown and consumed by ncome farmers in remote areas. Its price is higher than the imported alent would be and there are no imports. The price certainly reflects y and demand considerations in the absence of imports, but it is ful that imports could reduce the price very much under the current nge rate, owing to the cost of marketing imports in the hinterland . Cassava and sweet potates are important items in the rural diet, as as substitutes for sorghum and maize, but there are not enough data on rices of root crops to evaluate them.

One of the major effects of the combined pricing policies is to ss the prices of export and industrial crops relative to the prices of tic food crops. Also, the producer price of rice is somewhat higher it would be under conditions of free trade at an equilibrium exchange and foods processed in Haiti (flour, sugar, edible oils) have very prices. The high consumer price of sugar is not reflected in producer s of cane; the producer-consumer price ratio for sugar is perhaps the t in the world. And since all wheat is imported and only small ities of edible oils are produced in Haiti (mainly cottonseed oil), cers do not benefit from any of the high administered prices. Hence, the pricing policy depresses producer prices on the average and rts relative producer prices. Export and industrial crops pay the est penalties and because of pricing policies, producers lose more in crops than they gain in rice. On the consumer side, consumption is tively taxed for rice, centrifugal sugar, flour, and edible oils. plays a very small role in the diet of the poor, however, for it is a y vehicle for obtaining nutrition. (Rice is two to three times more sive than maize per calorie and per gram of protein.) Overall,

prevailing pricing policies impose a considerable cost on consumers. This finding contrasts with the situation in many other developing countries, where consumption is subsidized. It also is noteworthy because Haiti's nutrition levels are the lowest in the hemisphere. Thus, both consumers and producers are taxed by the combination of pricing instruments. Only the national treasury gains.

Table 11 compares domestic and border prices for selected principal products. Table 12 provides estimates of the net tax or subsidy for each product implicit in Haitian pricing policy, based on estimates of consumption levels per capita of a number of foods.

As Table 12 shows, the combination of pricing policies has a greater effect on consumer welfare than on producer welfare, and the effect on both is negative. The entries in the table were compiled by multiplying the price differentials in Table 11 by the quantities produced or consumed.[7] The sorghum price differential is not included in the calculations because it is probably not affected by policies. To calculate the loss to producers of the sugar cane price policy, some assumptions were required. First, the international price is taken to be $0.15/lb. Second it is assumed that the cane-to-sugar conversion ratio is 12:1. Third, it is assumed that a normal pricing policy (as practiced in other countries) would give about 60% of the cane's value to the cane growers. Taken together, these assumptions imply a cane price of $16.50/ton, vs. the actual price of $13.00 per ton in Haiti. This difference, multiplied by the amount of cane production, implies an annual loss to cane growers of about US$18.9 million.

Rice is the only case in Table 12 with symmetrical effects on producers and consumers: a change in the price affects both groups in

TABLE 11. DOMESTIC AND BORDER PRICES FOR SELECTED AGRICULTURAL PRODUCTS

(Gourdes/MT, 1982)

Product	Border Prices: At Official Exchange Rate	Border Prices: At Equilibrium Exchange Rate	Domestic Price	Domestic Price Definition
Coffee	2,340	2,808	1,732	Intermediary
Cacao	9,000	10,800	6,372	Exporter
Cotton Fibre	7,574a/	9,088	4,950b/	Producer
Maize	1,100	1,320	1,380	Producer
Rice	2,101	2,521	3,029	Producer
Sorghum (1981)	1,155	1,386	1,558	Producer
Flour	2,107	2,528	2,638	Ex-factory
Sugar (raw)	1,650c/	1,980	3,960	Wholesaled/
Edible Oil				

a/ Average of U.S. and Mexican prices.
b/ Fibre equivalent price.
c/ At $0.15/lb.
d/ Ex-factory plus taxes.

Note: These producer prices were derived indirectly from information on consumer prices in Port-au-Price, and they are not very reliable.

TABLE 12. IMPLICIT TAXES (-) AND SUBSIDIES (+) IN AGRICULTURAL PRICING POLICY

(Million Gourdes, 1982)

	PRODUCERS	CONSUMERS
Coffee	-92.5	n.a.
Cacao		
Cotton Fibre	7.1	n.a.
Maize	0	0
Rice	+37.5	-37.5
Sorghum	n.a.	n.a.
Flour	n.a.	-22.9
Sugar	-18.9	-142.5
Total	-81.0	-202.9

n.a. = not applicable

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te directions.[8] Leaving out rice, the net annual welfare cost to ·onomy of agricultural pricing policy is about G 209 million (or US$42 ·n). The cost represents about 7% of agricultural GDP each year. :stimates of the distributional consequences of pricing policy cannot le readily, but some qualitative remarks can be made on that subject. by the nature of the goods taxed on the consumption side, the ·it consumer taxes fall largely on urban groups. In rural areas, a ›roporion of the sugar is consumed in the form of open-pan sugar lou), raw cane, and local cane alcohol (clairin). While wheat flour :ts have penetrated some rural areas, their share of the average diet :h higher in rural areas. And, as noted, rice is not consumed in quantities by the poorest groups.

›n the producer side, most coffee and cotton producers are nolders but they are not the poorest subsistence farmers, who tend to sorghum or cassava and a small amount of legumes or vegetables. , while the implicit taxes affect a large part of the population, they to spare the very poorest. The implicit tax burden is largely carried e lower middle and middle classes, and the tax revenues go to the nment or, via rent creation, to the more entrepreneurial classes. the pricing system is regressive for the top two-thirds or -fourths of the income strata, but does not materially affect the t strata.

Trade Related Policies

Apart from export taxes, the trade-related policies that have the est impact on prices are the restrictive import licensing practices -- ·ially for rice, wheat flour, and sugar -- and the exchange rate

policies. As mentioned above, sorghum imports are not likely to be practicable because sorghum's market is neither urban nor oriented toward animal feed. As regards maize, Haitian consumers prefer their own varieties over the U.S. yellow corn. It is estimated that this preference could translate into a quality-related price differential of at least ten percent. Given this fact plus the prevailing pattern of prices, it does not appear that importing maize for human consumption would be a viable venture under an equilibrium exchange rate, although it might be nominally profitable under the prevailing exchange rate.[9]

Although under the prevailing exchange rate, short-run considerations suggest that importing more rice and possibly more maize would be an efficient measure, that conclusion does not necessarily follow in a longer-run context. Agricultural experts in Haiti agree that there is an important potential for raising rice yields, and in fact Haiti may develop a significant comparative advantage in that crop. With that in mind, it may be useful to maintain the existing price incentives for rice, in the medium term, as a means to help develop that potential comparative advantage. In the case of maize the picture is less clear, but nutritionally it is an important crop. Because considerations of farmer income and affordability move in different directions, there appears to be no strong justification for departing from the present policy of importing maize for poultry and animal feed only. It is important to remember that nutrition levels are determined more by the income levels of the poor than by the physical availability of food. The relatively restrictive licensing policy for grain imports appears reasonably justifiable when all factors are taken into account. A viable option would be to allow greater maize and rice imports under a temporary protective tariff (which now exists de

jure). The tariff need not be high (say, 20%) in order to protect producer incomes and producer incentives in these crops, and greater imports under a tariff would generate more fiscal revenues. The restrictions on imports of flour and edible oils do not appear justified from an economic policy viewpoint, their only apparent justification is fiscal: protecting the profits of the parastatal food processing plants.

3.3. The Agricultural Fiscal System [10]

Haiti's fiscal system currently is under pressure to generate more revenues, so on the surface the possibilities for reducing some of the burdens of the pricing system do not appear encouraging. However, closer examination reveals considerable diversity and a potential for flexibility in the agricultural part of the system. The fiscal pillars in agriculture are the coffee export tax and the revenues accruing from the parastatal flour mill (the Minoterie d'Haiti). Together these two sources generate about half of the agricultural tax revenues. The budgetary tax revenues can be grouped into eight categories: export taxes, taxes on processed foods, taxes on alcohol and cigarettes, import tariffs, lease fees on public lands, irrigation water charges, agricultural marketing taxes, and the profits of parastatal food processing plants.

In addition, the fiscal system generates extra-budgetary revenues which have no direct relation to the regular government expenditure accounts. There are two principal sources of these extrabudgetary revenues: special taxes on flour and sugar, and the profits earned from re-export of sugar and coffee to the U.S. quota. (The re-export goods are purchased on the world market and sold at the higher quota price; Haiti's own production has filled neither the sugar nor the coffee quota in the

last several years.) Taken together, the agricultural extrabudgetary revenues amount to perhaps 25% of the budgetary revenues in agriculture.

A final element of the fiscal system is what may be called "policy-induced rents." In a sense, these are foregone taxes -- private-sector rents created by public licensing or regulatory arrangements. In value, the largest of these rents is the income earne from the sub-leasing of public lands. The government leases public agricultural land for a fee well below market value, and the leaseholde customarily re-lease the land at a higher rate. Even for those leaseholders who choose to farm the land, however, the government's pol has created a rent. A second category of rent accrues to the use of irrigation water, which is priced at a rate below even the annualized O costs of the irrigation systems. (This second category of rent of cour may be observed in many countries.) The third source of rent is the ad exemptions from import duties and export taxes, and the fourth is the mandated supernumerary employment at parastatal food processing plants. This fourth kind of rent is significant; it may be estimated that it generates private incomes in the range of US$1.5 to $3.0 million per ye. Finally, there is a rent created by the failure to implement the constitutional provision that requires a tax on large landholdings. T is not an archaic provision but rather an amendment that was passed in August of 1983. The value of this last rent depends on the promulgated schedule, but it is estimated that even a modest and tax could generate revenue of at least US$5.0 million per year. All together, the policy-induced rents amount to 50% - 70% of the regular budgetary reven The extrabudgetary revenues and rents jointly represent 75% - 90% of th regular revenues.

'erhaps the best example of how the fiscal system functions is found ; Minoterie's flour milling operations. Public revenues or private are generated at five distinct points in the Minoterie's process: lasses of flour taxes, the plant's balance sheet profit (part of which netimes advanced to the treasury), a special account tax on flour accrues to the Regie du Tabao, and the rents associated with the lerable supernumerary employment.

'aken broadly then, Haiti's agricultural fiscal system is extensive ıried. There is room for flexibility in changing tax rates, but there ɜn more flexibility in the potential for shifting extrabudgetary ıes into the regular budget and for capturing into the budget the /-induced rents. Table 13 provides approximate estimates of the value ı of the main components of the agricultural fiscal system.

ı policy decision to incorporate the extrabudgetary revenues and the /-induced rents into the regular budget would have favorable ɜations for pricing policy where efficiency is concerned. First, it permit a reduction of export taxes which, as noted, distort relative ; and depress producers' incomes. Second, higher lease fees in public and higher irrigation charges, up to the marginal product of these rees, would have no direct effect on prices. The same statement can le regarding the possibility of taxing large landholdings. And third, ıction of supernumerary employment in the parastatals would permit a tıon in consumer prices of flour and vegetable oil. Thus, fiscal ns which raise more net revenues could also have neutral or favorable ts on the price structure of Haitian agriculture.

The distributional effects of fiscal reforms also could be positive, ıe policy-created private rents largely accrue to the upper income

TABLE 13. THE AGRICULTURAL FISCAL SYSTEM IN HAITI

		Value in 1982 (US$ million)
1. Instruments of Budgetary Taxation		
1.1	Coffee export tax	9.0
1.2	Flour tax (T.C.A.)	3.5
1.3	Flour tax (other)	1.1
1.4	Sugar tax	5.2 a/
1.5	Vegetable oil tax	0.9
1.6	Taxes on luxury foods and alcohol	2.1
1.7	Cigarette tax	8.4
1.8	Profit from flour milling (determined by administered sales price)	13.0 b/
1.9	Government profit from sugar mills (determined by administered prices of cane and sugar)	(negative)
1.10	Export tax: cacao	0.2
1.11	Export tax: sisal	0.005
1.12	Export tax: vetiver, lime, amyris	0.3
1.13	Export tax: meat	0.016
1.14	Other export taxes	negligibl
1.15	Tariffs on agricultural imports	?
1.16	Lease fees on public lands	approx 0.
1.17	Irrigation water charges (O&M)	0.2
1.18	Agricultural marketing taxes	?
		43.96
2. Extrabudgetary Revenue Sources		
2.1	Special account tax on flour	1.9
2.2	Special account tax on sugar	2.6
2.3	Profit on sugar re-export	6.0
		10.5
3. Policy-Induced Rents (to private sector)		
3.1	Rents on public lands	8.0
3.2	Rents from irrigation	6.9
3.3	Exemptions from import duties	0.5-2.0
3.4	Exemptions from export taxes	1.0-5.0
3.5	Supernumerary employment at parastatals in food processing	1.5-3.0
3.6	Failure to implement constitutional tax on large land holdings	5.0
3.7	Profit on coffee re-export	
		22.9-29.9

a/ US$8.0 million in 1983.

b/ Includes advance of US$2.9 million to the Government but does not ı capital reserve fund of US$2.6 million

strata. If a sufficient amount of the rents were captured in the budget and sufficient extrabudgetary revenues were transferred to the regular budget, then export taxes and flour milling profits could be reduced. The net effect would be an increase in economic welfare for the lower-middle and middle income strata. In light of these foregoing considerations, then, there appear to be important possibilities for structural reform in Haiti's agricultural fiscal system. It is possible to envisage reforms which would yield a positive and significant net change in revenues and at the same time have favorable efficiency effects on prices and progressive effects on the income distribution.

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Endnotes

1. In this chapter is edited from material originally developed as part extensive World Bank - AID - French government study of Haitian agric carried out in 1984. The findings of that study were positively rece by the Haitian government and some of its recommendations were implem and hence some of the information used here is out of date. Helpful cussions on parts of this report were held with Ralph Hanan, Javier T Paul Duret, Daniel Lafontaine, Guy de Rincquesen, and Steven Oliver, they should not be implicated in any remaining errors. Neither the W Bank nor the Haitian government should be held responsible for the vi expressed here.

2. See Texas A&M University and Haitian Research and Extension Staff, A Report 1983, USAID Contract No. 521-0078-C-00-1010-00, Research and Extension Component, Port-au-Prince.

3. See W. McNally, W. David, and D. Flood, Sugar Study, draft, World Ban July 1984.

4. The definition of profits used here is pure profits, exclusive of the opportunity costs of land and labor.

5. These consumption estimates are provided by the Agriculture and Nutri Planning Unit (UPAN) of the Ministry of Plan.

6. Haiti's single flour mill is government-owned as is the oilseed proce plant and two of the flour centrifugal sugar mills.

7. By not taking into account supply and demand elasticities, the estima this table are slight overstatements of the changes in consumer and producer surplus.

8. The consumer effects of coffee pricing policies have been omitted.

9. As in many countries, this kind of statement has to be qualified with spatial dimension. Imported maize might be more competitive than loc maize in Port-au-Prince, but not in other areas.

10. Owing to recent fiscal reforms, the figures in this section are very out of date in some cases.

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POLICY ISSUES IN MEXICAN AGRICULTURE

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POLICY ISSUES IN MEXICAN AGRICULTURE

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1. Introduction and Summary

After several decades of rapid development, Mexican agriculture has become, in the 1970s and 1980s, a subject of considerable concern at the level of national policy. In the early and middle 1970s the concern was focussed on generation of rural employment and also restoration of sector growth at historical rates. As the 1970s progressed, the mounting volume of agricultural imports became an issue of increasing importance, and in the past two years this issue has remained important, along with the magnitude of federal outlays on agricultural subsidies. In light of these concerns, this report is directed toward issues of trade and pricing policy, in the context of a changing agricultural structure.

Section 2 of the report reviews trends in both official support prices and farm-gate prices, for Mexico's principal agricultural products. A careful review of trends reveals that, vis-a-vis international market prices, Mexico's farm-gate prices for staple foods suffered declines, in real terms, from 196 to 198 . Two factors were behind these declines: an increasing tendency for overvaluation of the peso, and changes in the internal terms of trade. The trend of declining real prices was reversed, however, in 1981-83. In particular, by the last quarter of 1983, the real prices of maize, wheat, and sorghum reached twenty-year highs.

In procedural terms, the study finds that the usual price deflation procedure (by the GDP deflator) and the usual definition of relevant "world" prices both are misleading. Corrected procedures and data were used. In numerical terms, it was found that real protection rates for all staples have been negative since 1960, with the exception of maize

in 1981 to 1983 and wheat and sorghum in 1983. In the period 1970-' the negative real protection rate for the three principal grains rea an average of -30% for maize, -37% for wheat, and -40% for sorghum (Tables 2-7 to 2-9), which may explain a good deal of the stagnation production experienced at that time. Other measures also are review such as the rates of support prices to official minimum wages, and t all point in the direction of a declining purchasing power of Mexico staple food harvests until very recent years.

Section 3 reviews structural changes over the past two decades, in particular the aggregate composition of production by product groups, the use of agricultural inputs, the role of agricultural tra and patterns of consumer demand for food products. Rates of yield increase also are reviewed, and it is concluded that sector growth in the range of 3.3% to 3.5% per annum is feasible, and that appropriate pricing policies can raise it higher. The dominant structural change on both the supply and demand sides is the diminished importance of basic foodgrains, and the increased importance of feed grains, oilseeds, fruits and vegetables, and other high-value crops

The theme of structural change is carried to the farm level in section 4, where the rather surprising result is found that maize (including home retentions) now accounts for no more than 25% of the income on the smallest farms. Small-scale livestock operations, tre crops, remittances, and off-farm work all are important sources of income. In light of these and other data, the analysis shows that price protection to maize production alone is somewhat regressive i terms of the national income distribution. Protection to feedgrains is a progressive measure, and so these results lend support to the

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later recommendation that food grains and feedgrains (or maize and sorghum) should receive approximately equal rates of protection. Later in the section, a recent study is cited to the effect that within the agricultural sector support of the maize price is a progressive measure, as are several other cited instruments of pricing policy.

Section 4 also analyzes the relation between trade and pricing policies, and it briefly reviews the budgetary aspects of alternative consumer subsidy schemes. One of the principal conclusions to emerge is that substantial budgetary savings can be realized by better targetting of consumer subsidies and by reduction of the number of products subsidized. Another conclusion is that it would be important to establish the principle of using international prices as reference prices, and this can be done by adopting an implicit or explicit tariff on maize and sorghum, and by using border prices for all other products (or domestic market prices in the case of nontraded goods). In the past, there has been a considerable sacrifice of efficiency caused by great variations in border price-domestic price ratios. On the other hand, in light of Mexico's national objectives, persuasive arguments can be made for protection of maize and sorghum, at least for the present. Elimination of the sorghum subsidy, and eventually imposition of an explicit tariff on sorghum imports, would raise considerable amounts of revenue to help finance the consumer subsidy program. Whether or not the implicit maize tariff raises revenue in net terms would depend on the relative magnitudes of maize imports and maize sold at subsidized prices to target consumer groups. The principal points at issue here are that: (1) trade policy can be used to help define pricing policy and at the same time to generate budgetary revenues, whereas the current mode of effecting pricing policy causes only budgetary outlays, and (2) pricing policy in Mexico agriculture has not operated efficiently with regard to relative prices over crops.

Section 5 draws together the foregoing considerations into s specific conclusions. A selective tariff on maize and sorghum im at a level of 25-30% is proposed (at an equilibrium exchange rate) with use of border or market pricing for other products. For sorp arguments can be advanced for eliminating the end-use subsidy. Th subsidy on wheat is fairly regressive and appears to have no econ fication. For rice, pricing policy acts as a significant tax on and because of that tax Mexico may be failing to capitalize on a advantage in the production of rice. The role of CONASUPO as a p and marketing agency is reviewed, and some possible redefinitions mandate are considered, in keeping with suggestions for much more focussed programs of consumer subsidy.

Overall, an important point to emerge from the study is that tural pricing policy in Mexico appears to have developed in an in fashion over time, rather than being based on stated pricing prin Also, trade policy has not been used as an instrument of pricing This study suggests that trade policy can be an effective instrum pricing policy and that its use can improve the government's reve tion as well. Uniform use of border prices is not appropriate fo selective departures can be justified in light of national econom tives, particularly those related to income distribution and mate security. Nevertheless, international prices can provide useful reference in establishing pricing policy, and it would be more ef for Mexican agriculture to reduce the degree of inter-crop price vis-a-vis border prices. As regards producer incentives, the stu cludes that it is indeed feasible in budgetary terms to extend a

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price stimulus to farmers than was extended in the 1970s, provided that consumer subsidies are targetted and that trade policy is used as an instrument of pricing policy.

The most recent data show that the real protection rates for the principal grains were quite high by the end of 1983 (see Tables 2-7 to 2-9 below). However, those data warrant two cautionary notes of interpretation. One is that the crop prices used in the calculation are the support prices effective as of September 1983, and thus they did not influence planting decisions in that year. In a highly inflationary environment, it may take a series of upward revisions in the support prices to convince farmers that the purchasing power of their harvest will not be eroded. Another qualification is that the high real protection is largely determined by the undervalued exchange rate. Thus, as noted in the historical discussion of Mexican pricing policy, the exchange rate is de facto the most powerful instrument of agricultural pricing policy.

The following figures illustrate the importance of the exchange rate. In 1960 constant prices, the end-1983 real protection rates are calculated in Tables 2-7 to 2-9 as 2.185 for maize, 1.692 for sorghum, and 1.069 for wheat. But a parity exchange rate for 1983 would have been about 91 pesos/dollar vs. the actual 150 pesos/dollar. If the parity exchange had in fact been the actual rate, real protection would have been much less, specifically 1.33 for maize, 1.03 for sorghum, and 1.14 for wheat (where 1.0 denotes no protection).

The policy implication is that the current support prices are high, but that they may not continue to be high if the process of gradual devaluation-cum-inflation leads to a lessening

of the degree of undervaluation of the peso, as is planned. A parallel conclusion may be reached by looking at the nominal pr tection rates in Table 2-10 below. In 1982 and 1983, nominal protection rates appear to have dropped, but they would be much higher if the exchange rate were 91 pesos to the dollar. For example, the nominal protection coefficient (NPC) for maize is (1983, but if the exchange rate distortion were removed it would 1.33; for sorghum, the NPC would rise from 0.62 to 1.03, and fo wheat it would rise from 0.69 to 1.14. If the exchange rate we truly a parity rate, then the nominal and real protection rates would become the same.

These considerations suggest that, for these three crops, appropriate policy would be to continue to maintain the same re domestic support prices, i.e., continue to adjust the support p in line with domestic inflation, while in the meantime the degr undervaluation is gradually removed. Also, it would be useful take steps to correct the downward bias in the support price fo rice.

In a historical context, the important conclusion is that recent years the long-lived tendency to tax farmers via pricing has been overcome. Some distortions still remain, as in rice a milk, but for the main traded grains the 1981-83 policies mark sharp departure from past practice. The challenge is now to ma tain the new policy in a rapidly changing economic environment.

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2. Relative Prices in Mexican Agriculture

Agricultural pricing policy has a long history in Mexico. The fundamental law of pricing policy was promulgated in 1950, and it provided for regulation of foreign trade as well as for price control. From the beginning, a primary aim of pricing and trade policy has been to improve the economic welfare of the lower income groups:

> "The essential postulate of the law [of 1950] is the protection of the economic interests of the [lower income groups] by means of a number of important measures, especially price control, policies to influence the marketing process, and regulation of foreign trade..." (Dávila, 1982).

However, the policy has not always been implemented effectively toward these ends, especially with regard to the rural poor. Neither the 1950 law nor subsequent policy documents clarified the relative emphasis to be given to consumer vs. producer subsidies. However, from 1975 through 1981, the emphasis has been placed increasingly on consumer subsidies (Dávila, op.cit.), with little attempt to target the consumer programs. The commitment to agricultural and other subsidies during the inflationary decade of the 1970s led to rapidly increasing government outlays on subsidy programs. From 1970 to 1981, total subsidy outlays increased at a 42.5% annual rate, in nominal terms, while nominal GNP grew by 26.5% annually (Dávila, op.cit.).

A part of this increasing emphasis on subsidies is explainable by the priority given to income redistribution under the presidential administrations of Luis Echevarría and José López Portillo. Another factor at work may have been the sense of budgetary sufficiency created by the sharp rise in oil exports, plus substantial foreign borrowings, during the latter half of the 1970s. It is likely that these two factors

together were principal causes of the increases in consumer subsidi but other forces were at work to create a need for increased produc subsidies. These other forces may be summarized as the movements i two sets of terms of trade: the domestic agricultural-nonagricultu terms of trade, and the overall domestic-foreign terms of trade. I the following pages, these price movements are documented and revie

In the 1950s, guaranteed prices were implemented for only fou basic food crops: maize, beans, wheat, and rice. Sorghum was adde to the list of supported crops in 1961, and soybeans and some oilse were added in the mid-1960s. As of 1983, the number of crops recei price support is thirteen, as follows: maize, beans, wheat, rice, sorghum, soybeans, safflower, sesame, cottonseed, sunflower, copra, malt barley, and forage barley.

In the early years of the guaranteed price program, CONASUPO' official purchase prices tended to remain fixed for long periods of time, except for the decline in the wheat support price in 1965 (Tab 2-1). That is not surprising in view of the general price stabilit in Mexico in the 1950s and 1960s. From 1960 to 1969, Mexico's whol sale price index increased by 2.0% per year on the average. The support prices also tended to maintain a fairly stable relationship average farm-gate prices (precio medios rurales), with the notable exception of soybeans, and later of cottonseed (Table 2-2). In the early years of the program, the concerns were not so much for the p level as for the geographical coverage of CONASUPO's programs. Man in more remote areas received prices which were well below the supp prices and average farm-gate prices, owing to lack of adequate tran portation and storage facilities. In recognition of this problem,

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Table 2-1. 1960-83 SUPPORT PRICES FOR PRINCIPAL CROPS
(pesos/ton)

Year	Maize	Wheat	Sorghum	Beans	Rice	Soybeans	Safflower	Sesame
1960	800	913		1,500	850			
1961	800	913	525	1,750	900			
1962	800	913	550	1,750	900			
1963	940	913	565	1,750	1,050			
1964	940	913	625	1,750	1,100			
1965	940	800	575	1,750	1,100		1,500	
1966	940	800	625	1,750	1,100	1,600	1,500	2,500
1967	940	800	625	1,750	1,100	1,600	1,500	2,500
1968	940	800	625	1,750	1,100	1,600	1,500	2,500
1969	940	800	625	1,750	1,100	1,450	1,500	2,500
1970	940	800	625	1,750	1,100	1,300	1,500	2,500
1971	940	800	625	1,750	1,100	1,600	1,500	2,500
1972	940	800	725	1,750	1,100	1,775	1,500	3,000
1973	1,200	870	750	1,750	1,100	2,700	1,600	3,000
1974	1,500	1,300	1,100	5,500	3,000	3,300	3,000	5,000
1975	1,900	1,750	1,600	6,000	2,500	3,500	3,500	6,000
1976	2,340	1,750	1,600	4,750	3,000	4,000	3,200	7,540
1977	2,900	2,050	2,030	5,000	3,100	5,500	3,900	7,540
1978	2,900	2,600	2,030	6,250	3,100	5,500	4,600	7,540
1979	3,480	3,000	2,335	7,750	3,720	6,400	5,000	9,050
1980	4,450	3,550	2,900	12,000	4,500	8,000	6,000	11,500
1981	6,550	4,600	3,930	16,000	6,500	10,800	7,800	15,525
1982	8,850	6,930	5,200	21,100	8,600	15,300	11,150	20,900
1983 May	16,000	14,000	10,500	29,500	17,600	27,700	22,600	37,800
1983 Sept.	19,200	18,200	13,600	33,000	21,000	33,000	26,400	50,000
1984 April	25,500	25,000	19,000	40,000	21,000	35,000	35,000	50,000

Sources: 1960-81 prices: Coordinación General del Sistema Nacional de Evaluación, Sistema Alimentario Mexicano, Política de Precios de Garantía del Sistema Alimentario Mexicano, México, D.F., September 1981. Prices reported are the average prices paid by CONASUPO in its operations over the year.

1982-83 prices: Dirección General de Programación Económica y Social, Secretaría de Programación y Presupuesto.

Table 2-2. SUPPORT PRICE LEVELS RELATIVE TO FARM-GATE PRICES
(support price/farm gate price in percent)

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Maize	102.4	100.0	100.6	105.1	103.9	104.4	104.2	84.8	102.5	93.9	87.4	102.2	99.6	98.0	89.4	117.6	99.4
Beans	97.8	99.7	99.5	97.2	94.7	88.6	86.2	71.8	107.1	114.1	101.1	92.0	84.0	82.1	81.4	100.5	86.8
Barley	-	-	-	-	-	-	124.8	109.1	88.3	101.6	108.6	111.5	89.8	86.2	95.9	192.6	99.4
Wheat	90.7	94.2	93.3	94.2	95.0	92.9	93.9	97.8	96.7	101.5	100.6	96.3	99.8	100.0	99.3	99.0	106.8
Cottonseed	-	-	-	-	-	66.1	71.6	42.7	100.5	93.1	88.6	-	-	101.4	100.7	141.0	88.0
Rice	97.8	100.2	96.1	92.7	92.4	89.7	97.6	68.4	111.5	88.8	95.0	97.1	82.4	86.2	76.1	94.4	73.3
Sorghum	97.8	100.8	100.5	97.8	96.3	91.8	84.9	85.5	57.2	69.9	96.4	80.1	90.4	92.6	84.1	101.8	93.5
Soybeans	43.8	39.0	39.1	39.1	38.2	37.7	40.4	23.9	33.4	47.8	38.5	38.9	35.4	107.2	93.5	99.8	98.7
Safflower	107.9	102.7	101.5	99.7	97.3	96.5	95.2	84.4	80.0	104.0	87.7	93.2	81.4	88.5	82.6	100.0	142.8
Sesame	119.0	101.8	101.8	99.3	99.4	96.7	106.9	84.8	91.2	105.1	102.9	92.3	69.8	69.7	97.6	94.1	83.9

Source. Secretaría de Agricultura y Recursos Hidráulicos (1966-80 figures are taken, with some modifications, from an earlier World Bank Report)

early 1970s CONASUPO significantly expanded its system of storage and collection points and also its stock of transport vehicles.

The first important departures from the policy of stable support prices came in 1973 and 1974. Inflation had accelerated in 1973 (the wholesale price index increased by 15.7% that year), but in fact the government intended to raise the support prices by more than the inflation rate, to stimulate lagging production (Secretaría de la Presidencía, 1973). In the spring of 1974, new support prices were announced which amounted to a 64% increase for maize, a 214% increase for beans, a 173% increase for rice, a 66% increase for sesame, and lesser but still significant increases for other crops. The new policy was continued in the following year, with the result that in 1974 and 1975 the support prices increased substantially in real terms (Table 2-3). Poor weather, especially in 1974, and a series of land tenure disputes of increasing severity inhibited generalized production responses to these higher incentives, but very strong responses were recorded in the production of rice, wheat, safflower, and sorghum, and smaller responses in beans and soybeans (Table 3-7).

By 1976, budgetary and inflationary pressures were beginning to be felt, and so the policy of high support prices was weakened. By 1977, real domestic support prices for all crops were significantly below their 1975 levels. The pattern varied by crop for the rest of the decade, but real support prices, without exception, remained below their 1975 levels. They also were well below their levels in 1960 for maize, wheat, beans and rice, and well below their level in the initial year of inclusion in the program, in the case of other crops. In 1981 and again in 1983 real support prices increased for almost all crops, but in 1983 they still remained uniformly below their 1975 levels.

The trends in real support prices are shown in Table 2-3. A word of interpretation is in order, for the derivation of real prices is different than the usual procedures for Mexico. In most reports on the Mexican economy, real agricultural prices are derived via deflation by the GDP deflator. Conceptually, however, CONASUPO purchase prices and average farm gate prices are species of wholesale prices, and therefore deflation by a value added price index such as the GDP deflator is inappropriate. A reason for hesitation to use the wholesale price inde may be that it is compiled on the basis of a survey in Mexico City only However, while wholesale prices elsewhere may differ from those of Mexi City, the spatial distribution of wholesale prices typically does not change very much over time. As Table 2-4 shows, the wholesale price index itself has declined substantially over time with respect to the GDP deflator. Use of the wholesale price index, therefore, implies a slower rate of decline in real agricultural prices. Since basic foodstuffs account for a significant portion of the wholesale price index, it can be said a priori that the real prices in Table 2-3 are upper bound estimates.

It should be noted that the decline in real farm gate prices of basic foods does not characterize the trends in prices for other agricultural products. At the level of the Mexico City wholesale market, during 1972-80 the nominal prices of grains increased by 20% per annum while the nominal prices of vegetables increased by 30% per annum (Banco de México, 1981, p. 156). This difference, of course, is not unrelated to the differential production growth rates by crop (Table 3-

Turning to the international terms of trade, Table 2-4 shows the annual average exchange rates since 1960. It is immediately evide

Table 2-3. REAL DOMESTIC SUPPORT PRICES FOR PRINCIPAL CROPS
(in constant 1960 prices)

Year	Maize	Wheat	Sorghum	Beans	Rice	Soybeans	Safflower	Sesame
1960	800	913		1,500	850			
1961	793	905	520	1,734	892			
1962	778	888	535	1,702	875			
1963	910	884	547	1,694	1,016			
1964	873	848	580	1,625	1,021			
1965	857	729	524	1,595	1,003		1,393	
1966	846	720	563	1,575	990	1,440	1,350	2,250
1967	822	700	547	1,531	962	1,400	1,312	2,187
1968	807	687	536	1,502	944	1,373	1,288	2,146
1969	787	669	523	1,464	921	1,213	1,255	2,092
1970	742	632	494	1,382	869	1,027	1,185	1,975
1971	716	609	476	1,333	838	1,219	1,142	1,904
1972	696	593	537	1,296	815	1,315	1,111	2,222
1973	769	557	480	1,120	704	1,729	1,024	1,921
1974	784	680	575	2,875	1,568	1,725	1,568	2,614
1975	899	828	757	2,838	1,183	1,656	1,656	2,838
1976	905	677	619	1,838	1,161	1,548	1,238	2,918
1977	794	562	556	1,370	850	1,507	1,069	2,066
1978	686	615	480	1,479	734	1,302	1,089	1,785
1979	696	600	467	1,551	744	1,281	1,000	1,811
1980	715	570	466	1,928	723	1,286	964	1,848
1981	845	594	507	2,065	839	1,394	1,007	2,003
1982	731	573	430	1,745	711	1,265	922	1,728
1983	818	776	580	1,407	895	1,407	1,125	2,131

Note: Real prices are defined as nominal prices deflated by the wholesale price index.

Table 2-4. AGGREGATE PRICE INDICES

Year	Wholesale price index	Consumer price index	GDP deflator	Exchange rate	Wholesale index÷GDP deflator	Exchange rate÷ wholesale index
1960	1.000		1.000	12.491	1.000	12.491
1961	1.009		1.034	12.491	0.976	12.380
1962	1.028		1.065	12.491	0.965	12.151
1963	1.033		1.098	12.491	0.941	12.092
1964	1.077		1.160	12.491	0.928	11.598
1965	1.097		1.187	12.491	0.924	11.387
1966	1.111		1.234	12.491	0.900	11.243
1967	1.143		1.270	12.491	0.900	10.928
1968	1.165	1.000	1.300	12.491	0.896	10.722
1969	1.195	1.035	1.351	12.491	0.885	10.453
1970	1.266	1.087	1.412	12.491	0.897	9.867
1971	1.313	1.146	1.475	12.491	0.890	9.513
1972	1.350	1.203	1.557	12.491	0.867	9.253
1973	1.562	1.348	1.750	12.491	0.893	7.997
1974	1.913	1.668	2.112	12.491	0.906	6.530
1975	2.114	1.918	2.532	12.491	0.835	5.909
1976	2.584	2.211	3.081	15.444	0 839	5.977
1977	3.649	2.867	4.069	22.579	0.897	6.188
1978	4.225	3.367	4.749	22.764	0.890	5.388
1979	4.998	3.980	5.712	22.800	0.875	4.562
1980	6:223	5.027	7.351	22.950	0.847	3.688
1981	7.749	6.401	9.409	24.510	0.824	3.163
1982	12.095	10.700		55.470		4.586
1983	23.460	18.367		150.294		
Annual rates of change, 1968-82	18.1%	17.9%		11.2%		
1968-83	22.2%	21.4%		39.7%		

Source: Banco de México

that the exchange rate movements are discrete and sizeable, as opposed to more continuous changes in the other price indexes. A direct comparison of the exchange rate with domestic price indexes is not very useful, for movements in international prices must also be taken into account. Since the United States is Mexico's largest trading partner, U.S. wholesale prices are used as the international price reference in Table 2-5. In that table, an approximate parity exchange rate is constructed on the assumption that the actual exchange rate was in equilibrium in 1960. For years after 1960, the "parity exchange rate" is defined as the 1960 rate multiplied by the ratio of Mexican and U.S. wholesale price indexes in each year.

As Table 2-5 shows, up to 1982 there was an increasing tendency for overvaluation of the peso, although the degree of overvaluation was roughly constant from 1964 to 1972. (Also, in 1977 the peso appears to have been slightly undervalued as a result of the devaluations in 1976 and 1977.) By 1980, the degree of overvaluation reached about 20%, and in 1981 it was about 28%. The 1982 devaluation was strong enough to undervalue the peso, and the degree of undervaluation increased significantly in 1983.

Given the volume of Mexico's trade in agricultural products, the external terms of trade has an effect on the net agricultural trade balance. In order to see the importance of this effect, it is useful to compare Mexican and world prices of agricultural products in real terms. This is most easily done by expressing both in constant 1960 international prices, thus correcting for changes in both the internal and external terms of trade. Before this step can be taken, however, the relevant

Table 2-5. THE EXCHANGE RATE AND RELATIVE PRICES

Year	(a) U.S. producer price index	(b) Mexican wholesale price index	(c) Ratio (b) ÷ (a)	(d) Mexican exchange rate	(e) Approximate parity exchange rate
1960	1.000	1.000	1.000	12.491	12.491
1961	.996	1.009	1.013	12.491	12.653
1962	.999	1.028	1.029	12.491	12.853
1963	.996	1.033	1.037	12.491	12.953
1964	.998	1.077	1.079	12.491	13.478
1965	1.018	1.097	1.078	12.491	13.465
1966	1.052	1.111	1.056	12.491	13.191
1967	1.054	1.143	1.084	12.491	13.540
1968	1.080	1.165	1.079	12.491	13.478
1969	1.122	1.195	1.065	12.491	13.303
1970	1.163	1.266	1.089	12.491	13.603
1971	1.201	1.313	1.093	12.491	13.653
1972	1.255	1.350	1.076	12.491	13.440
1973	1.419	1.562	1.101	12.491	13.753
1974	1.687	1.913	1.134	12.491	14.165
1975	1.843	2.114	1.147	12.491	14.327
1976	1.928	2.584	1.340	15.444	16.738
1977	2.046	3.649	1.784	22.579	22.284
1978	2.206	4.225	1.915	22.764	23.920
1979	2.483	4.998	2.013	22.800	25.144
1980	2.833	6.223	2.197	22.950	27.443
1981	3.092	7.749	2.506	24.510	31.302
1982	3.154	12.095	3.835	55.470	47.903
1983	3.211	23.460	7.306	150.294	91.261

world product prices must be determined. Most Bank studies utilize "world" f.o.b. prices whose geographical basis of calculation varies with the product. For an importing country, however, the relevant price is a c.i.f. import price. Table 2-6 shows alternative definitions of Mexico's import prices for the principal imported products. In the case of maize, the c.i.f. "border" price averaged 27% higher than the f.o.b. "world" price for 1970-81.* For wheat, the two price measurements are closer, and for sorghum again the border price averages quite a bit higher than the world price. For this report, the c.i.f. Mexico prices have been used as representing the true import cost to Mexico. The U.S. export price shown in Table 2-6 refers to shipments specifically to Mexico, and there are a few cases of obvious discrepancy in which the U.S. f.o.b. price is somewhat greater than the Mexican c.i.f. price. The timing of import contracts may be responsible for these discrepancies, but in any case the c.i.f. price is the appropriate one for use in review of Mexican pricing policy.

To express Mexican domestic grain prices in constant international price, the real domestic price is divided by the parity exchange rate premium; the latter is defined as the parity exchange rate divided by the actual exchange rate. Prices converted in this manner (shown in

*The Mexican maize import price reflects the fact that part of Mexico's maize imports are of seed corn, which is more costly. However, it is appropriate that this factor should be reflected in the import price, for Mexico's import cost depends in part on its decisions regarding the share of production to be allocated to seed purposes.

Table 2-6. ALTERNATIVE DEFINITIONS OF INTERNATIONAL PRICES FOR MEXICAN AGRICULTURAL IMPORTS
(pesos/ton)

	Maize			Wheat			Sorghum		
	U.S. export price (f.o.b.) to Mexico	World f.o.b. export price	Mexican import price (c.i.f.)	U.S. export price (f.o.b.) to Mexico	World f.o.b. export price	Mexican import price (c.i.f.)	U.S. export price (f.o.b.) to Mexico	World f.o.b. export price	Mexican import price (c.i.f.)
1965	1,070	687	872				643	590	701
1966	921	742	801				602	646	768
1967	926	623	791				570	630	749
1968	1,156	613	779				639	581	691
1969	1,036	673	855				687	626	744
1970	817	729	957				680	647	769
1971	1,069	729	1,407	801	799	830	762	696	827
1972	886	699	1,036	833	887	909	717	699	831
1973	1,193	1,224	1,352	1,296	1,836	1,359	727	1,162	1,381
1974	1,750	1,649	1,936	2,237	2,598	2,419	1,531	1,511	1,878
1975	1,851	1,486	1,912	2,425	2,251	2,494	1,538	1,474	1,758
1976	1,862	1,730	1,700	2,824	2,301	*	1,630	1,622	1,860
1977	2,321	2,145	2,528	2,057	2,619	2,229	2,254	1,987	2,328
1978	2,574	2,292	2,820	3,041	3,073	3,091	2,363	2,140	2,563
1979	3,009	2,633	3,100	3,814	3,922	3,820	2,613	2,462	2,704
1980	3,207	2,869	3,340	4,202	4,383	4,390	3,042	2,961	3,352
1981	3,910	2,941	3,890	4,866	3,922	4,748	3,872	3,039	4,072
1982	7,397		7,531 P	10,243			6,499		6,993 P

Sources: U.S. export price to Mexico: U.S. Department of Agriculture
World export price: World Bank
Mexican import price: for 1965-78, derived from import value and volume data compiled by the Secretaría de Agricultura y Recursos Hidráulicos; for 1979-81, from CONASUPO information.

Notes: a) World prices are converted to pesos at the official exchange rate.

columns (1) and (2) of Table 2-7) may then be compared with real c.i.f. import prices (column (3) in Table 2-7), which are deflated by the U.S. wholesale price index. The ratios of these two real prices also are shown in Table 2-7.

In reading Table 2-7, the first column of numbers (real domestic support price) expresses the support price in terms of its purchasing power over a representative bundle of goods in the economy. The exchange rate premium converts this measure into an expression of purchasing power over a bundle of international goods. The dollar value in 1960 prices is obtained by converting by the 1960 exchange rate.

The major conclusion to emerge from Table 2-7 is that real protection of maize has generally been negative in Mexico.* *It was positive* only in 1967-68, when Mexico still was exporting maize (with a subsidy), in 1976-77, following the first devaluations in two decades, and in 1981-82. In the latter years the higher domestic price supports and then the peso devaluation caused changes in protection rates. This conclusion about *negative protection* differs from those of previous studies which have not taken into account movements over time in the internal and external terms of trade.

A large part of the negative protection for maize arose from the failure of the domestic producer price *to respond* to the international grain price increases in the early 1970s. Devaluations (1976 and 1982) have had a greater influence on protection rates than revisions of support prices (1974, 1975, 1981) have. Tables 2-8 and 2-9 show a similar story for wheat and sorghum, except that for those crops the protection rates have been even more strongly negative. For sorghum, protection

*This analysis ignores input subsidies, which are important but perhaps not significant as a share of maize production costs.

Table 2-7. COMPARISON OF REAL DOMESTIC AND IMPORT PRICES OF MAIZE
(Prices per ton)

Year	Real domestic support price	Parity exchange rate premium	Domestic support price in 1960 international prices (1) in pesos	(2) in dollars	Import price in current dollars	(3) Import price in 1960 dollars	Ratio (2) ÷ (3)	Period Average Ratio
1960	800	1.000	800	64.05	n.a.	n.a.	n.a.	
1965	857	1.078	795	63.65	69.85	68.61	.928	
1966	846	1.056	801	64.13	75.44	71.71	.894	
1967	822	1.084	758	60.68	63.34	60.10	1.010	.968
1968	807	1.079	748	59.88	62.33	57.71	1.038	
1969	787	1.065	739	59.16	68.43	60.99	.970	
1970	742	1.089	681	54.52	76.62	65.88	.828	
1971	716	1.093	655	52.44	112.64	93.79	.559	
1972	696	1.076	647	51.80	82.94	66.09	.784	.701
1973	769	1.101	698	55.90	108.24	76.28	.733	
1974	784	1.134	691	55.32	154.99	91.87	.602	
1975	899	1.147	784	62.75	153.07	83.05	.756	
1976	905	1.084	835	66.85	110.08	57.09	1.171	
1977	794	0.987	804	64.39	111.96	54.72	1.177	.992
1978	686	1.051	653	52.28	123.88	56.16	.931	
1979	696	1.103	631	50.52	135.96	54.61	.925	
1980	715	1.196	598	47.87	145.53	51.37	.932	
1981	845	1.277	662	53.00	158.71	51.33	1.033	1.431
1982	731	0.864	846	67.73	135.78	43.05	1.573	
1983	818	0.607	1,348	107.92	158.62*	49.40	2.185-	

*For 1983, the maize import price is estimated on the basis of the 1982 import price and the 1982-83 percentage change in the U.S. f.o.b. price of maize. This estimate is unlikely to correspond exactly to the actual CONASUPO import price.

Table 2-8. COMPARISON OF REAL DOMESTIC AND IMPORT PRICES OF SORGHUM
(prices per ton)

Year	Real domestic support price	Parity exchange rate premium	Domestic support price in 1960 international prices (1) in pesos	(2) in dollars	Import price in current dollars	(3) Import price in 1960 dollars	Ratio (2) ÷ (3)	Period Average Ratio
1965	524	1.078	486	38.91	56.12	55.13	.706	
1966	563	1.056	533	42.67	61.48	58.44	.730	
1967	547	1.084	505	40.43	59.96	56.89	.711	.733
1968	536	1.079	497	39.79	55.32	51.22	.777	
1969	523	1.065	491	39.31	59.56	53.08	.741	
1970	494	1.089	454	36.34	61.56	52.93	.687	
1971	476	1.093	435	34.83	66.21	55.13	.632	
1972	537	1.076	499	39.95	66.53	53.01	.754	.595
1973	480	1.101	436	34.91	110.56	77.91	.448	
1974	575	1.134	507	40.59	150.35	89.12	.456	
1975	757	1.147	660	52.84	139.14	75.50	.700	
1976	619	1.084	571	45.71	120.44	62.47	.732	
1977	556	0.987	563	45.07	103.10	50.39	.894	.750
1978	480	1.051	457	36.59	112.59	51.04	.717	
1979	467	1.103	423	33.86	118.60	47.76	.709	
1980	466	1.196	390	31.22	146.06	51.56	.606	
1981	507	1.277	397	31.78	166.14	53.73	.592	.972
1982	430	0.864	498	39.87	126.16	40.00	.997	
1983	580	0.607	956	76.50	145.17*	45.21	1.692	

*For 1983, the sorghum import price is estimated on the basis of the 1982 import price and the 1982-83 percentage change in the U.S. f.o.b. price of sorghum. This estimate is unlikely to correspond exactly to the actual CONASUPO import price.

Table 2-9. COMPARISON OF REAL DOMESTIC AND IMPORT PRICES OF WHEAT
(prices per ton)

Year	Real domestic support price	Parity exchange rate premium	Domestic support price in 1960 international prices (1) in pesos	(2) in dollars	Import price in current dollars	(3) Import price in 1960 dollars	Ratio (2) ÷ (3)	Period Average Ratio
1965	729	1.078	676	54.15				
1966	720	1.056	681	54.55				
1967	700	1.084	646	51.69				
1968	687	1.079	637	51.00				
1969	669	1.065	628	50.26				
1970	632	1.089	580	46.46				
1971	609	1.093	557	44.62	66.45	55.33	.806	
1972	593	1.076	551	44.11	72.77	57.98	.761	.628
1973	557	1.101	506	40.48	108.80	76.67	.528	
1974	680	1.134	600	48.03	193.66	114.80	.418	
1975	828	1.147	722	57.80	199.66	108.33	.534	
1976	677	1.084	625	50.04	n.a.	n.a.	n.a.	
1977	562	0.987	569	45.55	98.72	48.25	.944	.721
1978	615	1.051	585	46.83	135.78	61.55	.761	
1979	600	1.103	544	43.55	167.54	67.47	.646	
1980	570	1.196	477	38.19	191.29	67.52	.566	
1981	594	1.277	465	37.23	193.72	62.65	.594	.993
1982	573	0.864	663	53.08	177.78*	56.37	.942	
1983	776	0.607	1,278	102.35	175.79*	54.75	1.869	

*For 1982 and 1983, the wheat import prices are estimated on the basis of the 1981 import price and the 1981-82 and 1982-83 percentage changes in the U.S. f.o.b. price of wheat. These estimates are unlikely to correspond exactly to the actual CONASUPO import prices.

has average -25% to -40%, except for 1982. For wheat, protection rates have been more variable, but they have been even more negative than the sorghum protection rates, on the average.

Two studies independently have estimated that the supply elasticity of maize in Mexico is about 0.5.* If this is representative of grains in general, then it seems clear that negative real protection rates have accounted for a significant share of Mexico's trade deficits in grains. Put in other terms, a part of Mexico's increase in real standards of living over the 1965-82 period, especially in urban areas, was brought about by increasing reliance on relatively cheap imported supplies of basic agricultural commodities.** Mexico faces a major long-run policy choice in this respect: it can continue utilizing imported food as one of the bases for future urban prosperity, subject to constraints imposed by its export-earning capacity, or it can implement programs to bring it closer to its goal of food self-sufficiency. This goal has been affirmed by three successive presidential administrations in terms that suggest it has more than the usual importance in the case of Mexico. As an example, in the words of the latest national plan document the broad objectives of Mexican foreign policy include:

> ". . .strengthening our political and economic independence"***

and at the level of sectoral policy the plan document states:

*One of the studies was carried out with a mathematical programming model (CHAC) and the other with econometric methods. The first one is reported in L. M. Bassoco et al. (1982), and the second one is reported in a working paper by Celso Cartas and Edwardo Cifuentes at the Secretaría de Programación y Presupuesto (personal communication).

**Note that the dollar value of Mexico's agricultural imports (excluding livestock products) increased thirty-fold from 1969-71 to 1979-81, while the dollar value of agricultural exports increased only three-fold over the same period (Table 2-5).

***Poder Ejecutivo Federal, op. cit., p. 71. This quotation and the following three are unofficial translations.

> "The increasing dependence on foreign sources of food has given rise to severe problems in food supply and distribution and has prejudiced our national sovereignty in regard to food."*

And therefore a national food program will be set in motion, whose objectives are:

> "to attain food sovereignty and to create nutritional conditions which will permit the full development of the capacities and potentialities of every Mexican."**

The agricultural subsidy programs of the preceeding administration, developed by the Sistema Alimentario Mexicano (Mexican Food System) also were based explicitly on the goal of food-sufficiency:

> "The Mexican Food System adopts a global approach because its objective is to attain food self-sufficiency via both production- and consumption-oriented programs."***

If these statements are to be translated into effective actions in the agricultural sector, it would appear important to reverse the decline of agricultural prices. This was of course attempted in 1980 and 1981, via an expanded subsidy budget for CONASUPO's operations, and the attempt turned out to be prohibitively expensive, in part because the consumer subsidy component of the program was not sufficiently targetted. There other instruments of pricing policy, however; in particular, trade and tariff policy can have important effects on the domestic pricing structure. Trade policy does not appear to have been used as an instrument of agricultural pricing policy in Mexico, but if used in this way its budgetary consequences can be much more favorable than the presently structured operations of CONASUPO. Section 5 below discusses some policy options of this nature.

*Op. cit., p. 235.

**Op. cit., pp. 236-37.

***Sistema Alimentario Mexicano (1980, p.1).

Another aspect of pricing policy which merits attention is the behavior of relative prices across the principal supported crops. (This issue has been raised in a recent bank report, "Mexico: Incentive Policies in Agriculture," no. 4179-ME, January 31, 1983.) To review this issue, it is helpful to use actual (nominal) prices, and to shift from support prices to farm-gate prices to bring matters in better focus. Tables 2-10 and 2-10a show the recent domestic price levels, as compared to c.i.f. import prices, for the principal supported and imported commodities. The table illustrates the fact that relative prices in Mexico differ considerably from international relative prices; for example, in 1980 and 1981, the maize/rice price ratio in Mexico was about 2½ times what it was in the international market. Also, from 1972 to 1982, the maize/wheat price ratio was consistently higher in Mexico than in the world market. These price divergencies simply illustrate the fact that possibilities for international trade in agriculture have not been utilized very much, and hence they have not influenced domestic resource allocation. Perhaps the most obvious policy discrepancy which emerges from Table 2-10n concerns rice. Mexico has consistently held the domestic price of rice well below international levels, and in so doing may be foregoing the benefits of an apparent comparative advantage in that crop. In 1982 and 1983 the farm-gate/c.i.f. price ratio for maize dropped sharply again, to close to the 1975-79 average, and the ratio for wheat also decreased from its 1980-81 values. However, as discussed in section 1, this change was caused by changes in exchange rate policy.

Table 2-10. RELATIVE PRICES OF MAIZE, WHEAT, AND SORGHUM IN NOMINAL TERMS, 1970-83
($/ton, current prices)

	Maize			Wheat			Sorghum		
Year	Domestic	Imported	Ratio	Domestic	Imported	Ratio	Domestic	Imported	Ratio
1970	75.25	76.62	.98	64.05	n.a.	n.a.	50.04	61.56	.81
1971	75.25	112.64	.67	64.05	66.45	.96	50.04	66.21	.76
1972	75.25	82.94	.91	64.05	72.77	.88	58.04	66.53	.87
1973	96.07	108.24	.89	69.65	108.80	.64	60.04	110.56	.54
1974	120.09	154.99	.77	104.07	193.66	.54	88.06	150.35	.59
1975	152.11	153.07	.99	140.10	199.66	.70	128.09	139.14	.92
1976	151.52	110.08	1.38	113.31	n.a.	n.a.	103.60	120.44	.86
1977	128.44	111.96	1.15	90.79	98.72	.92	89.91	103.10	.87
1978	127.39	123.88	1.03	114.22	135.78	.84	89.18	112.59	.79
1979	152.63	135.96	1.12	131.58	167.54	.79	102.41	118.60	.86
1980	193.90	145.53	1.33	154.68	191.29	.81	126.36	146.06	.87
1981	267.24	158.71	1.68	187.68	193.72	.97	160.34	166.14	.97
1982	159.55	135.78	1.18	124.93	177.78	.70	93.74	126.16	.74
1983	127.75	158.62	0.81	121.10	175.79	.69	90.49	145.17	.62

Notes: a) Domestic prices are official support prices. They are converted to dollars at the official exchange rate.

b) Except as noted, prices of imported goods are actual prices paid by CONASUPO, c.i.f. See Tables 2-6 to 2-9.

c) In interpreting the table, two cautionary words should be borne in mind. First, actual farm-gate prices generally differ from support prices (see Table 2-2). Second, the peso was overvalued for all years in the table except 1977, 1982, and 1983 (see Table 2-5).

Table 2-10a. RELATIVE PRICES OF SEVEN PRINCIPAL CROPS IN NOMINAL TERMS
(pesos/ton)

Crop	1980			1981			1980-81 average ratio to import price	
	Support price	Farm-gate price	Import price c.i.f.	Support price	Farm-gate price	Import price c.i.f.	Support price	Farm-gate price
Maize	4,450	4,791	3,340	6,550	6,420	3,890	1.52	1.55
Wheat	3,550	3,550	4,390	4,600	4,359	4,748	0.89	0.87
Sorghum	2,900	3,485	3,352	3,930	3,639	4,072	0.92	0.96
Beans	12,000	14,239	17,000	16,000	15,725	17,658	0.81	0.86
Rice	4,500	6,019	8,885	6,500	5,955	10,637	0.56	0.61
Soybeans	8,000	7,404	6,419	10,800	8,798	7,972	1.31	1.13
Sunflower	6,040	8,000	7,883	8,169	11,200	8,457	0.87	1.18

Sources: Support prices, Table 3-1.

Farm gate prices, Sistema Alimentario Mexicano, Política de Precio de Garantía del Sistema Alimentario Mexicano, Series de Precios, Coordination General del Sistema Nacional de Evaluación, Mexico, D.F., mayo de 1982.

Import prices, Table 2-6.

Thus, from 1970 through 1983, most crops have faced a negative nominal protection rate in most years. The main exceptions were maize during 1976-82 and soybeans in 1980 and 1981. (Soybeans had a negative nominal protection rate in all other years of the period.)

A number of policy questions arise from these considerations. First, given the Mexican policy emphasis on food self-sufficiency, and also on improving the incomes of the rural poor, would it not be important to continue the recent policy of positve real protection for several basic crops? If so, how could such a policy be made feasible in fiscal terms? What would be the implications for consumer welfare? What are the justifications for the large inter-crop disparities in nominal protection rates? Should there not be greater consistency over crops and over time in the nominal protection rates, or are border prices of little relevenace? These issues are discussed in section 4 below, after section 3's review of the importance of the basic crops in farm income and the income distribution.

A final comparison of relative prices involves wage rates and product prices. There are no time series on rural wages, but there is a series on the official rural minimum wage rate. The official wage is not always observed in practice, but its time trend may be roughly indicative of the trend in actual wages. Table 2-11 shows the official wage rates over time and the ratio of some support prices to those wage rates. It can be seen that product prices have fallen in relation to wage rates. Labor constituted a higher proportion of production costs in agriculture than in industry, and so these changes in output/factor price

Table 2-11. MINIMUM SALARIES AND SUPPORT PRICES

Year	Minimum Salaries (1) General	Minimum Salaries (2) Rural	Support Prices (3) Maize	Support Prices (4) Wheat	(5) (3) ÷ (2)	(6) (4) ÷ (2)
1969	23.21	20.12	940	800	46.7	39.8
1970	26.99	23.48	940	800	40.0	34.1
1971	26.99	23.48	940	800	40.0	34.1
1972	31.93	27.73	940	800	33.9	28.8
1973	34.81	30.23	1,200	870	39.7	28.8
1974	48.20	41.95	1,500	1,300	31.0	31.0
1975	52.97	46.10	1,900	1,750	41.2	38.0
1976	72.19	63.05	2,340	1,750	37.1	27.8
1977	87.56	76.48	2,900	2,050	37.9	26.8
1978	99.37	88.50	2,900	2,600	32.8	29.4
1979	116.02	106.81	3,480	3,000	32.6	28.1
1980	136.62	134.16	4,450	3,550	33.2	26.5
1981	178.87	178.87	6,550	4,600	36.6	25.7
1982	275.56	275.56	8,850	6,930	32.1	25.1
1983 May	418.01	418.01	16,000	14,000	38.1	33.3

Units: salaries in pesos/day; support prices in pesos/ton.

relatives imply an important diminution of agriculture's competitiveness. Hence in all respects relative prices have changed in an unfavorable way for Mexican agriculture, specifically for the sub-sector of basic foods. Successive presidential administrations have tried to offset this trend by subsidizing inputs--fertilizer, seeds, water, crop insurance, and credit--as well as outputs, but the structure of fiscal revenues has not evolved enough to sustain that approach. Not surprisingly, the Mexican government now is reviewing other responses to the relative price dilemma.

In section 4 below, trade and pricing policies are reviewed in the context of these trends in relative prices. Before closing this section, however, it is worth noting briefly the macro context of the agricultural price changes. It is well documented that the development process tends to bring about an increase in the price of non-tradeables relative to tradeables.* Also, agricultural goods tend to decline in price relative to industrial goods. What is at issue is the rate of such a decline, how it may affect the external trade balance, and how important food-self sufficiency is to the government. Relative price changes, to a certain extent, are inevitable in the development process. They drive reallocations of resources and they reflect the workings of comparative advantage. It has been established that Mexico does not have a comparative advantage in the production of basic grains, unlike fruits and vegetables.** The question is the extent to which policy priorities should modify the resource allocations which follow from pure considerations of comparative advantage, and what are the costs of doing so.

*See, for example I. B. Kravis, A. Heston, and R. Summers, International Comparisons of Real Product and Purchasing Power, Johns Hopkins, 1978; and B. Balassa, "The Purchasing Power Parity Doctrine: A Reappraisal," Journal of Political Economy, December 1964.

**Bassoco and Norton (1983).

3. Structural Change in Mexican Agriculture

Mexican agriculture is characterized by enormous diversity in crops, technologies, and growing conditions. The available tabulations of production in fact understate the diversity by excluding a large number of minor crops, but the CESPA study cited in this report reveals that in 1978 there were over 50 crops with a production value of at least 100 million pesos each. The sector also has been undergoing rather continuous structural change in response to new technologies and market opportunities.

This structural change is in itself a source of growth, as the national crop composition shifts in favor of higher-valued outputs. Going back to an earlier period, it has been estimated that the sector's 4.8% annual growth rate during the 1930-60 period may be decomposed as follows: expansion in area under cultivation, 2.4%; yield growth, 1.9%; and changes in crop composition, 0.5%.* From 1960-70, the overall growth rate declined to 3.5%, disaggregated as follows: area and yield growth, 1.7% each, and changes in crop composition, 0.1%. The tendency toward substitution of grains for cotton in the late 1960s was the main reason for the drop in the crop composition factor. In the decade of the 1970s, land expansion dropped to about 1.0% per year, yields maintained their historic growth rates of roughly 2.0% per year, and the crop composition factor rose again slightly.

The nature of the cropping pattern changes is shown in the data

*L Solís (1970).

by product group in Table 3-1. The principal secular trends over five decades have been as follows:

1) Increasing importance of non-food crops relative to foods.
2) Increasing relative importance of forage crops and unstable behavior of natural fibres.
3) Within food crops, decreasing importance of staples and increasing importance of oilseeds, vegetables, and fruit.

In the last decade and a half, these changes appear to have accelerated. Staples now account for less than half of food production, a third of agricultural production, and a fifth of total agricultural and livestock production. Output of oilseeds, fruit, and vegetables amounted to about half the output of staples in 1930/32, and now these crops together are equal to staples in value of output. Maize alone now accounts for a little over 20% of the value of crop production, down from 33% at the beginning of the 1930s. It is likely that Table 3-1 understates the current share of production in vegetables, for its tabulations omit a large number of those crops whose value, in the aggregate, is not insignificant.

While cotton has declined sharply in its share of agricultural output (it was 7.7% in 1976-78, down from 16.1% in 1964/66) forage crops almost tripled their share from the mid-1960s to the late 1970s. Sorghum in particular has expanded rapidly in area and production, but barley, oats and alfalfa have been expanding as well. The substitution of feedgrains for foodgrains has been one of the more interesting structural changes in recent years, and it will be discussed further subsequently in the context of farm-level data.

Table 3-1. *COMPOSITION OF AGRICULTURAL PRODUCTION BY PRODUCT GROUPS*

	Percentage Composition			
	1930/32	1946-48	1964/66	1976-78
I. Foods	85.1	81.5	77.7	79.4
A. Staples	43.2	34.9	37.3	32.8
B. Oilseeds	3.3	6.7	7.7	7.2
C. Vegetables and tubers	8.3	11.3	6.7	10.9
D. Fruit and nuts	11.7	11.4	9.7	13.2
E. Sugar cane	5.0	7.0	7.3	6.1
F. Others	13.6	10.2	9.0	9.2
II. Nonfoods	14.9	18.5	22.3	20.6
A. Forage crops	3.6	3.4	4.1	11.4
B. Fibres and tobacco	11.3	15.1	18.2	9.2

Notes: a) Composition percentages are calculated on the basis of gross value of production in constant 1977 prices.

b) This table is adapted from Centro de Estudios Agropecuarios, El Desarrollo Agropecuario de México, Pasado y Perspectivas, Tomo III: La Oferta de Productos Agropecuarios, México, D.F., 1982, p. 382. In this reference, barley and oats were classified as foods, but in the above table they have been reclassified as nonfoods (forage crops); and strawberries, cantaloupe, watermelon, and pineapple were reclassified as fruits instead of vegetables.

Key:		
	Staples	Maize, rice, wheat, beans
	Oilseeds	Sesame, cottonseed, copra, safflower, soybeans, peanuts, olive, and flax
	Vegetables and tubers	Garlic, onion, peas, dry and green chile, tomatoes, squash, potatoes, lima beans, chickpeas
	Fruit and nuts	Strawberries, cantaloupe, watermelon, pineapple, avocado, plums, coconut, peaches, limes, mango, apples, oranges, nuts, pears, bananas, grapes, guayaba, papaya, tamarind
	Sugar cane	Sugar cane
	Other foods	Coffee, cocoa, vanilla
	Forage crops	Sorghum, alfalfa, barley, oats
	Fibers and tobacco	Cotton, sisal, tobacco

These changes have been accompanied by a long-term tendency for export crops to grow in relative importance. Existing studies are somewhat confusing on this point because the bases of comparison are not always the most appropriate. For example, the cited CESPA study shows exports of "major" crops declining in importance relative to domestic sales of those crops, in the last decade. However, many of the more rapidly growing exports are not included in any list of "major" crops. A more appropriate comparison involves the value of agricultural exports vs. total gross production (not value added) in the sector. The gross production series is available from the national accounts office, but they have been affected by the overall national accounts revisions of recent years. With this caveat in mind, Table 3-2 displays some data on the relative importance of agricultural and livestock exports in the last three decades. The table shows a clearly declining proportion of crop output destined for the export market from 1950 to 1970, but then a recuperation of the export share in the 1970s. The decline was sharpest in the 1960s, and this is directly attributable to the decreased share of cotton and maize exported. The share of cotton exported behaved as follows over time:

1950/54	.72
1955/59	.78
1960/64	.71
1965/69	.67
1970/74	.51
1975/78	.45

(Source: Dirección General de Economía Agrícola, Econotécnica Agrícola, vol. III, núm. 9, Sept. 1979.)

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Table 3-2. EXPORTS AND GROSS PRODUCTION IN THE AGRICULTURAL AND LIVESTOCK SECTORS
(in million current pesos)

	Agriculture			Livestock			Total		
Period	Exports	Production	Ratio	Exports	Production	Ratio	Exports	Production	Ratio
1950/52	1,756	7,746	.227	112	4,430	.025	1,868	12,176	.153
1960	3,897	18,940	.206	387	11,637	.033	4,284	30,577	.140
1970	5,608	36,682	.153	1,624	24,219	.067	7,232	60,901	.119
1978	31,096	169,973	.183	5,941	98,678	.060	38,037	268,651	.142

Sources: Export data, Secretaría de Comercio and Secretaría de Programación y Presupuesto.
Production data, Banco de México.

Mexico does not have a comparative advantage in grains, and only a slight one in cotton. Therefore the long-term trends in the share of sector output exported reflect, at least in part, a shift in export structure away from crops in which Mexico has little or no comparative advantage and into crops in which Mexico has a significant comparative advantage (Bassoco and Norton, 1983). Thus structural shi in agricultural exports took place during the 1960s and early 1970s, a now the export component of the sector is very competitive. The incre share of fruit and vegetables in total production, shown in Table 3-1 partly attributable to the rapid growth of exports of those crops in 1970s. Table 3-3 shows these changes in more explicit form.

The changes in crop composition and export structure have been accompanied by some shifts in the spatial patterns of production. The 1930s, 1940s and 1950s were decades of expansion to the northwest and north, via construction of large-scale irrigation systems. Nevertheles most of the agricultural production in the country still is harvested in the states of the center and south, and in the last two or three dec output in the center and south has grown more rapidly than output in th north and northwest. According to one study, from 1960 to 1970, total agricultural production expanded by the following annual growth rates:

north and northwest*	3.4%
center**	7.0%
south***	4.6%

(Source: Silos, Bassoco, Rodríguez, y Agraz, 1976.)

*B. C. Norte, B. C. Sur, Sonora, Sinaloa, Nayarit, Chihuahua, Durango, Coahuila, N. León, Tamaulipas, Aguascalientes, S. L. Potosí, Zacatec

**Jalisco, Colima, Michoacán, Querétaro, Guanajuato, Hidalgo, México, Tlaxcala, Puebla, Morelos.

***Veracruz, Guerrero, Chiapas, Oaxaca, Tabasco, Campeche, Q. Roo, Yuca

Table 3-3. AGRICULTURAL AND LIVESTOCK EXPORTS BY COMMODITY GROUP
(in million current pesos)

Year	Total	Coffee	Vegetables	Fibres	Meat	Grains and Legumes	Cattle on the hoof	Sugar and honey	Fruit
1969	10,376.3	846.5	1,428.4	3,184.7	529.8	845.6	1,097.8	1,366.1	139.5
1970	8,499.0	1,158.1	2,105.4	1,896.5	574.6	1,111.2	895.9	1,291.6	211.0
1971	9,284.2	914.5	3,411.8	1,791.5	564.0	24.2	298.0	1,340.0	187.1
1972	11,978.7	1,188.4	3,139.6	2,308.8	739.0	252.0	1,458.9	1,663.4	253.5
1973	14,861.7	2,202.0	4,004.5	2,822.8	578.9	372.9	1,311.6	2,022.5	302.7
1974	16,145.3	2,011.2	3,969.9	3,675.6	383.3	301.1	704.9	3,121.0	398.7
1975	14,345.1	2,487.0	4,265.6	2,502.8	122.1	218.4	419.2	2,519.8	270.6
1976	16,476.0	4,331.8	3,523.4	3,433.2	377.2	989.3	971.5	616.9	256.3
1977	35,996.0	12,000.0	8,969.7	4,907.8	1,025.6	1,821.2	1,710.6	1,247.9	1,161.2
1978	41,797.0	10,017.0	10,549.0	6,820.0	2,166.9	2,471.0	1,952.0	1,673.0	1,444.0

Source: Informes Presidenciales, 1979, 1980.

The available data for the entire decade of the 1970s are organized on a slightly different regional basis, but they reveal the same general pattern. For the nine most basic annual crops (maize, beans, rice, wheat, cotton, safflower, sesame, soybeans, sorghum), the 1970-80 annual rates of production expansion by region were as follows, in 1975 constant prices

north[a]	-1.1%
center[b]	4.0%
gulf and south[c]	3.2%

(Source: Calculated from data provided by the Secretaría de Agricultura Recursos Hidráulicos and the Secretaría de Programación y Presupuesto.)

Again, the center has led in production growth, followed closely by the south. A comparable ranking may be observed in growth rates of cultivated area.

CESPA (tomo VIII, p. 139) also has calculated regional growth rates of production on the basis of 15 crops: maize, beans, rice, wheat, cotton, safflower, soybeans, sugar cane, tomatoes, coffee, oranges, sisal, grain, sorghum, and alfalfa. Their conclusions about relative regional growth rates are slightly different:*

*The CESPA data have been modified to include Tamaulipas in the gulf region instead of the north.

[a]B. C. Norte, B. C. Sur, Sonora, Sinaloa, Chihuahua, Durango, Coahuila, N. León, Aguascalientes, S. L. Potosí, Zacatecas.

[b]Nayarit, Jalisco, Colima, Michoacán, Querétaro, Guanajuato, Hidalgo, México, Tlaxcala, Puebla, Morelos.

[c]Tamaulipas, Veracruz, Guerrero, Chiapas, Oaxaca, Tabasco, Campeche, Q. Roo, Yucatán.

	1946/48-1964/66	1964/66-1975/77
north[1]	4.0%	0.2%
center[2]	4.6%	-0.5%
gulf and south[3]	6.5%	-0.1%

These various studies differ in crop coverage and regional definitions but it does seem clear that over a period of two to three decades, the center and south together have experienced more rapid production growth than the north has.

The northwest remains the richest agricultural zone of the country on a per farm basis, with net farm incomes twice as high as those in the south (Bassoco and Norton, 1983, p. 136), but the south and center have been the more dynamic agricultural regions in the country. Their productivity per hectare (measured in gross value of output per hectare) is as much as 50% greater than that of the northwest (ibid.) in spite of the proportionately greater access of northwestern farmers to irrigation. Also, over 75% of the national pasture land and land devoted to perennial crops is found in the gulf coast region and the south (CESPA, tomo VIII). Moreover, the potential for expansion of cultivated land (by terracing and water control systems) and for expansion of irrigated areas (via wells, small dams, and large-scale irrigation) now lies largely in the center and south. Hence it is almost certain that the coming decades will see a continuation of the

[1] B. C. Norte, B. C. Sur, Sonora, Sinaloa, Chihuahua, Coahuila, Durango, N. León, Zacatecas, S. L. Pótosí, Aguascalientes.

[2] Nayarit, Jalisco, Colima, Guanajuato, Michoacán, Querétaro, Hidalgo, México, D.F., Morelos, Tlaxcala, Puebla.

[3] Tamaulipas, Veracruz, Tabasco, Guerrero, Chiapas, Oaxaca, Campeche, Q. Roo, Yucatán.

trend toward an increasing share of production taking place in the center and south.

Irrigation is of course a major source of growth in productivity: via yield increases and via changing the crop composition to higher-valued crops. It also allows for double cropping in many cases where it previously was not possible. These factors together contribute to making net incomes per hectare, nation-wide, four times higher with irrigation than without irrigation (ibid.). Table 3-4 shows recent trends in irrigation, as measured in terms of area harvested. The table shows that rainfed acreage harvested was effectively stagnant from 1969 to 1979, and during that period the irrigated acreage increased by some 60%, so that it now accounts for about 30% of the total harvested area. (Owing to the extensive use of double cropping on irrigated land, it accounts for a smaller share of the total area which is cultivated at least once in a given year.) A striking fact to emerge from Table 3-4 is that individually-developed irrigation has grown more rapidly than facilities under the control of unified irrigation districts. This is consistent with the fact that production has expanded more in the center and south, where irrigation is proportionately less under the control of irrigation districts.

Average unit yields per cropping season are of course significantly higher under irrigation. In the five years 1977-81, irrigated maize yields averaged 120% higher than (2.2 times) rainfed maize yields (Norton, 1982). However, maize yields have been increasing significantly more rapidly in rainfed areas (ibid.). Thus the national yield increase is mainly attributable to a) an increasing share of total area which

Table 3-4. IRRIGATED AND RAINFED ACREAGE HARVESTED
(thousand hectares)

Year	Rainfed	Individually Irrigated	Irrigation Districts	Total Irrigated	Total
1969	11,033	534	2,489	3,023	14,056
1970	11,991	499	2,485	2,984	14,975
1971	12,497	538	2,452	2,990	15,487
1972	11,890	707	2,646	3,353	15,243
1973	11,742	1,367	2,759	4,126	15,868
1974	10,434	1,499	2,972	4,471	14,905
1975	10,692	1,722	3,081	4,803	15,495
1976	10,355	1,525	2,896	4,421	14,776
1977	12,248	1,411	3,075	4,486	16,734
1978	11,736	1,708	3,110	4,818	16,554
1979	11,318	1,477	3,404	4,881	16,199
Trend growth rate%	-0.4	+13.3	+3.1	+5.7	+1.1

Source: Informes Presidenciales, various years.

is irrigated -- and higher levels of yields under irrigation, and b) relatively rapid yield improvement in rainfed areas. Again these considerations point to the role of the center and south in future productivity growth, for those areas contain the bulk of the rainfed lands and also the larger future possibilities for land and irrigation expansion (see section 6 below).

Irrigation is a major agricultural input at the national level, but of course labor and land are the two most important inputs. Structural changes have occurred in labor use as well as in other areas. The increasing use of irrigation and hence double cropping has meant increasing labor requirements per hectare, and also the increasing share of land devoted to fruit and vegetable crops and alfalfa has increased the average labor requirement per hectare. To offset these trends, the increased share of oilseeds and grain forage crops has reduced average labor requirements, as has the greater reliance on mechanization for land preparation and harvesting. The CESPA study calculates that total labor requirements in agricultural production increased by 5.0% per year from 1946/48 to 1964/66 and then decreased by 2.9% per year from 1964/66 to 1976/78 (Table 3-5). There are two important qualifications to that conclusion: 1) the latter period marked a transition from peak growth rates to the bottom of the downward trend in agricultural production, and hence that period's growth rate is unrepresentative of, say, 1970-82 trends; and 2) in reviewing the crop-specific labor coefficients in the CESPA study, the coefficients for grain forage crops and oilseeds, and to some extent for grains, in 1976/78 certainly are underestimates (they are as low as 5 man-days per

Table 3-5. ESTIMATES OF DIRECT DEMAND FOR LABOR IN AGRICULTURE AND LIVESTOCK (million man-days)

Period	Agriculture	Livestock	Total
1946/48	264	69	333
1964/66	638	173	811
1976/78	448	241	689
Growth rates (%):			
1946/48 - 1964/66	5.0	5.2	5.1
1964/66 - 1976/78	-2.9	2.8	-1.3

Source: Centro de Estudios Agropecuarios, El Desarrollo Agropecuario de México, Pasado y Perspectivas, Tomo VI, El Empleo de Mano de Obra en las Actividades Productivas Agropecuarias, Secretaría de Agricultura y Recursos Hidráulicos, en colaboración con CEPAL, México, D.F., 1982, p. 61.

Note: For agriculture, these estimates are based on crop input coefficients for 18 crops.

hectare per crop year in flaxseed and 6 man-days in safflower). Correcting for this last factor would add very roughly 100 million man-days to the total required agricultural employment in 1976/78 in Table 3-5.* Nevertheless, it appears to be correct that the growth rate of direct demands for labor in the cropping sector has slackened. A principal cause is the rapid trend toward mechanization of field operations. The CESPA study has estimated that the share of total cultivated area which was worked with mechanical traction power rose from 3.9% in 1950 to 21.5% in 1970.** CESPA also has estimated that the number of tractors increased by 5.1% per year from 1960 to 1970 and by 7.5% per year from 1970 to 1977*** Mechanization has proceeded more rapidly in rainfed areas than in irrigated areas.

All of these changes together have led to significant growth in yields in almost all crops. Tables 3-6 and 3-7 show the trends in yields and production for 12 principal crops over the 1960-1982 period. From Table 3-6, it is apparent that some revisions are required in the conventional wisdom about prospects for maize yields. On the basis of almost no yield improvement from 1964 to 1976, most observers assumed that in the longer run national-average maize yields could not be expected to increase by more than 1.5% per year. However, the data now show that the 1960/62 to 1979/81 growth rate has been 2.9% for maize yields, and 4.4% for wheat yields. It is significant that many of the crops not reported in Table 3-6 (especially fruits and vegetables) had higher yield growth rates than most of those in the table.

*Also, the CESPA data in Table 3-5 almost certainly overstate the rate of increase of employment in the livestock subsector.

**CESPA, op.cit., tomo VI, p. 72.

***Op.cit., p. 74.

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Table 3-6. YIELDS OF PRINCIPAL CROPS, 1960-82
(kg/hectare)

Year	Maize	Wheat	Grain sorghum	Beans	Rice (paddy)	Soybeans	Safflower	Sesame	Cotton fibre	Barley	Tomatoes	Onions
1960	975	1,417	1,797	398	2,297	1,230	1,248	636	523	752	6,091	4,122
1961	993	1,676	2,491	447	2,275	1,985	1,260	678	566	747	7,342	4,178
1962	995	1,946	2,516	392	2,158	2,076	1,270	662	617	784	7,188	5,415
1963	987	2,079	2,036	396	2,199	2,051	1,298	673	632	799	7,312	6,125
1964	1,133	2,692	1,901	426	2,070	1,968	1,325	657	699	806	7,278	6,293
1965	1,158	2,505	2,376	406	2,734	2,107	1,354	578	710	854	12,303	6,299
1966	1,119	2,254	2,450	452	2,439	1,749	1,432	661	750	914	12,271	6,348
1967	1,130	2,727	2,475	508	2,482	1,875	1,486	574	747	853	13,405	9,906
1968	1,181	2,632	2,570	479	2,503	2,069	1,191	614	839	1,003	12,795	9,757
1969	1,184	2,765	2,781	504	2,582	1,757	1,443	663	774	867	12,960	8,718
1970	1,194	3,020	2,829	530	2,703	1,920	1,645	655	812	1,060	14,486	8,284
1971	1,272	2,981	2,689	485	2,404	1,985	1,550	641	866	1,222	15,290	10,522
1972	1,265	2,634	2,355	515	2,582	1,700	1,364	581	796	1,426	16,785	10,827
1973	1,132	3,264	2,760	540	2,996	1,877	1,506	698	922	1,495	15,719	13,138
1974	1,168	3,602	3,028	626	2,843	1,636	1,421	665	887	1,444	17,911	13,192
1975	1,262	3,596	2,855	586	2,792	1,738	1,466	506	907	1,537	17,796	12,150
1976	1,182	3,761	3,219	562	2,907	1,754	1,299	428	953	1,511	16,684	13,984
1977	1,357	3,464	3,060	472	3,143	1,642	1,284	592	997	1,681	15,791	14,996
1978	1,520	3,666	2,996	600	3,312	1,543	1,435	549	1,047	1,705	21,312	14,752
1979	1,517	3,881	3,437	616	3,278	1,682	1,202	449	925	1,488	20,192	14,421
1980	1,780	3,771	3,048	551	3,456	2,014	1,136	622	883	1,851	19,209	14,038
1981	1,812	3,703	3,562	683	3,584	1,884	952	569	970	2,039	n.a.	n.a.
1982	1,948[a]	4,227	2,865	639	2,472	1,565	982	240	999	1,189	n.a.	n.a.
1983	1,552	3,847	2,559	578	2,649	1,643	595	637	n.a.	1,866	n.a.	n.a.
Growth Rates:												
1960/62-1979/81	2.9%	4.4%	2.1%	2.1%	2.3%	0.3%	-0.7%	-1.0%	2.6%	4.6%	6.2%[b]	6.6%[b]
1960/62-1977/79	2.3%	4.7%	2.2%	2.2%	2.4%	-0.5%	0.2%	-1.3%	3.3%	4.6%	6.2%	7.1%

Sources: 1960-80: Dirección de Economía Agrícola, Secretaría de Agricultura y Recursos Hidráulicos.
1981-82: Banco Nacional de México, Informe de la Economía Agrícola, junio, 1983.

[a] Figure in process of downward revision.

[b] 1960-62 to 1978-80 growth rate

Table 3-7. PRODUCTION OF PRINCIPAL CROPS, 1960-82
(thousand tons)

Year	Maize	Wheat	Grain sorghum	Beans	Rice (paddy)	Soybeans	Safflower	Sesame	Cotton fibre	Barley	Tomatoes	Onions
1960	5,420	1,190	209	528	328	5	32	129	470	180	389	61
1961	6,246	1,402	281	723	333	20	41	147	450	174	453	64
1962	6,337	1,455	296	656	289	57	47	158	486	151	434	84
1963	6,870	1,703	402	677	296	56	47	169	535	186	443	96
1964	8,454	2,203	526	892	274	60	47	172	565	171	445	102
1965	8,936	2,150	747	860	378	58	80	154	577	193	554	103
1966	9,272	1,647	1,411	1,013	372	95	236	167	521	220	555	108
1967	8,603	2,122	1,667	980	418	131	149	155	495	203	619	161
1968	9,062	2,081	2,133	857	347	275	102	159	592	253	670	171
1969	8,411	2,326	2,456	835	395	287	209	175	397	213	715	135
1970	8,879	2,676	2,747	925	405	215	289	179	334	238	923	139
1971	9,786	1,831	2,516	954	369	256	411	180	397	270	939	227
1972	9,223	1,809	2,612	870	403	377	271	161	417	310	1,204	267
1973	8,609	2,091	3,270	1,009	451	586	298	178	393	392	1,091	342
1974	7,848	2,789	3,499	972	492	491	272	160	513	250	1,121	336
1975	8,449	2,798	4,126	1,027	717	599	532	111	206	440	1,056	243
1976	8,017	3,363	4,027	740	463	303	240	85	224	549	807	290
1977	10,138	2,456	4,325	770	567	516	518	121	418	418	974	315
1978	10,930	2,785	4,193	949	402	334	616	134	366	505	1,394	354
1979	8,449	2,283	3,994	641	495	719	628	138	345	373	1,533	384
1980	12,383	2,785	4,812	971	456	312	446	176	329	610	1,458	372
1981	14,766	3,189	6,296	1,469	644	712	372	86	344	559	n.a.	n.a.
1982	10,111	4,462	4,730	1,093[p]	511	648	220	32	185[p]	391	n.a.	n.a.
1983	13,423	3,490	5,068	1,032	441	683	272	116	n.a.	610	n.a.	n.a.
Growth Rate:												
1960/62-1979/81	3.7%	3.8%	16.8%	2.6%	2.8%	17.5%	14.0%	-0.4%	-1.7%	6.1%	7.1%[a]	9.7%[a]

Sources: Dirección General de Economía Agrícola, Secretaría de Agricultura y Recursos Hidráulicos; Secretaría de Programación y Presupuesto.

[p] Preliminary

[a] 1960-62 to 1978-80 growth rate

Note: The 1982 production estimates were the subject of considerable controversy which still has not been entirely resolved.

The question is still debated as to the influence of the high-price policies of 1980 and 1981 on yield performance. Table 3-6 shows that, with the exception of maize, yield growth was not significantly different if measured up to the period 1977-79, before the revised pricing policy took effect. Of course, the new policy emphasized maize, so it appears likely that it did have an effect on yields, especially if the 1982 harvest is taken into account. Nevertheless, the point which emerges is that long-term yield extrapolations will not be materially affected by the pricing policy changes of recent years.

On the basis of the data in Tables 3-6, 3-7, and 3-4, a 3.3-3.5% growth rate of agricultural production appears feasible for the next decade: 2.0% in yields, 1.0% in land expansion, and 0.3-0.5% in crop composition effects. (This decomposition marks a reversal of the pattern of the 1930-60 period, when expansion of cultivated land was more important quantitatively than yield growth.) As the oilseed yields stabilize, and if pricing incentives are at least moderately favorable, a national-average rate of yield increase of 2.5% would appear attainable. In summary, the supply-side prospects for Mexican agriculture now appear to be more favorable than they have in more than a decade, provided appropriate policies can be implemented.

Finally, it should be noted that these structural changes on the supply side of the sector have had their counterpart on the demand side. Table 3-8 shows the structure of demand for food products at different points in time. The demand data are based on apparent consumption series, which suffer the well-known defect of including inventory change. Using three-year averages ameliorates the problem but does not eliminate it. In spite of this caveat, the table reveals some significant changes over time: the tendency to substitute vegetables and potatoes for legumes, the very rapid rise in consumption of oilseeds, milk, and pork, and the moderation of the earlier trend toward rapid increases of sugar and coffee consumption. For reference,

Table 3-8. INTERNAL DEMAND FOR FOOD PRODUCTS
(in millions of 1977 pesos)

	1955-57	1965-67		1976-78	
	Amount	Amount	Share	Amount	Share
I. Agriculture	27,299	53,776	.469	77,656	.428
A. Cereals	12,101	19,638	.171	29,112	.161
maize	9,030	14,685	.128	22,378	.123
wheat	2,219	3,375	.029	5,068	.028
rice	618	1,145	.010	1,064	.006
oats	9	24	-	44	-
barley	225	409	.004	558*	.003
B. Tubers	362	909	.008	1,540	.009
squash	99	200	.002	111	.001
potatoes	263	709	.006	1,429*	.008
C. Legumes	2,069	4,300	.038	4,150	.023
beans	1,914	4,155	.036	3,784	.021
chickpeas	71	31	-	238	.001
lima beans	84	114	.001	128	.001
D. Oilseeds	2,886	5,759	.050	12,365	.068
cottonseed	2,025	2,624	.023	1,344	.007
safflower	-	480	.004	2,461	.014
soybeans	35	501	.004	5,828	.032
copra	n.a.	861	.008	1,265	.007
sesame	808	1,201	.011	922	.005
others	18	92	.001	545*	.003
E. Sugar cane	2,711	5,372	.047	6,773*	.037
F. Vegetables	2,293	3,330	.029	5,696	.031
tomatoes	1,383	1,696	.015	2,772	.015
onions	138	271	.002	696	.004
green chile	238	656	.006	973	.005
others	534	707	.006	1,255*	.007
G. Short-cycle fruit	324	1,250	.011	1,370	.008
pineapples	119	217	.002	420	.002
watermelon	127	388	.003	450	.003
cantaloupe	66	337	.003	332	.002
strawberries	12	308	.003	168	.001

Continued on following page

Table 3-8. INTERNAL DEMAND FOR FOOD PRODUCTS (continued)
(in millions of 1977 pesos)

	1955-57	1965-67		1976-78	
	Amount	Amount	Share	Amount	Share
H. Perennial fruit	3,312	7,406	.065	12,350	.068
banana	350	1,364	.012	1,788	.010
apples	255	553	.005	1,117	.006
grapes	255	403	.004	1,285	.007
mango	371	802	.007	1,226	.007
lime	138	292	.003	691	.004
avocado	587	1,070	.009	2,123	.012
others	1,356	2,922	.026	4,120*	.023
I. Other foods	839	5,256	.046	4,300	.024
coffee	465	4,708	.041	3,681	.020
others	374	548	.005	619*	.003
II. Livestock and poultry	n.a.	61,447	.536	103,694	.572
beef	n.a.	15,763	.138	22,318*	.123
pork	n.a.	9,593	.084	22,033*	.122
poultry	n.a.	5,908	.052	9,715*	.054
goat	n.a.	1,629	.014	1,672*	.009
mutton	n.a.	1,257	.011	1,102*	.006
milk	n.a.	18,795	.164	36,043*	.199
eggs	n.a.	8,502	.074	10,741*	.059
honey	n.a.	n.a.	n.a.	70*	-
III. Total	n.a.	114,667	1.000	181,350	1.000

*1976-77.

Source: This table was compiled from two documents -- CESPA, tomo II, pp. 187-188; and Dirección de Economía Agrícola, Secretaría de Agricultura y Recursos Hidráulicos, Econotécnica Agrícola, vol. III, núm. 9, Sept. 1979.

real GDP per capita grew by 3.15% per year from 1955/57 to 1965/67, and by 2.26% per year from 1965/67 to 1976/78. By the latter period, maize consumption had dropped to 12% of total food consumption, but of course that share varies over income groups.

Home retentions continue to account for a significant component of consumption of maize, beans, and some forage crops, as the data in Table 3-9 reveal. However, home retentions of all other crops are negligible. Even in the case of maize, feedgrain uses account for one-third of the home retentions. On a national scale the amount retained for family consumption would be adequate for the annual requirements for 1.5-2.0 million families. Thus, while home retentions still are important in the more marginal rural areas, that practice can no longer be said to typify Mexican agriculture.

To conclude this review of structural change in Mexican agriculture, we turn to the question of the structure of farm production and income. This is an area in which survey information has been particularly scarce, and so it has been difficult to quantify the role of specific crops and of off-farm activities in generating income for the farm household. Partly as a result of this dearth of information, overly simplified images of the small-scale farmer have persisted: in the conventional perception he cultivates mostly maize and beans, perhaps raises a few chickens, and migrates seasonally to urban areas for part-time employment. New information is now available from surveys of the Banco Nacional de Crédito Rural (Banrural) which enables us to evaluate the conventional image.*

Tables 3-10 to 3-12 summarize some of the Banrural information on farm income sources and the role of maize in the cropping pattern. The evidence indicates that livestock and poultry sales are as important

*However, it should be noted that these surveys probably exclude the very poorest farms.

Table 3-9. SHARES OF AGRICULTURAL PRODUCTION RETAINED FOR FARM USES(%), 1979-80

Crop	Marketed share	Retained share	Share of Retentions Destined for: Family consumption	Livestock feed	Seed uses
Maize	77.9	22.1	62.9	35.1	2.0
Beans	90.1	9.9	93.1	1.2	5.7
Wheat	99.7	0.3	16.7	78.9	4.4
Rice	99.9	0.1	79.8	0	20.2
Oats	58.4	41.6	0.9	98.9	0.2
Sorghum	91.4	8.6	0.6	99.4	0
Alfalfa	51.4	48.6	0	100.0	0
Potatoes	99.7	0.3	9.6	42.5	47.9
Garlic	99.8	0.2	0	0	100.0
Chile	99.9	0.1	1.9	0	98.1
Tomatoes	99.8	0.2	0.6	99.4	0
Sesame	99.9	0.1	39.3	0	60.7
Safflower	100.0	0	0	0	0
Soya	100.0	0	0	0	0
Strawberries	99.9	0.1	100.0	0	0

Source: Banco Nacional de Crédito Rural, Fideicomiso para Estudios y Planes de Desarrollo Agropecuario y Programas de Crédito Agrícola, La Comercialización de los Principales Productos Agrícolas y Costos de Producción de Cultivos Comerciales y de Autoconsumo, México, D.F., 1980.

Table 3-11. SHARES OF PRINCIPAL INCOME SOURCES ON SMALL FARMS

	Total Income*	(A) Share from Crop Sales (%)	(B) Share from Off-Farm Work (%)	(C) Share Livestock and Poultry Sales (%)	(D) (B) + (C)
Aguascalientes	240.3	62	9	14	23
Baja California Norte	716.3	6	0	94	94
Baja California Sur	215.8	26	42	30	72
Campeche	39.3	45	13	21	34
Colima	104.9	28	2	55	57
Chiapas	75.7	20	15	20	35
Chihuahua	97.4	41	22	25	47
Guanajuato	69.7	16	18	41	59
Guerrero	45.9	30	19	21	40
Hidalgo	107.8	17	21	21	42
Jalisco	264.8	26	20	43	63
Michoacán	95.7	28	37	25	62
Morelos	282.7	24	12	36	48
Nayarit	97.8	26	44	22	66
Nuevo León	236.1	9	14	60	74
Oaxaca	80.2	58	12	19	31
Puebla	175.0	12	21	25	46
Querétaro	59.6	15	2	5	7
Quintana Roo	27.1	16	8	13	21
Tabasco	66.6	36	9	23	32
Tamaulipas	51.1	13	30	48	78
Tlaxacala	134.8	6	32	19	51
Veracruz	65.6	24	46	23	69
Yucatán	100.1	13	15	61	76
Zacatecas	115.2	35	8	30	38
Weighted Totals**	112.9	33	18	26	44
Unweighted Totals	3,565.5	23	16	45	61

Source: Table 3-10

*Thousand pesos per person per farm, farms of less than 4 hectares

**Weighted by state shares in total farms sampled.

Table 3-12 SHARE OF MAIZE (%) IN AREA PLANTED, BY FARM SIZE CLASS (annual crops only)

	Farm Size Stratum		
	0-4 has.	4-8 has.	8 + has.
Aguascalientes	66	72	52
Baja California Norte	14	0	5
Baja California Sur	34	67	5
Campeche	70	73	38
Colima	74	83	88
Chiapas	66	81	74
Chihuahua	63	46	13
Guanajuato	59	52	44
Guerrero	72	77	71
Hidalgo	70	60	51
Jalisco	88	81	81
Michoacán	61	55	51
Morelos	59	29	52
Nayarit	59	50	34
Nuevo León	81	79	28
Oaxaca	47	23	73
Puebla	83	79	63
Querétaro	91	80	63
Quintana Roo	55	59	68
Tabasco	73	70	41
Tamaulipas	56	52	22
Tlaxcala	70	70	50
Veracruz	85	84	69
Yucatán	97	96	99
Zacatecas	50	46	42
Unweighted average	66	63	51

Source: Banco Nacional de Crédito Rural, S.A., Fideicomiso para Estudios y Planes de Desarrollo Agropecuario y Programas de Crédito Agrícola (FEDA), Principales Indicadores del Estudio del Empleo, Subempleo y Desempleo Rural, México, D.F., 1983.

as crop sales in generating income, and that generally income sources are quite diversified. Taken together, livestock and poultry operations plus off-farm work account for much more income than crop sales plus home retentions do, on the smallest farms. Crop sales account for no more than one-fourth to one-third of earnings, and maize (including the value of home retentions) accounts for no more than two-thirds of that figure. Thus, at most maize accounts for between one-fourth and one-fifth of income (including the value of home retentions) on farms of less than four hectares. While increased producer prices for maize are beneficial to these farmers, their importance in the small farm budget is perhaps less than commonly thought. The same set of surveys shows that sorghum is an important crop in all farm size classes in some regions of the country, so it is not a negligible factor. Sorghum yields, in fact, are almost twice as high as maize yields, on the average,* and the prices and input requirements for the two crops are comparable. Hence, at the margin sorghum is the more profitable crop, and this fact no doubt explains its rapid rate of production increase in recent years. The combination of forage crop cultivation and livestock activities contributes more to the average small farm household's budget than maize cultivation does. Off-farm work is less important but still is a significant source of income. Thus, the role of maize production for the more traditional farmers appears to be less dominant than often is assumed. The typical small farm is quite a diversified operation, including the tree crops, annual crops, poultry, livestock, and diversified off-farm work in the surrounding locality, apart from some longer-term and longer-distance seasonal migration.

*For 1981 and 1982, average sorghum yields in Mexico were 3.6 tons/hectare and average maize yields were 1.9 tons/hectare.

One immediate implication of these findings is that it may be worthwhile to develop programs of marketing assistance for small-scale producers in the areas of livestock, poultry, and tree crop products. Such programs already are contemplated by the Ministry of Agriculture and Water Resources in the dairy field, and FIRA has been working on marketing programs for some tree crops. In combination, programs of that nature could be as important to the economic welfare of small farmers as support prices for staple crops are. Some other implications of the Banrural data are discussed in the following section, in the context of trade and pricing policy.

4. Trade and Pricing Policy

Agricultural trade and pricing policy have been closely linked in Mexico over the past thirty years. To a certain extent, trade policy has been submerged in pricing policy by the decision to handle all imports of basic foods through a parastatal organization (CONASUPO). The domestic price of imported goods is then set according to domestic policy goals and budget constraints, and the result has been a degree of insulation of domestic relative prices from international relative prices.

Trade and pricing issues are sufficiently complex that it is easier to review them separately by major product or product group, and then to summarize the general conclusions subsequently. Hence this section of the report starts with a question of increasing importance: the choice at the margin between feedgrain imports and foodgrain imports. Soybeans may be included in the feedgrain category because of their importance in balanced animal feeds. Imports of both sorghum and soybeans have increased more rapidly than imports of foodgrains over the past 15 years, in spite of the fact that production levels also have increased more rapidly in feedgrains (Table 4-1). It also should be noted that approximately twenty percent of total agricultural production goes for animal feed (Centro de Estudios en Planeación Agrícola, 1982a, p. 124).

These trends pose choices for Mexican policy, not simply because of the food self-sufficiency issue, but because income distribution issues are involved. The feedgrain imports ultimately are destined proportionately more for the upper-income groups, via consumption of meat, poultry, and dairy products. Consumption patterns differ significantly by income group in Mexico. For the lowest two income deciles

Table 4-1. IMPORTS OF PRINCIPAL AGRICULTURAL PRODUCTS

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Maize											
value	704	24	205	1,536	2,460	5,005	1,539	4,427	3,983	2,274	13,517
volume	736	17	198	1,136	1,270	2,618	905	1,751	1,412	744	3,777
Sorghum											
value	21	14	218	49	801	1,452	145	1,638	1,886	3,528	7,073
volume	11	13	246	14	427	835	44	703	736	1,277	2,255
Beans											
value	27	-	10	56	387	802	-	233	12	87	5,533
volume	9	-	3	18	39	104	-	29	1	7	443
Wheat											
value	-	147	582	977	2,361	218	3	1,062	1,496	4,294	3,746
volume	-	177	640	718	976	87	2	476	484	1,148	823
Soybeans											
value	132	90	28	159	1,235	93	1,655	3,517	4,023	3,518	2,038
volume	90	53	11	42	435	22	349	520	681	578	522
Oilseeds											
value	32	-	-	141	169	-	6	313	1,418	1,067	2,452
volume	17	-	-	40	40	-	1	37	211	172	324
Soybean cake											
value	-	175	72	340	183	55	17	413	477	695	1,106
volume	-	116	45	100	79	29	10	60	89	107	178
Rice											
value	24	-	-	141	335	-	-	-	-	131	808
volume	16	-	-	37	71	-	-	-	-	18	90
Sugar											
value	-	-	-	-	-	-	-	-	-	-	6,270
volume	-	-	-	-	-	-	-	-	-	-	363
Milk											
value	120	266	485	442	1,133	350	532	812	1,024	1,472	4,305
volume	36	48	68	61	107	38	69	78	91	107	244
Total value, 10 principal products	1,060	716	1,600	3,841	9.064	7,975	3,897	12,415	14,319	31,385	46,848

Units: Value in million pesos, volume in thousand tons.
Source: Secretaría de Agricultura y Recursos Hidráulicos; Secretaría de Programación y Presupuesto.

52%-64% of their protein consumption derives from maize, and only 10%-17% from meat, poultry, fish, and dairy products. For the upper two deciles, the corresponding figures are 24%-32% of their protein from maize, and 37%-39% from the meat and dairy sources.*

In a sense, this is an argument for concentrating imports on maize and wheat, via pricing policy and trade policy, with the presumption that this would make available greater volumes of foodgrains at lower prices. However, the other side of the story is that maize is a principal source of income for low-income farmers, and cheaper imports (everything else being equal) tend to lower the price they receive for their output and hence to lower their incomes.

Thus, at first glance, there appears to be a choice, at least at the margin, between a trade policy which favors the interests of low-income consumers (emphasis on foodgrain imports) and one which favors low-income producers (feedgrain imports). However, matters are not quite that simple, for as the previous section showed, income-earning activities on small farms in Mexico are quite a bit more diversified than is often supposed. Taking into account the relatively small share of income which is attributable to maize production, even on the smaller farms, it is clear that the income distributional implications of pricing policy cannot be reduced to simple questions of whether and by how much to support the maize price. The following examples, while hypothetical, illustrate the nature of the relevant trade-offs. Drawing upon the data in Tables 3-9 to 3-11, we may assume that foodgrains and beans account for about 25% of the income of poor farming households

* Norton (1982, p. 119), citing data from the Centro Nacional de Información sobre Empleo y Trabajo.

and also that livestock, poultry, and feedgrains account for another 25%. Using representative consumer budget shares, simplified household budgets may be constructed (normalized to sum to 100 pesos):

Case A.

	lowest income groups		upper income groups
	rural	urban	
Income sources			
maize[a]	25	0	0
meat[b]	25	0	5
others	50	100	95
total	100	100	100
Expenditures			
maize	30	30	7
meat	10	10	10
other	60	60	83
total	100	100	100

[a]Including, in all cases, maize, wheat, rice, and beans, all of which have official support prices.

[b]In all cases, meat, fish, poultry, dairy products, and, for producers, feedgrains.

Data from the Centro de Estudios en Planeación Agrícola (1982a, pp. 71,73) show that in 1968 households in the lowest income strata (incomes of 0 to 300 pesos/month) spend 29% of their income on maize and 35% on all cereals. According to the same reference, the expenditure figures of case A for the upper groups would apply to those earning 3000 pesos a month or more.

With the above table, we may investigate the effects of higher producer support prices (or policies which are equivalent to tariffs), in the two alternative cases in which they are applied to foodgrains (case A) and feedgrains (case B). The revised household budgets are as follows, assuming a price support giving rise to a 20% price increase:*

*For simplicity, supply response is ignored in this static picture.

Case B.

	lowest income groups		upper income groups
	rural	urban	
Income sources			
maize	30	0	0
meat	25	0	5
other	50	100	95
total	105	100	100
Expenditures			
maize	36	36	8.4
meat	10	10	10
other	60	60	83
total	106	106	101.4
Budget deficit (-) or surplus (+)	-1	-6	--1.4

And, for the price support on feedgrains:

Case C.

	lowest income groups		upper income groups
	rural	urban	
Income sources			
maize	25	0	0
meat	30	0	6
other	50	100	95
total	105	100	101
Expenditures			
maize	30	30	7
meat	12	12	12
other	60	60	83
total	102	102	102
Budget deficit (-) or surplus (+)	+3	-2	-1

Before discussing the implications of these numerical illustrations, three notes of interpretation: First, the income and expenditure budget shares are only approximate, but refinements should not change the qualitative implications of the examples. Second, clearly consumer subsidies can be extended in either case B or case C to offset the effects on

the budgets of the poor; but assuming that the budget for consumer subsidies ultimately is limited, it is useful to review the alternatives before introducing such subsidies. Third, a household budget deficit or surplus would not be sustained; rather, all budgetary outlays would be adjusted to bring the budget into balance once again. Nevertheless, the example comes out more clearly if the budgets are presented in this form.

A comparison of cases A and B makes it clear that in net terms a price support on maize is regressive (without an accompanying consumer subsidy), particularly with respect to the urban poor. Comparing cases B and C also indicates that in relative terms, it is more regressive than a price support for feedgrains, assuming consumer subsidies could be applied in equal amounts in the two cases. In other words, with a given policy on income distribution, the fiscal burden of subsidies is greater in the case of foodgrain price supports than in the case of feedgrain supports.

If tariffs are used instead of domestic price supports, the implications for trade policy are that income redistribution is favored by a higher tariff on feedgrain imports than on foodgrains, or, equivalently, by quantitative import restrictions which generate a higher price rise in the case of feedgrains. Such a policy of course would lead to an increase in feedgrains production, relative to foodgrains; but that is exactly what has been occurring in the past fifteen years.

These examples illustrate the dilemma which has arisen from the sustained Mexican policy emphasis on foodgrain price supports: it leads either to a worsening of the income distribution or, to avoid that outcome, to greater federal expenditures on consumer subsidies than would otherwise be necessary. The income distribution does appear to have been worsening in the 1960s and 1970s,* owing of course to a

*See Norton (1982).

large number of factors, and to counteract that trend the government substantially increased its subsidies for basic foods in 1979-81. Those levels of subsidy proved not to be sustainable. Hence a question which now arises is the following: might it not be preferable to use trade policy to influence producer prices? And if so, should income distribution concerns affect the nature of the trade policy; i.e., should the emphasis be placed on inducing higher producer prices for feedgrains?

As mentioned earlier, in Mexico trade policy has not been used to influence price levels, although in many countries trade policy is de facto the principal instrument of pricing policy. In the following paragraphs a possible pricing role for trade policy is reviewed, with special reference to the case of maize. To a certain extent, trade policy can substitute for domestic subsidies, but one of the factors determining the feasibility of such a substitution is the degree of selectivity in consumer subsidies. CONASUPO's practice has not been to target the subsidies on particular socio-economic groups, with the exception of powdered milk for a few families.* Increased targetting would of course reduce the fiscal burden of the subsidies, but it also would increase the possibilities of using trade policies as pricing instruments. These points are brought out below with numerical examples.

Table 4-2 gives estimates of the amount of pricing subsidies extended to the basic crops. The implementation of the subsidies is rather complex, as it involves interventions in the buying and selling prices of grain mills and other processing operations, as well as direct purchases from farmers. The estimates of Table 4-2 differ slightly from those of some other studies in Mexico, but they are consistent with the fiscal accounts of the Secretaría de Hacienda and therefore are the most definitive. Maize and wheat of course dominate the subsidy programs, but recently beans and sorghum have accounted

*However, in general there are non-targetted subsidies on meats, poultry, and dairy products, arising from CONASUPO's practice of selling sorghum for animal feed at subsidized prices.

Table 4-2. AGRICULTURAL SUBSIDIES EXTENDED VIA OUTPUT PRICING AND PROCESSING, 1980-82
(millions of current pesos)

	1980	1981	1982[P]
Maize	9,752	15,111	23,799
Wheat	7,644	10,209	17,000
Beans	3,014	2,144	5,455
Rice	292	- 260	949
Sorghum			7,257
Oilseeds			1,534
Powdered milk			733
Others			1,119
Total			57,846*
Total subsidies in the economy	684,160	822,360	n.a.

[P] Preliminary

Source: Mission estimates

* Of this total, about 63% represents CONASUPO operating costs, and 37% (21,400 million pesos) represents differentials between purchase and sales prices at different stages of production and processing.

for important outlays. Most of the subsidy amounts are not in fact attributable to a wedge between buying and selling prices, but rather correspond to CONASUPO's operating costs.

In the aggregate, subsidies on agricultural inputs account for greater outlays than the output subsidies do. Subsidies on short-term credit cause the largest fiscal burden, followed by those on fertilizer. Improved seeds, pesticides and crop insurance also receive subsidies. A previous Bank mission has estimated that all input subsidies amounted to about $Mex 56 billion in 1981 and $Mex 80 billion in 1982.

Table 4-3 examines the case of the maize subsidy, as a case study in alternative ways of implementing subsidy concepts. It is assumed that providing producer incentives and subsidizing low income consumers are two of the more important goals behind the subsidy program. For the sake of illustration, the figures are simplified to represent very approximately the average annual production, imports, consumption, and producer prices in 1979-81. The same concepts may be applied to other sets of figures if desired, but the qualitative results will be the same. Also, again for the sake of illustration, it is assumed that 25% of the maize consumption goes to the poorer groups for whom the government would prefer to subsidize the price. This percentage may be altered without affecting the nature of the results.

The nominal farm gate price (5,000 pesos/ton) is higher than the import price (4,000 pesos/ton), so the average supply price is between those two numbers (at 4,833 pesos per ton). The farm gate-to-consumer markup is about 50%, so 4,833 pesos translates into 7,250 pesos at the consumer level, without a subsidy. In the period for which this table was constructed the value of the maize pricing subsidy was a little over 9,000

Table 4-3. ALTERNATIVE MAIZE SUBSIDY SCHEMES: A STATIC ANALYSIS

		Unsubsidized Case		Subsidy Case A		Subsidy Case B		Subsidy Case C	
	Quantity	Price	Value	Price	Value	Price	Value	Price	Value
Domestic production	10,000	5,000	50,000	5,000	50,000	5,000	50,000	5,000	50,000
Imports	2,000	4,000	8,000	4,000	8,000	5,000	9,600	5,000	9,600
Total supply	12,000	4,833	58,000	4,833	58,000	5,000	59,600	5,000	59,600
Total consumption	12,000	7,250	87,000	6,477	77,720	7,244	86,931	6,980	83,760
Consumption of the poor	3,000	7,250	21,750	6,477	19,430	6,477	19,430	5,420	16,260
Pricing subsidy					9,280		3,069		6,240
Tariff revenue					- -		1,600		1,600
Net subsidy					9,280		1,469		4,640
(Price to non-poor)		(7,250)		(6,477)		(7,500)		(7,500)	

Units: Quantities in thousand tons, prices in pesos/ton, and values in million pesos.

Notes:
a) The quantities and prices listed in the first two columns are simplified representations of the 1979-81 situation with respect to maize in Mexico.
b) The consumption values are higher than the values of total supply because maize is marked up about 50% as it moves from the farm-gate level to the consumer level.
c) Subsidy case A more or less represents the actual 1980 situation in terms of the amount of subsidy and the fact that it is passed on fairly uniformly to all consumers.
d) Subsidy cases B and C represent a different approach: applying a tariff to imports and targetting consumer subsidies on the poor. The "poor" are defined here, for purely illustrative purposes, as the lower income groups summed up to the point where they consume 25% of the maize supply. In case B, all the fiscal savings over case A are applied to reducing the subsidy outlays, while avoiding a price increase for the poor. In case C, the subsidy outlay is reduced by one-half over case A, and the remaining fiscal savings are applied to reducing the price for the non-poor.

pesos, and all consumer groups benefitted more or less equally from it.* This approximate "actual" program is illustrated by the fourth and fifth columns of numbers in Table 4-3: subsidy case A.

Alternative programs are presented as cases B and C in the table. Both o the alternatives are based on two important points of departure from recent actual practice. First, these alternatives explore the idea of applying a selective tariff to a few basic food imports; and second, consumer subsidies are hypothesized to be targetted on the poorer groups, rather than being made available to all. A tariff on basic foods conceivably could be administered i two ways: a) if the private sector were permitted to import these items, a straightforward tariff could be applied, and CONASUPO would buy from domestic producers and importers at the prevailing market price; b) if CONASUPO continu to hold an import monopoly, it could implicitly levy a tariff through its poli domestic sales to non-subsidized segments of the market.

In the years when the quantities sold at subsidized prices are greater th the imports, the tariff would not improve the government's net revenue positio in other years it would. However, an associated tariff on sorghum, for exampl would generate considerable revenues to help offset the consumer subsidies. M important, a set of selective tariffs on basic items would establish international scarcity values as a point of reference for domestic pricing policy. Use of the tariffs would avoid the unplanned and extremely variable domestic-international price ratios discussed in section 2. In designing the tariffs, could be a review of issues like the one (discussed above) on feedgrains, food grains and the income distribution, and hence explicit policy goals could cont to be brought to bear on pricing measures, but this time in terms of considered

*Actually, urban consumers have been more favored by these subsidies than rural consumers have.

departures from international scarcity values.

In illustrative case A, the price of maize to the poor is maintained at the level established by prevailing policy, and the revenue savings from targetting are applied to reduction of the amount of the subsidy. Case B is defined by reducing the subsidy by half over the prevailing amount, and applying the reduced amount toward subsidization of poorer consumers. Clearly, many other strategies could be developed, but the numbers for case B illustrate the point that targetting of the consumer subsidies could lead to very substantial fiscal savings and yet still be consistent with the goals of the Mexican government.

It should be noted that more than half the fiscal outlays connected with agricultural pricing policy derive from CONASUPO operating expenditures. Perhaps this is an appropriate juncture to ask whether all the CONASUPO operations are essential to the social welfare goals of the Mexican government. On welfare grounds, it can easily be argued that subsidies should be extended to consumption (by the poor) of maize, beans, and powdered milk, but it is not clear that the same arguments would extend to the practice of selling dozens of products through the CONASUPER stores and related outlets. Also, how essential to the goals of social justice and development is the practice of conferring monopoly food import power on one government agency? If, incidentally, it is desired to insulate the Mexican consumer from fluctuations in world market prices, then a variable tariff policy can serve that aim at less cost than the present CONASUPO infrastructure does. Tariffs alone will not establish a domestic price level in all cases, particularly if the import volume is low relative to domestic production, so CONASUPO will have to continue some purchases of products at the farm level. However, there appears to be scope for reducing

the scale of CONASUPO operations without prejudicing the Mexican government's goals for pricing policy.

An implication of the material presented in this section is that the Mexican government may wish to undertake a thorough-going review of the administration of its agricultural pricing policy, with special emphasis on targetted consumer programs and the use of trade policy to help effect pricing policy.

Earlier in this section some effects of trade policy on Mexico's income distribution were examined taking into account effects on both urban and rural groups. For the agricultural sector itself, a fairly extensive study has been conducted recently regarding the incidence of different instruments of pricing policy.* The study employed the CHAC model of the agricultural sector; that model has considerable regional and crop disaggregation and also incorporates downward-sloping demand curves and endogenous price determination. For the cited study, the model was employed in a comparative statics manner to examine the consequences of altering price support levels and input subsidy rates. In each case, the model provided an estimate of the new equilibrium toward which the sector would tend to move, given the hypothesized policy change. For full details of how this model is applied to questions of pricing policy, the reader is referred to chapter 5 of The Book of CHAC.**

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*L. M. Bassoco, et al., Análisis de las Interrelaciones del Sector Agrícola en un Horizonte de Corto y Mediano Plazo, Oficina de los Asesores del C. Presidente, Mexico, D.F., Oct. 1982.

**R.D. Norton and L. Solís M., The Book of CHAC: Programming Studies for Mexican Agriculture, John Hopkins, 1983.

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Table 4-4 shows the results of these model experiments as regards output pricing policy. The figures in the table denote the net gains for each objective per unit (per 10 million pesos) of public expenditure on the specified policy instrument). It can be seen that the maize price support is the most effective of the output subsidies in raising producer income, but the support instrument for beans is the most effective redistributional instrument. (Income can actually decline slightly in some producing areas, owing to the fact that in general all prices change and regional production patterns change somewhat when a price support level is altered.)

These results, of course, do not take into account the effects of the policies on producers as consumers. If a corresponding subsidy is not extended to consumers as well, then an increased support price leads to a net loss of consumer surplus. Thus, the total net gains from a unit of subsidy expenditure are always less than 1.0, when consumer welfare is taken into account. Allowing for consumption patterns, as was done earlier in this section, the sorghum support turns out to be more progressive than maize. Nevertheless, the maize support programs turn out to be relatively effective ways to generate rural employment. Only the soybeans and safflower supports are more effective from an employment-generation viewpoint, and that is because an increase in production of those crops displaces employment in other crops to a lesser degree than is the case with maize.

Table 4-5 shows a comparable analysis for instruments of input subsidy. Not surprisingly, a subsidy for mechanization has strongly negative effects on employment, but it has a stronger positive effect on incomes in rainfed

Table 4-4

Changes in Sector Objectives per 10 Million Pesos Spent on Alternative Price Support Investments

Objective \ Instrument	Maize	Beans	Sorghum	Wheat	Rice	Barley	Soybeans	Sesame	Safflower
Producer profits	1.024	.123	.569	.048	.229	.233	.396	.378	.589
Sector income	.820	.156	.525	.054	.343	.224	.516	.420	.685
Irrigated areas	.325	- .088	.290	.006	.074	.075	.247	.140	.411
Northwest	.084	- .098	.113	.006	.049	.037	.022	.070	.068
North	.044	.010	.059	.006	.025	0	.022	0	.205
Center	.193	- .010	.196	- .012	0	0	.202	0	.103
South	.004	0	0	0	0	0	0	0	0
Rainfed areas	.495	.234	.236	.048	.270	.112	.280	.280	.274
Northwest	.008	.010	.010	.006	.025	.037	.011	.070	.034
North	.048	.020	.039	0	0	0	0	0	.103
Center	.294	.068	.020	.012	.025	.037	- .045	.280	- .034
South	.143	.137	.162	.030	.196	.075	.291	0	.103
Employment	.172	.082	- .148	.011	.160	.032	.252	.110	.291

Note: Units are in 10 millions of pesos, except for employment, which is expressed in thousands of man-years. Sector income includes the income of hired labor.

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Table 4-5

Changes in Sector Objectives per 10 Million Pesos Spent on Alternative Input Subsidies

Objective \ Instrument	Subsidies at a Rate of 30% of Input Prices				
	Agro-Chemicals	Seeds	Credit	Surface Irrigation Water	Machinery
Producer profits	.550	.325	1.555	1.18	1.47
Sector income	.450	.316	.349	1.16	.574
Irrigated areas	.243	.162	.159	1.26	.115
Northwest	- .033	.044	- .071	.696	.013
North	.057	.007	.024	.435	.040
Center	.224	.103	.222	.130	.135
South	.007	.007	0	.043	- .072
Rainfed areas	.202	.154	.190	- .01	.457
Northwest	0	.007	.007	.043	.013
North	0	- .029	.032	0	.031
Center	- .018	.096	- .016	- .174	.233
South	.210	.074	.167	0	.175
Employment	.118	.022	.230	- .043	- .269
Foreign exchange savings	.163	0	.347	0	.761
Maize production	.875	- .007	1.857	.043	n.a.

Note: Units are in 10 millions of pesos, except for employment, which is expressed in thousands of man-years, and maize production, which is in thousand tons.

areas than in irrigated areas, owing to the more rapid rate of increase of mechanization in the former. Credit and irrigation subsidies are especially powerful instruments for increasing producer incomes, but the irrigation subsidy is particularly regressive, in terms of irrigated and rainfed areas. However, it is the strongest instrument for raising the incomes of hired laborers, a reflection of the labor intensity of crops grown under irrigation.

To conclude this section, some aspects of the consumer subsidy policies are reviewed briefly. First, Table 4-6 shows selected price trends at the farm gate and consumer levels. As the table demonstrates, for the period 1960-79 price movements for basic food products were roughly comparable for producers and consumers for wheat and beans, but during that period the proportionate rate of subsidy was reduced in the case of maize. In the years 1980 and 1981, the rate of subsidy was again increased in wheat and beans. When compared to other price indexes, e.g., the wholesale price index and the official minimum salaries, it is clear that the subsidized consumer prices for these and other basic products declined in real terms over the 1960-81 period. Taking into account the earlier material on producer prices, it can be said that, over the past two decades, price movements in basic products have favored consumers at the expense of producers.

The second point relevant to consumer subsidies is that CONASUPO subsidizes a dozen or more basic foods--and CONASUPO outlets sell dozens of products in all--and yet three basic products account for a very large share of total calorie and protein consumption of the poor. Table 4-7 shows the proportions of nutrients provided by maize, beans, and milk in the cases of lower income groups. Milk accounts for a low proportion of total nutrients but, of course, it is especially important for infants.

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Table 4-6

Producer and Consumer Prices for Selected Basic Products

	Maize			Wheat			Beans		
	Producer	Consumer	Ratio	Producer	Consumer	Ratio	Producer	Consumer	Ratio
1960	800	350	2.29	913	2650	0.34	1500	2570	0.58
1965	940	460	2.04	913	2650	0.34	1750	2490	0.70
1970	940	450	2.09	913	2500	0.37	1750	3530	0.50
1975	1750	1630	1.07	1750	4850	0.36	6000	7740	0.78
1979	3480	2700	1.29	3000	7140	0.42	7750	12000	0.65
1980	4450	3536	1.26	3550	7140	0.50	12000	12000	1.00
1981	6550	3536	1.85	4600	7140	0.64	16000	16000	1.00
1982	8850	7072	1.25	6930	14280	0.49	21100		

Notes: Consumer prices for maize are for masa (para tortilla).
Consumer prices for wheat are for white bread.
All prices are in pesos/ton.

Sources: Table 2-1 above; CESPA, El Desarrollo Agropecuario de Mexico, Pasado y Perspectivas, Tomo V: La Problemática Alimentaria, p. 227; CONASUPO.

These data raise questions about the need for the CONASUPO subsidies to be extended to so many products. Earlier in this report, an argument was developed for targetting the consumer subsidies by socio-economic groups; now the data of Table 4-7 suggest that, from a welfare viewpoint the subsidies could be limited to three, or at most four, food products.

Table 4-7

Proportions of Nutrients Provided by Basic Foods, 1975

	Income Strata, in Pesos/Month				
	0-600	601-1000	1001-2000	2001-4000	National Average
Maize	64/54	53/44	44/37	34/28	42/34
Beans	9/20	10/21	9/19	9/18	9/19
Wheat	6/7	7/7	7/6	10/9	8/8
Milk	2/5	4/9	6/13	7/15	6/14
Total, Four Products	81/86	74/81	66/76	60/70	65/75

Notes: Only the lowest four income strata, out of eight usually reported, are shown in this table. In each cell of the table, the top figure represents the percentage share of total calories consumed, and the lower figure represents the share of total proteins consumed. If all foods were included, the numerators would sum vertically to 100 (%), and the denominators also would.

Source: Adapted from CESPA, El Desarrollo Agropecuario de Mexico, Pasado y Perspectivas, Tomo V: La Problemática Alimentaria, pp. 261, 263.

5. Policy Conclusions

The discussions in the foregoing sections reveal that both the structure of the agricultural sector and the policy environment have been evolving gradually over the past two decades. In accordance with this process, policy goals also have changed. For example, while creation of agricultural employment figured prominently in the policy statements of the early 1970s, in recent official pronouncements employment creation per se appears to have been given less weight than fostering agricultural income growth and, above all, an improvement in the agricultural balance of payments. And, of course, the recent budgetary crisis has lent urgency to the calls for reduction in subsidy budgets. These national objectives will be taken into account in reviewing policy options.

The principal trends which have characterized the sector over the past two decades, until recently, have been declining real prices for basic foods; negative real protection for those products; increasing relative importance of livestock and poultry, vegetables and fruit, and oilseeds in the national production structure; rapid growth of exports of fruits and vegetables and rapid growth of imports of foodgrains and feedgrains; and diversification of production at the farm level, even on small farms. A related trend has been an expansion in subsidy outlays, with an increasing tendency for the subsidies to favor consumers more than producers. These trends are mutually consistent: the declining real prices of grains are consistent with an increasing demand-supply deficit and therefore greater reliance on imported grains. Mexico's comparative advantage does lie more with

fruits and vegetables than with grains, so the principal policy question is to what extent it is desired to construct policies which run counter to comparative advantage. Clearly the answer depends importantly on national priorities.

Policy preferences appear to give strong emphasis to food security, so in the circumstances it would be inappropriate to suggest that Mexico plan to rely extensively on imported grains. On the other hand, it may be unwise to attempt to secure complete self-sufficiency in foodgrains, especially given the stochastic nature of grain production and prices. The revised producer pricing policy of 1980-81, which was reinforced in 1983, appears to have successfully reduced the need for imported grains. (The role of weather in the good harvests of the early 1980s is still being debated, but it seems clear that the higher prices did stimulate production, especially in light of the cited studies on supply responsiveness to prices.) Thus, an important subsidiary question is the extent to which a continuing price stimulus can be offered to grain producers without incurring the high budgetary costs of recent years.

In this respect, it is helpful to recall that trends in subsidized prices have tended to favor consumers more than producers, and that, with the exception of milk, the subsidized products have not been targetted at all. Table 4-3 and its attendant discussion showed that there is considerable scope for reductions in the budgetary costs of subsidies if targetting is implemented. In the present budgetary situation, the cost of indiscriminate consumer subsidies

is no longer sustainable. That earlier discussion also pointed out the importance of using international prices as references, via an explicit or implicit tariff. Depending on the relative quantities of imported maize and maize subsidized for target groups, a tariff on maize might or might not raise revenues. However, a tariff on some products, such as sorghum,* would generate revenues and would go a long way toward offsetting the costs of the maize subsidy for needy consumer groups. The present system of reliance on informal quotas is inefficient from a viewpoint of revenue generation, and, as noted, it has led to inconsistent policies over time with regard to the ratio of domestic prices and border prices.

It must be emphasized that the appropriate policy mix very much depends on national objectives. For agricultural pricing policy in Mexico, the most relevant objectives are those of food security and of minimal welfare standards for the poor. These goals suggest a policy mix of price incentives to maize producers and selective consumer subsidies for the lower income groups. The material of this report suggests that price incentives perhaps should be extended to the principal feedgrain (sorghum) as well, to avoid undesirable income distributional effects. It also suggests that these two principal goals may be attainable--to a reasonable degree-- at an acceptable budgetary cost provided that:

(a) consumer subsidies are confined to three or four basic foods (preferably only maize, beans, and milk);

(b) all consumer subsidies are targetted to the lower income groups, via school lunch programs and other proven methods; and

(c) producer pricing policies are implemented by an explicit or implicit tariff which effectively establishes domestic prices in relation to import prices.

*Actually, the first step would be to remove the sorghum subsidy to users of that grain.

A tariff would be appropriately applied to maize and sorghum, as noted above. Appropriate magnitudes may be outlined by reference to historical experience. As Tables 2-7 and 2-8 showed, real protection has been consistently negative for sorghum and has been negative for maize until 1981-82. Nominal protection for maize was -19% in 1970-74, +11% in 1975-79, and about +30% in 1980-82. Nominal protection for sorghum was negative throughout the period. The 30% nominal protection rate on maize came close to eliminating the need for imports, temporarily. This is not surprising in view of the fact that imports had accounted for about 15% of total supply on the average, in the years immediately prior to the revised pricing policy, and the fact that the supply elasticity of maize is estimated to be about 0.5. Thus, from a food security viewpoint, a sustained nominal protection rate of 20%-30% on maize and sorghum (calculated at an equilibrium exchange rate) would come close to assuring attainment of national goals, and it also would be constructive from an income distribution viewpoint. For all other products, there is not compelling justification for intervening on prices. Their prices could be allowed to move toward border prices, or toward the domestic market equilibrium price in the case of products for which international trade is not very important. Two illustrative crops are wheat and rice. For wheat, the consumer price is highly subsidized--a regressive measure. For rice, the producer price is held below equilibrium levels. There is no economic justification for either of these policies.

It may be argued that for efficiency it would be preferable to impose a uniform protection rate on all agricultural imports, of say 15% to 20%. However, there are two objections to such a procedure: (i) strict interpretation of the cited national objectives requires

protection only for a very few products--perhaps wheat could be added to the list; and (ii) protection of a large number of products would perhaps invite tariff retaliation from Mexico's trading partners, and continued success in exporting agricultural products is important to Mexico.

A corollary of these lines of reasoning is that the role of CONASUPO bears rethinking. With a more sharply focussed program of price subsidies, it is not clear that CONASUPO needs to continue marketing a large number of products or to continue as Mexico's sole agricultural importing agency. CONASUPO's scope of operations has expanded rather inertially over the years until it now is much more comprehensive than envisaged in the original price support legislation of the 1950s. Under the proposed new policy focus, CONASUPO would have to stand ready to make farm-gate purchases of maize and sorghum, and perhaps wheat, to assure maintenance of the desired rates of nominal protection, especially if import quantities decline. But it could purchase fewer types of commodities at the farm level and market many fewer at the retail level. Producer price supports could be abolished for all crops save maize and sorghum and perhaps wheat. The network of CONASUPER stores and related outlets could be replaced with institutions better designed for targetted consumer subsidies. It is doubtful that a public agency has a comparative advantage in retail merchandising.

At the same time, CONASUPO should enhance its price-monitoring capabilities, and it may wish to develop a formula to adjust tariffs from year to year with the aim of smoothing the international price

fluctuations before they are transmitted to the internal market. The nominal protection on basic crops should not be viewed as permanent, and it should be reviewed every five years.

CONASUPO also would have to develop welfare norms for the consumer subsidy program and experiment with different modalities for that program. As noted, school meal programs have been effective, especially in Colombia, Brazil, and Chile, but other methods are available as well.

Finally, a counterpart to reducing (unnecessary) marketing interventions in basic grains would be increasing investments in marketing infrastructure for perishable fruits and vegetables, particularly in the southern and southeastern regions of the country. These regions are becoming the most dynamic on the supply side, and those products are the most rapidly increasing ones in Mexico.

The enormous diversity of Mexican agriculture, plus its strong international comparative advantage in many products, augurs well for the future. Growth prospects are reasonably good, but a rethinking of pricing policy may help make them yet brighter.

AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: Microcomputer Agricultural Pricing Models **Date:** Tuesday, June 3
Lead Instructor: D'Silva **Session #:** 5
Co-Trainer(s): **Time:** 2:45-4:15 pm

==========

OBJECTIVE(S): At the end of this session participants will be able to:

- o Distinguish between results obtained from single market and multimarket policy analyses.
- o Determine types of data needed and identify sources of data for multi-commodity policy analysis.

==========

ABSTRACT:

After introducing multicommodity agricultural policy analysis, participants will be asked to identify and characterize some of the agricultural policies which have or could be the subject of a policy dialogue. Methods of quantitatively analyzing the impact of policy changes will be outlined focussing on single market and multimarket analyses.

The Sudan Pricing Model will be demonstrated focussing on the manner in which the impact of policy changes can be traced and quantified. Sensitivity analysis of the model will be discussed, followed a review of the data and data sources required.

==========

READINGS: Required/Optional

- o "Steps in Developing a Multimarket Computer Simulation Model" ___/ X
- o "Details used to Describe How the Agricultural Sector Works" ___/ X
- o D'Silva, Brian, Sudan Case Study. X /__

USAID AGRICULTURAL POLICY COURSE

MULTICOMMODITY AGRICULTURAL PRICING POLICY ANALYSIS USING MICROCOMPUTERS

(BRIAN D'SILVA USDA/ERS).

1. WHY USE MULTICOMMODITY PRICING POLICY ANALYSIS?

A) PRICING CHANGES CAUSED BY DEVALUATIONS OR PRODUCER PRICE CHANGES HAVE EFFECTS ON MORE THAN ONE COMMODITY. DUE TO

i) INTERRELATIONSHIPS BETWEEN COMMODITY MARKETS,

ii) INTERRELATIONSHIPS BETWEEN COMMODITY AND INPUT MARKETS.

B) PRICING CHANGES COULD HAVE DIFFERENTIAL IMPACTS. DUE TO

i) STRUCTURAL DIFFERENCES BETWEEN COMMODITY MARKETS

ii) STRUCTURAL DIFFERENCES WITHIN THE AGRICULTURAL SECTOR.

C) POLICY MAKERS NEED TO EVALUATE THE IMPACT OF DIFFERENT POLICY CHANGES.

i) THEY MAY BE INTERESTED IN THE RANGE OF IMPACT, E.G. 5 TO 10 %, RATHER THAN AN EXACT QUANTITATIVE VALUE.

ii) THE TIME AVAILABLE FOR ANALYSIS MAY BE LIMITED.

iii) DATA LIMITATIONS ARE A DEFINITE PROBLEM.

D) MICROCOMPUTERS AND PRESENTLY AVAILABLE SOFTWARE NOW MAKE ANALYSIS OF POLICY CHANGES POSSIBLE

i) IN A USER FRIENDLY WAY.

ii) ENABLE POLICY MAKERS AND POLICY ANALYSTS TO UNDERTAKE ANALYSES IN A TIMELY FASHION.

iii) FACILITATES POLICY DIALOGUE.

iv) IS A LOW COST APPROACH TO DETERMINING AREAS OF FURTHER RESEARCH.

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2. HOW DO WE UNDERTAKE DEVELOPMENT OF A MULTICOMMODITY PRICING MODEL ON A MICROCOMPUTER.

A) DEFINE THE SET OF POLICY ISSUES WHICH ARE OF INTEREST.
E.G. IMPACT OF INCREASING MAIZE PRODUCER PRICES OR ALIGNING DOMESTIC PRODUCER PRICES WITH WORLD PRICES.

i) EACH OF THE ABOVE POLICY CHANGES COULD HAVE IMPLICATIONS FOR DOMESTIC PRODUCTION, CONSUMPTION, IMPORTS, EXPORTS, FOREIGN EXCHANGE EARNINGS, GOVERNMENT BUDGETARY REVENUES AND INCOME DISTRIBUTION. (see attached Table)

B) ii) DESCRIBE IN DETAIL THE STRUCTURE OF THE AGRICULTURAL SECTOR WITH PARTICULAR REFERENCE TO THE COMMODITY MARKETS THAT NEED TO BE ANALYSED.

a) DETERMINE HOW INPUT AND OUTPUT PRICES ARE DETERMINED.

b) EXTENT TO WHICH COMMODITIES AND INPUTS ARE TRADED.

c) MANNER IN WHICH GOVERNMENT REGULATES THE SPECIFIC INPUT AN COMMODITY MARKETS BEING ANALYSED.

C iii) DO THE NECESSARY <u>ALGEBRAIC</u> <u>AND</u> <u>MATHEMATICAL</u> MANIPULATION.
NOTE: THIS COULD BE A PAIN DEPENDING UPON THE NUMBER OF POLICY ISSUES THAT YOU WOULD LIKE TO ANALYSE AND THE COMPLEXITY OF THE MARKET STRUCTURE.

D iv) DETERMINE THE DATA REQUIRED. USUALLY THESE FALL INTO TWO CATEGORIES.

a) LEVELS OF PRODUCTION, CONSUMPTION AND PRICES IN THE BASE YEAR.

b) GUESSTIMATES (OR ESTIMATES IF AVAILABLE) OF SUPPLY DEMAND AND INCOME ELASTICITIES.

E) v) DETERMINE THE EXTENT OF RESULTS WHICH ARE DESIRED. E.G. LEVELS OF PRODUCTION, CONSUMPTION, GOVERNMENT TAX REVENUES , FOREIGN EXCHANGE EARNINGS.

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Table 2—Likely effects of policy changes, Sudan

Change in policy	Likely effect on:				
	Farmer income	Agricultural sector income	Consumer prices	Foreign exchange earnings	Government revenues
	Movement				
Exchange rate changes:					
Devaluation	Increase	Increase	Increase	Increase	Decrease
Movement toward unified exchange rate	Increase	Increase	Increase	Increase	Increase
Valuation of agricultural export earnings at commercial rate	Increase	Increase	None	Increase	Increase
Valuation of remittances at commercial rate	None	None	None	Increase	Increase
Producer incentives:					
Increase in producer prices 1/	Increase	Increase	None	Increase	Uncertain
Reduction in export taxes	Increase	Increase	None	Increase	Decrease
Removal of government monopoly in groundnuts and sesame marketing	Increase	Increase	None	Increase	Decrease
Reduction and removal of consumer price subsidies:					
Bread	None	None	Increase	Increase	Increase
Petroleum products	None	None	Increase	Increase	Increase
Sugar	None	None	Increase	Increase	Increase

1/ Cotton, gum arabic, and wheat.

H01: READY

HO HP HQ HR HS HT

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3
4          ::::::::::::::::::::::::::::::::::::::::::::
5          ::                                        ::
6          ::    Multi-Market Analysis of            ::
7          ::   Agricultural Pricing Policy in       ::
8          ::                                        ::
9          ::                SUDAN                   ::
10         ::                                        ::
11         ::                                        ::
12         ::            Brian D'Silva               ::
13         ::                USDA                    ::
14         ::                                        ::
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H01:                                                                    MENU
Basic Data  Elasticities  Matrices  Policies  Results   } MAIN
View/change quantities, prices, income, factor demands. } MENU
        HO          HP          HQ          HR          HS          HT
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4            ::::::::::::::::::::::::::::::::::::::::::::
5            ::                                        ::
6            ::      Multi-Market Analysis of          ::
7            ::   Agricultural Pricing Policy in       ::
8            ::                                        ::
9            ::                SUDAN                   ::
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H01:                                                                    MENU
Quantities  Prices  Factor demands  Income and miscellaneous (Wheat) } BASIC
View/change supply and demand quantities.                             } DATA
        HO          HP          HQ          HR          HS          HT  SUBMENU
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5            ::                                        ::
6            ::      Multi-Market Analysis of          ::
7            ::   Agricultural Pricing Policy in       ::
8            ::                                        ::
9            ::                SUDAN                   ::
10           ::                                        ::
11           ::                                        ::
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13           ::                USDA                    ::
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A1: [W10] ' READY

QUANTITIES SUBMENU

A	B	C	D	E	F
	(1983/84 BASE YEAR)				
	---------- SUPPLY AND DEMAND ----------				
SUPPLY:		MECHANIZED	TRADITIONAL	IRRIGATED	NET EXPORTS
	Groundnuts	0	233000	180000	0
	Sorghum	1084000	363000	359000	200000
	Millet	0	314000	0	0
	Wheat	0	0	169000	-300000
	Sesame	99000	107000	0	0
	Gum Arabic	0	45000	0	0
	ELS Cotton	0	0	239000	0
	MS Cotton	0	0	372000	0
DEMAND:		URBAN	TRADITIONAL	IRRIGATED	
	Groundnuts	0	0	0	
	Sorghum	400000	847000	359000	
	Millet	0	300000	0	
	Wheat	379000	0	90000	

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G1: READY

PRICES SUBMENU

G	H	I	J	K	L
	---------- PRICES ----------				
		CONSUMER	PRODUCER	EXPORT ($)	IMPORT ($)
	Groundnuts		1000	600	
	Sorghum		*	150	
	Millet		600		
	Wheat	300	550		200
	Sesame		935	750	
	Gum Arabic		1160	1600	
	ELS Cotton		120		
	MS Cotton		90		
	* See Below				
	Sorghum prod. price - Irrigated			350	(LS)
	Sorghum prod. price - Traditional			400	(LS)
	Millet prod. price - Traditional			500	(LS)
	Wheat procurement price			360	(LS)
	sorghum prod price - mech			330	(LS)

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Best Available Document

AE1: ELASTICITIES - SUPPLY SUBMENU READY

	AE	AF	AG	AH	AI	AJ	AK
1							
2		---------- SUPPLY ELASTICITIES ----------					
3							
4							
5	TRADITIONAL:		Sorghum	Groundnuts	Gum Arabic	Millet	Sesame
6		Sorghum	0.155	-0.3	0.6	0.25	0.3
7		Groundnuts	-0.3	0.25	0.4	-0.4	-0.2
8		Gum Arabic	0	0	0.75	0	0
9		Millet	-0.25	-0.4	0.7	0.12	0
10		Sesame	0.3	0	0.6	0.3	0.3
11							Mkt.
12	IRRIGATED:		Sorghum	Groundnuts	ELS Cotton	MS Cotton	Wheat
13		Sorghum	0.6	-0.3	-0.5	-0.5	0
14		Groundnuts	-0.3	0.7	0	0	0
15		ELS Cotton	0	0	0.7	0	0
16		MS Cotton	0	0	0	0.7	0
17		Wheat	0	0	0	0	0.4
18							
19		Wheat w. r. t. wheat procurement price				0.4	
20		Sorghum w. r. t. wheat procurement price				0	

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Y1: ELASTICITIES - DEMAND SUBMENU READY

	Y	Z	AA	AB	AC	AD
1		---------- DEMAND ELASTICITIES ----------				
2						
3	IRRIGATED:		Sorghum	Groundnuts	Wheat	
4		Sorghum	-0.225	0	0.3	
5		Groundnuts	0	-0.1	0	
6		Wheat	0.3	0	-0.15	
7						
8	URBAN:		Sorghum	Groundnuts	Wheat	Sorghum FOB
9		Sorghum	-0.2	0.3	0.5	0
10		Groundnuts	0.3	-0.75	0	0
11		Wheat	0.5	0	-0.5	0.3
12						
13	TRADITIONAL:		Sorghum	Groundnuts	Wheat	Millet
14		Sorghum	-0.25	0.35	0	0.1
15		Groundnuts	0.35	-0.5	0	0.1
16		Wheat	0	0	0	0
17		Millet	0.1	0.1	0	-0.3
18						
19	Wheat (Irrigated) w. r. t. Sorghum (Trad.) Price					0
20	Gov't Procurement of Wheat w. r. t. Wheat Proc.					0.67

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RESULTS -
CHANGE IN LEVELS OF
PRODUCTION

EP18: U READY

	EP	EQ	ER	ES	ET	EU
18						
19						
20	CHANGE IN LEVELS OF PRODUCTION					
21	IRRIGATED		TRADITIONAL		MECHANIZED	
22	COTTON ELS	232.361111	SORGHUM	15238.5724	SORGHUM	0
23						
24	COTTON MS	-321.48148	MILLET	6711.31463	SESAME	0
25						
26	SORGHUM	1684.50829	GNUTS	-15528.098		
27						
28	WHEAT	0	GUM ARABIC	8.52779429		
29						
30	GNUTS	0.23482071	SESAME	5328.61777		
31						
32	NEW LEVELS OF PRODUCTION					
33	IRRIGATED		TRADITIONAL		MECHANIZED	
34	COTTON ELS	239232.361	SORGHUM	378238.572	SORGHUM	1084000
35						
36	COTTON MS	371678.518	MILLET	320711.314	SESAME	99000
37						

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27
28  WHEAT                 0 GUM ARABIC 8.52779429
29
30  GNUTS        0.23482071 SESAME      5328.61777
31
32  NEW LEVELS OF PRODUCTION
33  IRRIGATED                TRADITIONAL              MECHANIZED
34  COTTON ELS 239232.361 SORGHUM     378238.572 SORGHUM        1084000
35
36  COTTON MS  371678.518 MILLET      320711.314 SESAME           99000
37
38  SORGHUM    360684.508 GNUTS       217471.901
39
01-Jan-80  04:01 AM
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EP50: RESULTS - NEW LEVELS OF PRODUCTION READY

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        EP          EQ          ER          ES          ET          EU
31
32  NEW LEVELS OF PRODUCTION
33  IRRIGATED                TRADITIONAL              MECHANIZED
34  COTTON ELS 239232.361 SORGHUM     378238.572 SORGHUM        1084000
35
36  COTTON MS  371678.518 MILLET      320711.314 SESAME           99000
37
38  SORGHUM    360684.508 GNUTS       217471.901
39
40  WHEAT          169000 GUM ARABIC 45008.5277
41
42  GNUTS      180000.234 SESAME      112328.617
43
44
45
46
47
48
49
50
01-Jan-80  04:01 AM
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AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: Uses and Abuses of Quantitative Models **Date:** Tuesday, June 3
Lead Instructors: Norton **Session #:** 6
Co-Trainer(s): D'Silva, Core Staff **Time:** 4:30-5:15 pm

==========

OBJECTIVE(S): At the end of this session participants will be able to:

- o Distinguish strengths and weaknesses of quantitative models focusing on key assumptions and available data
- o Select appropriate applications for use of such models in cost/effective terms

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ABSTRACT:

Quantitative models -- particularly with the widespread availability of micro-computers -- have become useful and relatively available tools for policy analysts in developing countries. Still, the "magic" of such approaches can conceal important shortcomings that include, for example:

- o definition of assumptions
- o limitations on types and accuracy of data available
- o overdependency on quantitative indicators at the risk of overlooking qualitative attitudinal, social, power, and political factors
- o unpredictable responses to unanticipated changes in circumstances

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READINGS: Required/Optional

- o None.

AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: Working Groups | **Date:** Tuesday, June 3
Lead Instructors: Norton, D'Silva | **Session #:** 7
Co-Trainer(s): Core Staff | **Time:** 5:30-6:00 pm

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OBJECTIVE(S): At the end of this session participants will be able to:

- o Apply concepts and learnings from today's sessions to group and individual action plans for presentation on Friday
- o Suggest questions of special interest/relevance for tomorrow's sessions

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ABSTRACT:

- o Describe a quantitative/modeling approach that might be particularly useful for your program
- o Suggest critical data/information required for such an application. Rank in terms of importance and suggest how such information could be obtained most cost effectively

==========

READINGS: Required/Optional

- o None.

AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: 'Exaction' Briefing
Lead Instructors: Cruz, Whelan
Co-Trainer(s): Rassas

Date: Tuesday, June 3
Session #: 8
Time: 8:00-9:30 pm

==========

OBJECTIVE(S): At the end of this session participants will be able to:

- o Understand rules to play 'Exaction'.
- o Participants will be assigned individual roles.
- o Participants assigned 'key' roles will receive an additional set of instructions.

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ABSTRACT:

Participants will take on the roles of poverty-stricken farmers in the rural sector; industrialists and laborers in the urban sector; trading intermediaries and decision makers in government. Acting and reacting with each other, in the face of an uncertain physical environment and a changing world economy, they struggle through several years at the edge of survival. They seize and miss opportunities, understand and misunderstand the challenges that confront them, collectively as well as individually. Participants learn from their own actions and experiences, both the significance and limits of their professional approach to promoting development.

EXACTION is an expansion of the well-established game in rural development used world wide - the GREEN REVOLUTION GAME - to include an urban-industrial sector, trade in foreign exchange on the world market and a role for government policy. EXACTION has been developed by the principal author of the GREEN REVOLUTION GAME, G.P. Chapman (Cambridge University) in collaboration with I. Tsakok (World Bank) to enable participants to experience the interaction between policy making at micro and macro levels.

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READINGS: Required/Optional

- o None.

WEDNESDAY

AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: 'Exaction'
Lead Instructors: Cruz, Whelan
Co-Trainer(s): Rassas

Date: Wednesday, June 4
Session #: 1
Time: 8:00-3:30 pm

OBJECTIVE(S): At the end of this session participants will be able to:

- o Better understand a real world situation which places them in the position of farmers, input distributors and government officials. Participants will experience the effect on their lives of changing economic and other enviornmental factors some of which are influenced by agricultural policy.

ABSTRACT:

EXACTION complements formal instruction by providing an active participatory context in which formal insights may be tested and integrated with interdisciplinary perspectives. It develops understanding neither by instruction nor by prediction, but by making participants face the responsibility and consequences of their decisions. Each game is a unique creation of the participants. In confronting problems as individuals and as members of wider interest groups, participants cannot but reveal their own personalities and philosophies in action. The dynamics of this economy, the perceptions, experiences and motivations of the participants are exhaustively analyzed in debriefing. This final session is of critical importance in drawing together these individual experiences to deepen perceptions and understanding of the development process. The debriefing is an integral and essential component of EXACTION as a pedagogical tool.

READINGS: Required/Optional

- o None.

AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: 'Exaction' Debriefing
Lead Instructor: Fletcher
Co-Trainer(s): Whelan, Cruz

Date: Wednesday, June 4
Session #: 2
Time: 4:00-6:00 pm

OBJECTIVE(S): At the end of this session participants will be able to:

- o Better understand a real world situation which places them in the position of farmers, input distributors and government officials. Participants will experience the effect on their lives of changing economic and other enviornmental factors some of which are influenced by agricultural policy.

ABSTRACT:

None.

READINGS: Required/Optional

- o None.

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THURSDAY

READINGS FOR THURSDAY

Session	Required/Optional
Session 1	
o Cummings, Ralph Jr., "Minimum Info-systems for Agricultural Development."	X /
o Hermann, Chris, CDIE Guidance for Policy Managers, pp. 1-2.	X /
o IDS/Sussex, "Some Observations on Rapid Rural Appraisal Systems."	X /
Lunch	
o Commins, Lofchie and Payne, "Africa's Agricultural Crisis: The Roots of Famine," Lynne Rienner, Boulder, CO, 1986.	X /
o M. Lofchie & S. Commins, "Food Deficits and Agricultural Policies in Sub-Saharan Africa," San Francisco: Hunger Project, Sept. 1984.	/ X
Session 3a	
o Agricultural Policy Analysis Project Flyer, Abt Associates.	X /
o Tilney, John, Riordan, James, "Agricultural Policy Analysis and Planning: A Summary of Two Recent Analyses," Abt Associates, Contract No. DAN-4084-C-00-3087-00, May 7, 1986.	/ X
o Bateson, William, "Sudan Case Study: Agricultural Planing and Statistics Project", Checchi and Company, 1986.	X /
o Chambers, Robert, Rural Development: Putting the Last First, Chapter 8 Practical Action, London, Lagos, New York, 1983, PP. 190-217.	/ X
o Uphoff, Norman and VanDusen, Katy, "Local Institutional Development for Agriculture," Local Institutional Development Series No. 5, Cornell University, 1985.	/ X
Session 3b	
o Fletcher, Lehman, "Evaluating Effects of Government Policies on Producers, Marketing Agencies and Consumers," 1986.	X /

AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: Data Systems and Information: **Appropriate Short and Long-term Strategies** Date: Thursday, June 5
Lead Instructor: Fletcher, Hermann, Wigton Session #: 1
Co-Trainer(s): Time: 8:30-10:30 am

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OBJECTIVE(S): At the end of this session participants will be able to

- o Distinguish between data and information for policy analysts.
- o Assess different approaches to data collection based on different objectives, field conditions and institutional capacity.

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ABSTRACT:

Agricultural policy reform programs may be supportive of reform to the extent that they disburse funds for necessary training and logistical support, however they will require more and different types of information than conventional data systems usually allow. Standard, large-scale reporting systems that function affectively have their advantages, however other innovative approaches to data collection which are both responsive and timely are essential. It is useful to distinguish between quantitative and qualitative data sets and their respective advantages and limitations. Staffing, logistical support, inadverted biases, and time limitations often make it extremely difficult to provide data sets to policy analysts from which statistically valid inferences can be drawn, therefore it is often necessary to provide alternative accounts of changing field and institutional conditions.

After introducing the derived demand concept for data and information, the critical categories of data and information will be outlined drawing from examples in Asia, Africa and the Middle East. This will be followed by a comparative review of data collection systems including: censuses, national accounts, farm management and village-based data sets, sample surveys and rapid rural appraisal. Attention will be focused on the costs, implementation problems and merits/disadvantages associated with different systems and collection techniques for generating policy-specific information in a timely and responsive manner. A matrix of types of information needs with techniques for obtaining information will be developed to summarize options and approaches for varying levels of effort.

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READINGS: Required/Optional

- o Cummings, Ralph Jr., "Minimum Info-systems for Agricultural Development" X /___
- o Herman, Chris, CDIE Guidance for Policy Managers, pp. 1-2. X /___
- o IDS/Sussex, "Some Observations on Rapid Rural Appraisal Systems" X /___

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No 14, September 1977
$1.00

seminar report

Minimum Information Systems for Agricultural Development in Low-Income Countries[1]

RALPH W. CUMMINGS, JR.*

INTRODUCTION

Information Systems for agricultural development in low-income countries has been an area of concern and interest to the Council for some time. In December 1976, a group of individuals experienced in this area met in Oxford to discuss problems and approaches in the development of more adequate information systems. The group included individuals on both the supply and demand side. Some have had long experience in data generation while others, in their roles as public officials or planners, confront the problem of securing required information.

This Seminar Report summarizes major points in the papers presented, and the discussions that ensued.

Papers presented at the seminar are now being edited with a view to their publication as a monograph Single copies of this report are available without charge from the Agricultural Development Council.

A. M. WEISBLAT
Director
Research and Training Network
A/D/C

Sound decisions depend on accurate information Yet every low income country faces severe competing demands for the financial and human resources it would need to staff an information system equal to its decision-making requirements for agricultural development

Three steps are essential if a low income country is to develop information wisely in support of its development efforts. It must be able to.

1. Identify the information required for the most important private and public decisions and specify the kinds of information that deserve highest priority.
2. Utilize methods of collecting, processing, and analyzing data that meet reasonable standards of accuracy, timeliness, and coverage while at the same time minimize financial and human costs
3. Do this within an institutional structure which brings *users* and *suppliers* of information together in a continuous dialog and which is able to adapt, as the economy changes, to changing demands for information and new methodologies for generating it.

The purposes of this paper are to identify the principal users of agricultural information and the types of information they need, to identify the principal suppliers of agricultural information and the types of information they can provide; to review some of the more critical methodological issues in supplying information; to discuss institutional arrangements for collecting, processing, and analyzing information, and to identify some critical areas for future atten-

*Dr Cummings is the Program Officer for the International Agricultural Development Service

[1]This paper has benefited substantially from suggestions, and in some cases substantial redrafting, by Bryant Kearl, Harry C Trelogan, Dale Hathaway, James Bonnen, Ken Bachman, and Abe Weisblat

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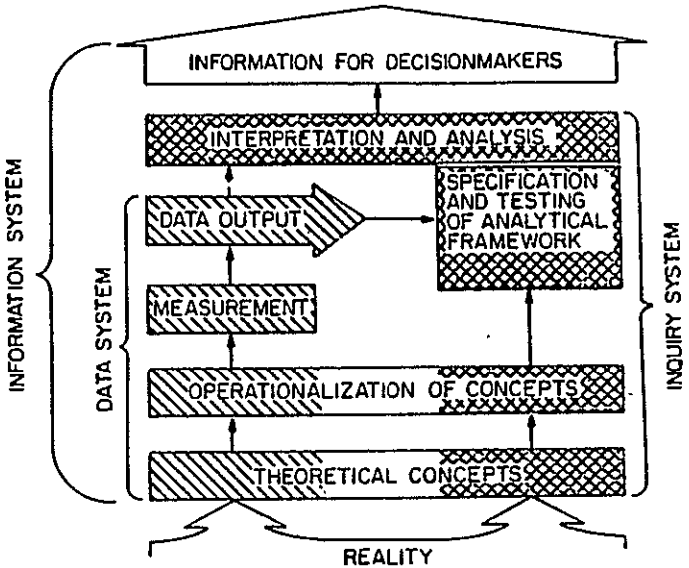
FIGURE 1

AN AGRICULTURAL INFORMATION SYSTEM



tion. The discussion will focus on the supply of information about agricultural commodities which can be generated within the agricultural sector. Many of the components of demand for agricultural commodities such as population growth and per capita income are outside the direct influence of the agricultural sector. Information on these categories, which are of interest to all economic sectors, is usually provided by the national statistical system.

DEFINITION

The information system is a subset of the social system: the process by which information describing the social system is organized for decision-making. The degree to which it accurately reflects reality in providing useful information for decision-making depends on the degree to which measurement and data, on the one hand, are compatible with specification and testing of the analytical framework, on the other. Thus suppliers of data must be in effective, continuous communication with the users of information (see Figure 1). Both political and objective processes must validate the information if it is to be truly useful in decision-making.

While information can be valuable, it also is expensive. Costs of poor decisions and subsequent lack of appropriate information can be large. Returns to effective decisions about data and information can also be high. Careful system design, followed by prompt and widespread distribution of information to those who effectively make or facilitate decisions is, therefore, the foundation of effective information management.

USERS OF AGRICULTURAL INFORMATION

Who uses agricultural information? In a country with a private agricultural sector, the most important decision makers are the primary producing units (farm families) and the merchants and traders. In the public sector, the most important are those government officials most directly concerned with agricultural policy and those concerned with agriculture as it relates to the overall economy (for example, the planning commission and central bankers). International organizations constitute a fifth category of users.

Each decision-maker's information needs depend upon the kind of options open to him—the number and nature of activities he can manipulate. His needs are affected by:

1. The nature and state of development of the economy
2. The other parties involved in his decisions.
3. What each party wants to achieve.
4. Each party's level of knowledge about economic units and how each responds.
5. The governmental philosophy as to what kinds of intervention are appropriate and effective.

In most countries there is a tendency to overestimate the utility of information to public policy makers and to underestimate what it might do for private decision makers. As a result, data-gathering tends to be organized for the public official's benefit and the potentially large payoff from better informed private decision makers is not fully exploited.

Primary Producing Units

Goals of the primary producing units (farmers/producers and also cooperatives) depend on their degree of market orientation. In a subsistence setting, a farm family strives to produce enough to satisfy its own needs. As productivity increases, the farmer has more opportunity to maximize the well-being of his family by profits from sales.

The non-commercial farmer often operates in an environment as complex as that of the commercial producer. He has the same types of decisions to make as does the commercial producer, e.g., what crops to grow, what inputs to utilize, what final use to make of this production. However, he buys little and sells little, and neither the government nor the market has much opportunity to influence his actions in the short run.

Uncertainty is an important consideration in agricultural decisions at all levels of agricultural activity but it is especially important at low levels of production when the farmer has little reserve on which to rely in case of crop failure due to unfavorable weather, attacks of disease and insects, or other causes.[8] The function of information for the poor farmer, as for all other users, is to equip him better to respond to this uncertainty.

As his production increases, the farmer buys a greater proportion of his production inputs and sells more of his output. He does not necessarily need *more information* at this stage. However, he does use a *different kind of information* on alternative varieties, fertilizer prices, credit rates, labor availability, commodity prices, etc. This necessitates a greater amount of quantitative data.

The concept of a "moving minimum" (the idea that minimum information needs change with economic circumstances) applies at this level of decision-making as at all others. The agricultural sector is not made up of homogeneous farming units. Not all farm families take advantage of their opportunities in the same way, and the sector does not develop uniformly.

Trade centers are often a major source of information for farm families; markets convey messages rapidly. But governments must consider what special steps they need to take to make sure that all categories of farmers/producers, and especially the smaller operators, have an equal chance to respond to new opportunities as they arise. If all primary producing units are to benefit from information, the form in which data are released may be as important as the kinds of data gathered; i.e., information must be intelligible to the least sophisticated of its potential users.

Merchant/Traders

Merchants and traders seek to maximize money profits. In a free enterprise economy the objectives they pursue may not always be in the broader public interest, i.e., they seek to gain access to special information or to retain or suppress public information from others.

Merchants and traders usually maintain informal exchanges with other traders regarding commodity prices and volumes including anticipated supplies and stocks. Enforcement of a competitive market structure, including steps to make information more accessible and to improve the accuracy and timeliness of volumes, with values standardized by unit and quality, will generally benefit:

1. Sellers (farmers/producers), by giving them better opportunities to choose when, where, and how to buy production inputs and to sell their outputs;
2. Smaller and newer traders, by easing their entry into the market and thereby presumably increasing its competitiveness; and
3. Consumers, by lowering costs of distribution and creating more awareness of when, where, and how to purchase commodities.

Agricultural Policy Makers

The goals of government agricultural policy makers cover a wide range: maximizing food production in the whole country or, in certain regions, maximizing the supply (and controlling the cost) of food fo

[8] Information becomes economically valuable *only* in the context of uncertainty. The theory of resource allocation under perfect competition assumes instantly available information. When uncertainty is introduced, information acquires the characteristics of a commodity, i.e., those firms which possess relevant information can expect to obtain higher profits because of it. The use to which the information is put determines its value.

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urban areas, increasing rural incomes, establishing more equitable land tenure, improving nutrition, and protecting foreign exchange reserves. Often the unstated goals of these officials are at least as important as their explicit, publicly announced goals.

Agricultural policy makers need a range of information to assist them in achieving these goals. However, information collected by government agencies must have, as its central purpose, service of public needs. Much of this same information is of interest to private bodies. Allowing private interests to dictate public needs—as opposed to sharing in them—invites the potential of corruption into public decision-making

The more commercial the economy, the more ways the government has of intervening. Correspondingly, its needs for information grow and change. But even in an advanced economy, the government can effectively manipulate only a limited number of policy variables. Government analysts and policy makers must identify, therefore, the limited number of points at which decisions can be made and then specify the kinds of information, including levels of aggregation, they must have to act intelligently.

Generally, the activities which government can influence fall into two categories. First are discrete projects which the government has a direct role in designing and operating and in which sound information is necessary in order to establish reasonable targets and to implement mechanisms to achieve the desired results. Low-income countries often utilize projects as their main means of influencing economic development. Second are matters such as commodity prices, fertilizer prices, or credit eligibility requirements in which the government may intervene and through which it may exercise a more indirect influence on economic behavior. For both types of government interventions, basic questions must be asked about information needs. Which pieces of data are essential, which are only interesting? Which relate directly to the effectiveness of policy variables?

In rapidly developing countries discontinuities in technology and institutions require that there be constant review of information, information-gathering strategies, and information categories. Otherwise, resources are wasted getting information no longer needed and producing results that may actually be misleading Recent experience has demonstrated that this observation is equally true in advanced economies which are undergoing change.

Agricultural policy makers generally need six main types of data and information organized either for discrete projects or for more generalized policies:

1 *Benchmark data* every five to ten years, covering:

(a) Physical resources such as land utilization, soil types, ground and surface water supplies, forest and range resources, topography, climate, and transportation facilities

(b) Human resources, including the age and sex composition, skills, income levels, etc, of the population.

(c) Economic activities such as alternative employment opportunities or other productive endeavors, the nature of the farming systems the available technology, and the transportation system

These data can aid in identifying the resources to be utilized, the target groups on which to focus, and the targets to be achieved and in establishing benchmarks against which to measure change at periodic intervals.

2. *Farmer/producer behavior information*, including farm management studies and examination of input/output prices to learn how producers react to policy variables. Lacking this information, policy makers are bound to make errors. A market system, with all its imperfections, often operates better than publicly administered attempts to preempt the market. But intensive analysis of the socio-economic system, including farm management studies based on sound surveys and in-depth interviews, is necessary to inform the policy-maker of probable convergences of interest among different groups, lessons from previous experiences involving change, and formal and informal rules of the relevant social subsystems.
Certain farmer behavior information can be brought up to date every year or so, once a basic understanding based on several cropping seasons has been established Agriculture is both complex and changing. New studies will be needed whenever a new technology is introduced which might lead to new input/output responses

3. *Agronomic data* from different locations and at different times of year showing how major crops respond to such management inputs as fertilizer, irrigation, plant density, weed control, and other cultivation practices

4 *Current supply data*, including production, area, and yields for the most important crops, supply and prices of fertilizers, interest rates and availability of credit, and storage stocks held by government and private traders Good crop data are particularly essential in countries where weather and other forces produce wide variations in yield from year to year.

5. Market news, including volumes of all major commodities traded or available in the market place, including imports exports, with values (prices) standardized on unit and quality

6 *Other analysis and data* that will permit planners to look ahead. For example, perennial crops have different policy implications than annual crops: policy makers need price outlook information and data on areas, number of trees or plants, ages of plantings, new plantings, and wage rates as a basis for establishing policies for perennial crops.

National Planning Bodies

Public officials interested in agriculture as it relates to the overall economy have many of the same information needs as agricultural officials, but will be more concerned with interrelationships among sectors, the foreign exchange position of the economy, the relative costs of domestic production to import prices, and the general price level.

International Organizations

International organizations undertake programs of financial and technical cooperation. They understandably need information on the general economy as well as the agricultural sector. However, they do not necessarily need any more or better information than do the national governments. There is need to codify, standardize, and build into national information systems the kind of data both needed for internal policy formulation and needed by external agencies for project development. The point of reference should, however, be each country's information needs, not a spurious or unjustified uniformity set up for external convenience.

SUPPLIERS OF AGRICULTURAL INFORMATION

Commonly, there are four categories of data suppliers:

Central statistical agencies collect numerical data on the general economy as well as agriculture. Ministries of agriculture usually confine themselves to agricultural data.

At the state or province level, two separate, and often uncoordinated statistical gathering units may also operate, one working within agriculture and the other dealing with broader needs.

Specific projects often have their own information gathering sections to gather benchmark data and to evaluate and monitor progress.

Finally, information is gathered by a range of non-governmental agencies—local businesses, traders, universities, and external assistance agencies.

Each of these categories—specializing in different types of information—can gain from using methods which are simple, inexpensive, accurate, timely, and give adequate coverage.

A modernized agriculture can satisfy most of its private and public information needs within the framework of a continuing collection of statistics organized as a time series. Continuity permits economies by spreading the costs of sampling, training, equipment, etc. It also permits experience to feed improvements into the system. But unless it has good built-in devices to adapt itself to changing needs, a continuing system is best adapted to a relatively static economy.

In a developing country, other kinds of basic and related data are needed before a continuing statistical series has meaning. To make reasonable agricultural policies, policy makers will find themselves wanting information on such questions as soil potential, relative prices and production costs for different crops or commodities, water availability, alternative crop possibilities, acreages and plantings, hired labor costs, fertilizer availability, and weather and climatic variability. A minimum information system for a developing country must provide for such data, perhaps on a one-shot or periodic up-dating basis.

Experience with agricultural development reveals that we often take too narrow a view of the relevant variables. Sound policies demand current information on many variables that are outside the traditional scope of agricultural economics—job opportunities (especially for women) outside the farming sector, the health status of family members who make up the work force, mother's non-agricultural and non-market time uses, children's educational costs and opportunities, and so on. In a peasant agriculture, "family" variables are crucially intertwined with the "firm" variables to which we have customarily limited ourselves More often the unit of observation should be the family, rather than the farm.

Keeping in mind these general comments, a few methods provide the bulk of information. They include censuses, sample surveys, agronomic trials, field reporting, and government reporting.

Censuses

A full-count census provides basic information for benchmark purposes as well as a frame on which to base samples. For small areas, complete enumeration may be the only way to collect information with reasonable accuracy

The full-count census faces several problems. It is costly in manpower and finances Difficulties in training and motivating the large numbers of people who collect and process the data are compounded by the intermittent nature of censuses. In addition, there often is a long time lag between collection and publication of the information. These problems notwithstanding, there are situations in which it is difficult to avoid a full-count census.

Most developing countries have now converted the full count census of agriculture into a periodic large scale comprehensive sample survey of agriculture Problems of delay and accuracy of data remain, however, because of the wide variety of benchmark data needs and the noncontinuous nature of these operations. Often speed and accuracy can be promoted by developing instead a planned program of surveys that rely on large but carefully drawn samples, in some cases combined with satellite imagery and other forms of remote sensing (about which more will be said later), or by continuous large sample surveys concentrating on a limited number of key factors

Sample Surveys

Sample surveys have considerable value in establishing and updating benchmark data and in collecting specialized information on such topics as the

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factors which limit increased farm production (e.g., labor shortages as peak periods).[3]

One issue is how much data should be collected in a given sample survey; some persons favor using integrated, continuous rural surveys, possibly continuing a core set of questions in each survey but emphasizing special topics each time. From the standpoint of costs, multi-purpose surveys that serve the whole economic planning process have advantages over separate information gathering for agricultural, demographic, industrial, and other planning groups. By using common sampling frames and linking the results, ministries of health and education and agriculture and other agencies can get more information at less cost and mutually support one another's work. However, trying to derive too much information from a single interview schedule may introduce weaknesses. For example, collecting crop data along with social data may work to the disadvantage of both; farmers who hesitate to give information on one category may therefore give incorrect information on the other or none at all.

Understanding basic behavioral patterns and monitoring production or trade transactions are each quite complex: separate groups should probably be assigned to each, otherwise both will be done badly. Efficiency in gathering agricultural data can be enhanced by finding ways to involve data users from the beginning. Producer panels and research by social scientists offer alternative, possibly useful, ways to learn about farmers' intentions.

In the subsistence sector, there is a question whether male interviewers are able to describe properly, especially in some cultures, the important contribution of the rural women to the family enterprise. More must be done to get male and female researchers working together in teams to get reliable data not now accessible.

Agronomic Data

The first step in producing agronomic data is to know the technology already being used by the farmers in the area and the readily available materials and technologies not being used which might be introduced with minimum modifications in the local system. Existing technology should be analyzed for modifications that are most likely to produce increases in output and net incomes. Technological questions for further investigation should then be listed in order of priority. Field trials (i.e., fairly simple but well designed experiments on farmers' fields distributed over representative agro-climatic zones of the region) can test such variables as plant population, data and rate of planting, amount, kind and timing of fertilizers, etc., including measurement of economic return.[4]

The risks farmers face in using different levels of inputs should be estimated using the information that is available on climatic variability and fluctuations in prices.[5] Recommendations then can be developed for different levels of inputs (perhaps initially at two levels, full capital and limited capital) and for different ecological conditions taking into account the expected risks in production and marketing.[6]

Tests should continue until they have covered adequately the range of climatic conditions which farmers experience most of the time. In general, the amount of agronomic research required before recommendations are made is proportional to the ecological variability in the area. In regions of irrigated farming or with dependable rainfall, recommendations derived after one year of research may be acceptable. For rainfed regions with frequent or intense droughts, continued agronomic research for several years will be necessary. New varieties have to be evaluated in an experimental environment year by year as they become available, as well as in succeeding years.

Current Supply

Viewing agricultural data from the standpoint of policy makers' needs, supply data are of the highest importance. This is true for a food exporting country, where supply estimates determine how much can safely be exported, as well as for importing countries.

Some supply relationships are unusually complex, and the data analyst must pay attention to the indirect linkages involved. For example, the world price of fish meal may interact with the supply and price of feed grain within a country to determine the urban consumer's meat price—which in turn has potentially great political consequences. Grain yield and production estimates for the country's own agriculture do not in this case give enough information for policy-making.

What national planners need ahead of everything else is a continuing estimate of food supplies and disappearance—current estimates of production, stocks on hand, and expected consumption. Estimates of area sown to specific crops as a proxy for expected production do not begin to give as much information as is needed. Research to relate meteorological data with biometric data should help to improve capacity to predict production. Thus far, the predictive power of analysis of this subject is weak.

Commodity data should be confined to the crops and animals which are most important in local consumption, enter in largest volumes into the market economy, figure prominently in foreign trade, and for which reasonably accurate data can be collected. Fruits and vegetables which are grown largely in family yards are rarely reported accurately and therefore the "official" figures are often meaningless.

Data on area sown to various crops can be collected, after a suitable frame has been established from sample surveys. Accurate data on yields will require crop cuttings on a sample basis. Production of crops which are almost entirely marketed (e.g., cocoa) can be estimated from market sales. Oral enquiries are usually deficient when farmers do not know the hectarage of their various plots. Aerial photography and remote sensing have potentially useful roles in cooperation with ground estimates if a number of conditions can be met, such as if the day is cloudless and if altitude can be maintained relatively uniformly.

Animal counts, especially when grazing is under nomadic conditions, are difficult. Sample surveys can be utilized in some circumstances. Aerial photography has so far seldom been effective.

Major difficulties can arise from linking area or yield reports to the revenue system, e.g., there may be incentives for a local official to classify land under a low revenue category and then pocket a fee from the farmer for this "service."

Data on commodity stocks held by the government should be part of a regular monthly reporting system. This should be done on a week during periods of large purchases or heavy consumption. Figures on private stocks held by dealers are important for decision-making but should be collected only if an effective reporting system can be implemented which does not interfere with the normal operation of the private trade. Data on stocks held by farmers/producers or consumers are practically impossible to estimate with accuracy. On the other hand, it may be worth considerable effort to estimate the direction of change in private stocks, especially in relation to changes in public stocks. Periodic sample surveys at all four levels—government, private traders, farmers/producers, and consumers—should be taken to estimate losses and wastes in storage.

Sample surveys will often be the best way to learn about input consumption on farms. Aggregate sales and stocks of fertilizers, pesticides, herbicides, tractors, and implements can be obtained from dealers. These reports can be confirmed periodically by systematic on-site inventory inspection in order to correct cumulative underreporting which can lead to overestimates of stocks. Sales and stock information should be collected on a monthly basis during the off-season and on a weekly basis with minimum time lag in reporting and processing just before and during the peak marketing period.

Market News

Data on volumes and prices of major commodities sold in markets should be collected from correspondents in terminal markets or such other markets where farmers can find ready sale for their products at wholesale, and also similar information on assembly or retail markets. These data have the greatest influence on the disposition of the available supplies and their distribution over time, space, and among uses. Price data, and to a lesser extent, volume data are most readily accessible, but the problems of collecting, assimilating, and disseminating the relevant information to be useful for the growers (sellers) and the consumers (buyers) in helping them arrive at intelligent decisions is difficult. In developing countries, especially, it frequently requires the adoption of more universally understood measures of quantities and qualities of products to facilitate meaningful communications. Average prices have little meaning, instead, opening and closing and high and low prices for all the standardized grades should be reported by telephone or cable each day during peak periods and by postcard each week during periods of lower volume.

Planning Ahead

Change itself creates a need for information on variables which previously had not been given attention by policy makers. Somehow the agricultural data system has to foresee the place of such variables, not confining its data gathering to variables which have had historic importance in policy issues.

Governments do not live in the "long term"; their effectiveness is absolutely limited by how well they make the short term decisions that assure their survival. Thus the goal of collecting data useful for analysis of long term policy decisions, which some professionals might prefer, will not usually satisfy the most urgent needs of the policy maker. The value of data of long term relevance may not even be recognized, or at best may be viewed as a luxury. Policy makers necessarily take into account political as well as economic considerations in a socio-economic decision. The political climate, political forces, the politician's sense of timing, and his sensitivity to the pressures of society dictate his readiness to seek data on a policy issue. The economic advisor has a duty to call important issues and alternatives to the attention of political leadership, and to continue doing so while awaiting the time when there will be a readiness to pay attention.

Effective managers of information systems learn to take advantage of adversity. During crises, politicians realize that they need adequate information. The effective manager must anticipate such situations,

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[3] Some of the practical issues in making such surveys are discussed in *Field Data Collection in the Social Sciences: Experiences in Africa and the Middle East* (New York: The Agricultural Development Council, Inc. 1976). Bryant Kearl, ed.

[4] The credibility of the farm trials will be increased if farmers, scientists and technical assistance workers jointly discuss plans for this research.

[5] The benchmark and farmer behavior surveys should make important contributions, such as identifying the competing demands for labor, to determine which varieties and practices are eventually recommended.

[6] Richard K. Perrin, Donald L. Winkelmann, Edgardo R. Moscardi and Jock R. Anderson, *From Agronomic Data to Farmer Recommendations: An Economics Training Manual* (Mexico: Centro Internacional de Mejoramiento de Maíz y Trigo (CIMMYT) Information Bulletin 27, 1976).

noting the difference between short run and long range needs, collecting some kinds of data which, while not useful under existing circumstances, will be valuable for decision-making when circumstances change. At that time he has the information available and can show its value, making a strong case for more and better information on other fronts.

External Events

Information on such external events as world commodity production, trade, and prices is important to policymakers. Individual countries find it hard to collect and maintain these data. Costs are high and several major countries (for example, China and the U S S.R.) have been unwilling or unable to join in international exchanges of current data.

The only two sources of world data are the Food and Agriculture Organization of the United Nations (FAO) and the United States Department of Agriculture (USDA).[7] Because FAO is an international organization which consists of member governments, FAO statistics are limited to those reported by member governments; their unity is reduced by this constraint. The USDA makes its own estimates of other nations' production.

The International Food Policy Research Institute (IFPRI) will attempt, as one of its objectives, to improve world agricultural data collection and analysis. IFPRI does not have a capacity to carry out its own collection, but it will attempt to identify and communicate areas of weakness in information collection in each country. Furthermore, it will attempt to anticipate the influence of major external events on international production, trade, and prices so that the world is not caught short on analytical information as it was in 1972.

METHODOLOGICAL ISSUES

Several issues relevant to supplying information deserve special mention.

Censuses vs. surveys

The numerous difficulties associated with a census, including inflexibility, suggest that low-income countries seek ways to reduce their reliance on this approach and pay more attention to developing and implementing suitable sampling techniques to produce accurate, timely data

Remote Sensing

Remote sensing is a new technique whose potential is not yet clearly defined. It presently can do some things, but not everything, well, even for those things that it can do well, it must be supplemented by traditional methods.

At present, the LANDSAT satellite has resolution which makes it effective for large areas Encouraging results in accurately estimating area sown to major crops such as wheat and maize grown on large farms has been demonstrated in the U.S.

On the other hand, there are still weaknesses in estimating crop area under conditions which characterize agriculture in the developing countries, particularly Asia and much of Africa, in which there are small, fragmented farms, often standing water in fields, and partial to full cloud cover. It is difficult to distinguish among major crops, i.e., wheat from barley. Mixed crops are difficult to identify. As a result, ground "truth" is required to supplement the atmospheric reconnaissance for area estimates. Yield estimates must still be made from the ground. The real potential of remote sensing is now, and probably will continue to be in the future, in interfacing with traditional methods to improve accuracy and, especially, timeliness of area estimates.

Remote sensing is being explored for such other uses as mapping of topography and major soil types to aid agricultural planning; reporting range conditions to aid in animal grazing management; reporting snow pack coverage for estimates of spring and summer irrigation availability; reporting relative water deficit areas in canal systems to help redirect irrigation supplies; noting the appearance and spread of pests and diseases; and recording changes in forestry conditions.[8]

The U.S. lead in remote sensing technology is now great. The information from the LANDSAT and succeeding satellites will be made available, at cost, to any requesting body, including nations. Receiving stations in individual countries can be constructed and equipped for an investment of $2 to 3 million. Some regional installations are already being initiated

Advance Productions Estimates

The ability to obtain advance estimates of production when the crop is still in the field remains in an unsatisfactory state. The current method is to measure crop progress at a given time and then project growth based on normal weather for the remainder of the growing season. Yet the seasons when weather is not normal are most critical for policy-makers, these are the times when advance projections of production fail.

Major problems still exist in predicting weather for any significant time into the future—particularly uncertain is the interval between one week and one year away. Furthermore, substantial work remains to be done in relating weather conditions to plant growth. Reports to the contrary, neither of these categories of information has been developed with any high level of predictability.

One question as yet unanswered is, "At what stage in the crop season can one attach a given level of reliability (e g., ± 5% of the final figure) to a given estimate?" Beyond some point in the growing season, the contribution of favorable weather to increase a yield is generally minimized Unfavorable weather (e g , hail or heavy rains) can, however, reduce production right up to the time that the crop is harvested (or processed, if the crop must be sundried). Freezing terminates growth.

Accuracy

Low-income countries may not be able to fine-tune estimates to the accuracy levels demanded in the U.S. system. Yet if errors result in serious food shortages, the costs in terms of human suffering, expenditures for imports, and probable political instability can be high. This is an especially serious problem in low-income countries with marginal or deficit food supply conditions; when crops fail, there is little to fall back on. Until there is successful completion of a world buffer stock scheme, low income countries bear the full impact of the uncertainties of the international commercial market to supplement their domestic production. On the other hand, most low-income countries are located in the tropics and subtropics where continuous growing seasons permit greater opportunity to respond to a single poor crop season A large amount of storage is done on farms, and experience indicates that a substantial private buffer is usually available for one poor production year, although not for two poor years in a row.

Breadth of coverage involves tradeoffs. With a fixed budget for agricultural information, the more items that are reported, the less accuracy can be attached to each. Therefore, the best advice seems to be to concentrate on the few items most important in policy-making. If the information analyst must err in reporting, it is better to err on the conservative side.

Release of Information

Access to information is a crucial policy issue. Significant economic advantage accrues to those bodies which get accurate information earliest. Some countries restrict release of public information when crops are disappointing or government stocks are low, with the justification that this practice minimizes speculation and hoarding. They argue that when storage stocks are high, little harm can be done (and perhaps some good achieved) by wide publicity However, they contend that when stocks are low, an official government report confirming shortage encourages market dislocations, i.e., while rumors of shortages are damaging, their bad effects are only intensified by official verification that they are true. In dealing with international organizations, most countries use some discretion in deciding what information to supply and when.

Large grain companies and other international trade bodies have reporting systems that supply information for their own purposes regardless of whether the government releases official data. Withholding public information therefore gives such companies a large market advantage. This practice may also create suspicions which a government wishes to avoid. It is generally assumed that information is withheld when conditions are unfavorable but freely available when favorable. The U.S. practice of not allowing any degree of discretion as to the timing or nature of information released was conscientiously developed to avoid abuse. Reports are made to all parties, public and private, at pre-established times This practice virtually eliminates political pressures for special favors. The private sector may put out its own figures in an effort to influence the market (e g , report a large harvest in order to induce farmers to unload stocks at low prices), but a resolute government policy does much to negate these efforts.

Countries that have an elaborate mass media system, supplemented by a network of organized communications channels, circulate current crop and livestock estimates widely. When printed media are not as well developed, the circulation is more limited. Agricultural statistics do not lend themselves easily to the oral or visual media. The practical minded user wants to make comparisons over time or between categories, and to draw from a large body of data those items of special interest to him For these purposes a printed report is essential. When literacy is low and specialized printed media do not circulate widely, this means that agricultural data tends to come to the attention of the government planner and the highly centralized agricultural business firm more easily

When agricultural data have economic value, this differential availability has consequences in terms of equal economic opportunity. The individual small farmer or small merchant may be disadvantaged in two ways. The information used by larger entrepreneurs is not as available to him, he lacks access to the sources they have. Moreover, he has less chance to influence those sources and the kinds of data they gather and make available. Users define the data to be gathered Unless we are prepared to see agricultural data collection contribute to greater economic inequality, someone must assure that small and dispersed potential users get the kinds of information in the form they need, not simply the rich and powerful

While it is difficult to make general rules to cover all situations, the following seem to hold

1. What to release?—aggregations of all information collected

[7] *Food Information System Summary and Analysis*, Office of Technology Assessment United States Congress August 1976

[8] *Applications of Landsat Imagery*, The World Bank, Washington, D C., 1976

2. When?—at set, predetermined times
3. In what form?—as simply as possible, i.e., understandable to the least sophisticated user.

The Role of Models

Some government planners and policy makers err in thinking they must rely on sophisticated econometric models. Such an attitude does a positive disservice if it guides information collection away from the important task of learning what the farmer is capable of doing, what he needs, and what policies will bring the desired responses. There is always a risk that models will result in premature assumptions about which variables will prove most important to decision-making. Indirect economic interventions are often much more effective in guiding the progress of agriculture than are top-down administrative interventions by government. But either approach requires price data and micro-data on the individual farmer's use of inputs and responses to changing price and changing risk. Redoing a scheme of national accounts is likely to be a great deal less useful to agricultural development than making soil surveys, obtaining some idea of cash flows, getting data on response to fertilizers, describing the marketing system, and obtaining other usable first-hand information on what actually happens in the market, on the farm, and in the farm family.

Formal econometric models, which are typically estimated from time series data for analysis at the national level, are also often too aggregative to be of much use for sector policy or for exploring important distributional questions. This is not an essential property of econometric models, however, and substantial improvements are possible by a revision of data coverage if historical data are inadequate or missing. The models most often used in the past have applied most appropriately to long run changes, and have been of much less value in guiding what is to happen in the immediate future. However, much of their data requirement can be generated simultaneously with good single-purpose studies. The high data costs for which modelling approaches are sometimes criticized may in part be explained as a misallocation of the data overhead costs that would otherwise be committed in single purpose studies. Without a larger model to provide context, a single purpose studies may in fact add up to little as a source of constant and dependable input on policies and programs.

Good models can crystallize the essence of economic theory. Models (even very aggregate ones) are often useful and sometimes essential if one is to identify the nature of trade-offs between modern and traditional sectors of the economy. They may be a vehicle for communicating the importance of a lagging sector. A multiplicity of village studies can document a host of goals and problems, but the integrating power of a model may be needed to identify the policy variables that will move the system toward desired objectives.

It must be remembered that econometric models are only one member of a family of formal models. Numerical projections and simulations are other formal approaches. The greater disaggregative capabilities of models which can be developed from cross-section data (especially linear programming models) can be useful in examining many distributional and allocational questions, both sectoral and interregional. The type of data they require is typically generated by almost any kind of study that goes beyond simple *ad hoc* treatment. For example, single purpose studies of income and employment, farmer price response, demand and supply analysis, and intranational production and trade relationships can provide data essential for developing larger models.

A good rule for analysis at any level is to seek the simplest method of analysis that will accomplish a given task. Econometric models can help expose questions relevant in policy decisions and make explicit the data required to produce answers. At this stage in their development, however, they must be viewed as a valuable supporting resource for experienced judgment rather than a substitute for it.

Qualitative Non-Statistical Data

Numerical data are only a small part of the total data in an information system. Substantial benefits could undoubtedly result from greater use of non-numerical, qualitative, description data in the information system. Often the most effective way to present analysis to policy makers is to use precise qualitative judgments with modest quantitative data. For example, it may be more accurate to estimate *changes* in crop production levels as opposed to *absolute levels* of crop production each year, i.e., when one cannot get good statistical data, qualitative evaluation of whether crops are greater or less than normal may be as useful. The use of Crop Reporting Boards in the U.S. illustrate that subjective judgment is still an important ingredient even in a highly developed information system. Particularly when the system has technical shortcomings, the wisdom of well-informed persons can play a key role in improving estimates.

But if qualitative data are often the most useful kind, they are also the most easily challenged and the most likely to be suspect. In the search for "objectivity," consequently, useful and necessary data are often thrown away or ignored. This loss can be minimized if a special effort is made to use highly organized and objective methods of collection and analysis when dealing with qualitative data.

INSTITUTIONAL ARRANGEMENTS FOR INFORMATION COLLECTION, PROCESSING, AND ANALYSIS

Essential Elements

An effective information system must satisfy four conditions:

1. It must be able to *anticipate or respond to changes in priorities*. Users of information are subject to political priorities. For example, at one time policy-makers may not wish to focus on questions of equity. Yet the situation and their priorities can change quickly and the information system must adjust quickly in order to service the new needs. If anything, it must be even more flexible in a less developed country than in a developed one. A complete census of resources and people may be required initially as a baseline stock of information flows. However, recurrent dependence on censuses builds inflexibility into the information system.
2. There must be *continual evaluation of concepts and methods* to provide a dynamic framework for the flow of information. The organization of U.S. agriculture has changed, but the concepts on which the statistics on U.S. agriculture are based have not kept up with the realities of the current situation. As a result, statistics may give a misleading picture of what is actually happening.
3. *A competent and balanced sustained package of human and nonhuman (hardware) resources* must be built into the system and maintained. Methodologies and equipment for collecting data must be kept up-to-date and appropriate to the situation which is being measured. The information system must remain de-politicized even though the decisions for which the information will be used are political.
4. *Communication of information will need to flow both ways in the system.* It takes a great deal of effort to get information out to potential users in low-income countries where there are only sketchy formal communications networks, especially if this includes an effort to give equal access to less advantaged members of the economy. Likewise, because many of the economic units are less organized than in the developed countries, they offer less opportunity for the users, especially small farmers, to define the content of the information they need. Government and people often see things through different eyes. There is need to bridge these levels.

Alternative Organizational Situations for National Agricultural Statistical Systems

Countries have followed different paths in designing their national agricultural statistical systems. Approximately two-fifths of the low-income countries gather agricultural data as part of a centralized statistical service. One-third have ad hoc systems. The rest rely on their ministries of agriculture for their information needs.

It is not possible to generalize about the best form of organization. A centralized statistical system makes best use of limited human resources, especially when high technology methods (e.g., computers, LANDSAT) are employed. It also does a better job of measuring the intersectoral relationship. However, statistical systems based in the ministry of Agriculture generally bring users and suppliers of information closer together (unless, as in many countries, the Central Planning Agency is the major agricultural decision-maker). Ad hoc systems are generally weak, representing compromises which result in duplication and low quality.

Coordinating the different elements in the information system is a difficult task. One must go beyond admonishing users and suppliers that they do not communicate enough. Ways of reconciling shared collection systems, e.g., national and provincial agencies, must be worked out. Committees, a frequent choice, are not the answer. Finally, responsibility for adequate information must be fixed in a single organization and often in a single individual within that organization.

Balance of Collection and Analysis

It is difficult enough to use data when one cannot have confidence in the magnitude of change reported; no kind of analysis offers much promise when one cannot have confidence in the direction of change. Nor can better statistical methods and data processing techniques offset failures at the conceptual level. No matter how well one manipulates numbers, one may still be measuring the wrong thing.

However, a good analyst often can overcome some weaknesses in reported numbers. Trained field observers may be able to produce more accurate estimates of yield than statistical crop-cutters. Economists using price analysis may be able to improve gross production estimates.

This argues for a balance between the analytical and data gathering capacities of the information system. Furthermore, the type of analysis utilized must be consistent with the quality and type of information available. In many cases, inadequate information is more an indictment of the analysis (and the type of training that analysts receive) than of the data collection.

Steps in Designing a New System

The dilemma of survival in any effective information system arises with the production of data which threaten powerful forces in the society, e.g., land reform or equity, but at the same time to anticipate when such data might be needed and appreciated so

that it is available at that time. For this reason, it is much more difficult to restructure and improve an existing entrenched system than to build a system from the beginning. Redesigning an existing system means reassigning property rights which poses large problems in any society. If one could design the information system from the beginning, it should begin with an identification of problems which private and public policy-makers conceive to be most important. Initial perceptions are not always accurate. Users and suppliers must work together to:

1. understand how the decisions process is organized and how decisions are made,
2. begin to accumulate facts
   a. starting with categories of information considered to be most important, including natural and human resource inventories and basic data series which are commonly necessary; and
   b. adding other information categories once credibility is established.

Technical Assistance

Whether data collection and analysis are adequate in a country ultimately depends upon the ability of the institutions charged with that task in that country. Often they are understaffed and underequipped for their tasks. Outside agencies can train personnel, conduct analytical studies themselves, and provide equipment. This is a valuable contribution if it is not used as an excuse to delay strengthening local institutions and if it does not inadvertently set as a model for a kind of information system that is inappropriate for the low-income country.

SUMMING UP

The strategic part of agricultural decision-making is the careful design of information systems as part of the overall social system. The function of the minimum information system is to produce information to respond to uncertainty, to promote positive change.

Analysts and policy makers must support and encourage statisticians in their work; often statisticians do not get enought credit. They are essential to an agricultural information system. Professionals at all levels must be objective in giving advice—including, importantly, adequate information upon which to base decisions. If they do not play this role, there is little hope to implement a rational decision-making system on a politically sustainable basis.

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TRANSLATING AGRICULTURAL INFORMATION REQUIREMENTS INTO SURVEY DESIGN PARAMETERS

Information Requirements (What do you want to know?)	Unit of Analysis (Who or what is studied?)	Variables (What is measured?)	Indicators (How are variables measured?)	Unit of Enumeration (Who informs?)	Sampling Unit (What units are selected?)	Geographical Base (Where is survey taken?)	Reference Period (What period of time is used?)
1. Obtain information on the resource base for agricultural production							
2. Measure agricultural production for national accounts, food balance, sheets, balance of payments							
3. Measure response and constraints of different production activities							
4. Measure crop and livestock price structures and profitibility							
5. Analysis of marketing and manufacturing related to agriculture							
6. Analysis of farm management and viability							
7. Analysis of the socioeconomic status of farm families							

SELECTIONS

DRAFT

CDIE GUIDANCE FOR MANAGERS

INFORMATION PLANNING FOR POLICY REFORM PROGRAMS

February, 1986

Chris Hermann

READ pp. 1-2

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EXECUTIVE SUMMARY

AID has recently initiated a number of policy reform programs and more are likely in the coming years. As is true for any other type of development assistance, adequate information about program implementation and the effects of reform measures is critical for sound program management. Planning an information component for policy reform programs, therefore, should be an integral part of the design process.

This guidance paper is intended for two main users: a) AID and host country staff responsible for designing or managing a policy reform program, and b) specialists who have limited experience with planning information systems for these programs. The guidance focuses on the common categories of information that will be needed by most policy reform programs. To illustrate the types of data required and appropriate methods of collection, examples are provided from two ongoing policy reform programs - the Agriculture Sector Development Grant in Niger, and the Economic Policy Reform Program in Mali. The main information requirements of these programs are as follows.

1) Compliance Data -

Data are needed which demonstrate that the host country has met the conditions for disbursement. A broad range of data can be used for this purpose. Qualitative data describing changes in organizations and processes are often adequate. Quantitative measures, such as budgetary data or operational statistics, are also frequently used. A checklist of policy reforms supported by the program, the date when action was taken and evidence of actual implementation is a simple means for monitoring compliance. For the most part, the types of information required can be identified from the program agreement.

2) Performance of Public Sector Institutions -

Policy reforms lead to or require changes and improvements in the performance of public sector. Data will be needed which track these changes as reform measures are enacted. For the most part, data collection should be limited to readily observable changes in specific institutions which result directly from the reforms (i.e., intermediate effects), rather than more global measures of public sector efficiency. Operational data will be very useful in this regard.

3) Program Implementation and Context -

Joint Review Committees are commonly established in policy reform programs to assess implementation progress and the short-term effects of accomplishments. The Committees usually met prior to the release of program funds to determine whether conditions for

disbursement have been adequately met. Compliance data and institutional performance data will be central to this review. An important consideration in assessing progress is the economic and political context in which the program is currently being implemented. Changes in the program environment can significantly affect implementation and mid-course adjustments to the program might be necessary.

4) Policy Reform Impact and Private Sector Response -

Most policy reform programs will forward overall objectives of reducing government control over market operations, reducing the costs of public sector operations while increasing its economic efficiency, and stimulating private sector development. Preceding categories of information will cover the first two objectives. Additional information will be needed on the private sector's response to reform measures. In many cases, this will require special evaluation studies conducted during the latter stages of the program. This section describes a range of studies, varying in complexity according to program resources and other constraints. In general, the studies should examine whether the business community has reacted to the reform program as expected; if not, why; and is it likely that private sector growth will result from the reform measures. An important additional use of the studies is to provide information for subsequent interventions to stimulate private sector development.

After discussing the types of information needed for program monitoring and evaluation, several suggestions are made concerning delimiting the scope of the information system. A central problem for information planning in policy reform programs is determining precisely what the monitoring and evaluation responsibilities of the program include and exclude. Managements' desire for information has to be accommodated to the resources of the program and other constraints to data collection and analysis. Several characteristics of policy reform programs help to define and focus information requirements. First, the conditions for disbursement are especially useful for determining data needs for program monitoring and evaluation. Second, information requirements will be greater for programs which are very specific about how funds are to be used. Third, the difficulty of empirically demonstrating the effect of policy reforms on macroeconomic and sectoral conditions will, in many programs, preclude this as a viable strategy for evaluations.

The guidance concludes by strongly recommending that, in general, assistance from specialists in information planning should be obtained especially when the mission, host country or program management unit lacks such expertise.

3. Four Basic Categories of Information for Policy Reform Programs

3.1 Compliance Data

SUMMARY: Data are needed which demonstrate that the host country has met the conditions for disbursement. A broad range of data can be used for this purpose. Qualitative data describing changes in organizations and processes are often sufficient. Quantitative measures, such as budgetary data or operational statistics, are also frequently used. A checklist of policy reforms supported by the program, the date when action was taken and evidence of actual implementation is a simple means for monitoring compliance. For the most part, the types of information required can be identified from the program agreement.

Demonstrating that conditions for disbursement have been met is central to the implementation of policy reform programs. A useful means for determining what types of data will be needed is to develop an implementation chart for the program. This was done as an initial step for Mali's Economic Policy Reform Program (Mali/EPRP).

TABLE 1: EPRP PERFORMANCE DISBURSEMENT CRITERIA

CONDITIONS PRECEDENT:

a) Program Agreement acknowledged by the GRM as valid and binding.
b) GRM representatives designated.
c) Program Coordination Unit (PCU) offices established in the Ministry of Finance.
d) PCU staffed: two Malians and one technical advisor.
e) Complementary ProAg signed by GRM.
f) U.S. bank account opened for deposit of EPRP disbursements.
g) Development of plan for privatization of parastatals.

COMPONENT 1: TAX REFORM (C1)

TRANCHE 1 (T1)

C1T1:
a) Council of Ministers approve the new Commercial Code.
b) Three year action plan for tax and customs reform, and Year 1 implementation plan developed.

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TRANCHE 2 (T2)

C1T2:
a) Enactment of new Commercial Code.
b) Liberalization of pricing and external trade controls.
c) Assess results of previous tax reform actions and develop Year 2 implementation plan.

TRANCHE 3 (T3)

C1T3:
a) Assess results of previous tax reform actions and develop Year 3 implementation plan.

COMPONENT 2: BUDGET & ADMINISTRATIVE REFORM (C2)

TRANCHE 1

C2T1:
a) Meet all conditions of C1T1.
b) Computerize payroll and use system to pay employees.
c) Implement new budget accounting system for receipts and expenditures.
d) Implement Privatization Program.
e) Develop plans and procedures for Early Retirement Program.
f) Establish disbursement procedures for EPRP financing including local currency fund needed for Early Retirement Program.
g) Set annual civil service hiring ceiling to reduce rate of growth (i.e., 1100 new hires only).
h) Set level for non-wage expenditures acceptable to AID (e.g., $1.5 million in the coming year raising the nonwage to wage ratio).

TRANCHE 2 (T2)

C2T2:
a) Assess implementation progress of C2T1 reforms.
b) Provide data on expenditures incurred for Severance Pay Pension Guarantee Fund, Credit Guarantee Fund and Feasibility Study.
c) Adhere to C2T1-G and set annual civil service hiring ceiling to reduce rate of growth (i.e., 800 new hires).
d) Adhere to C2T1-H and set new target for nonwage expenditures (i.e., $1.5 million).

TABLE 2: ILLUSTRATIVE IMPLEMENTATION SCHEDULE

Conditions to be met:	CP	C1T1	C2T1	C1T2	C2T2	C1T3	PACD
Timing	12/85	12/85	6/86	12/86	12/86	12/87	12/88
Funding ($M)	0.8	2.56	2.7	3.55	4.785	2.02	
Joint Reviews				12/86		12/87	

Monitoring compliance with the various conditions associated with the series of disbursements and facilitating action needed for compliance constitutes the core responsibilities of the program management unit. What must result from this activity is sound evidence demonstrating that conditions for disbursement have been met.

On the surface, the conditions for disbursement suggest that only one major action must be taken to satisfy a specific condition (e.g., Ministerial approval of the new Commercial Code, enactment of the Code, etc.). However, this appearance is misleading. In reality, a number of discrete actions will precede full compliance. For example, the GRM office involved with the reform measure must first fully understand the objectives and importance of the proposed changes. This might require some time to study and assess the proposed actions to appreciate the ramifications of the changes on operating procedures. An action plan might have to be developed. This plan might need approval at higher management levels. Implementing the plan might require staff training about new modes of operation (e.g., in Mali/EPRP, how to use the new budget accounting system). Moreover, certain reforms will encompass a number of separate changes. For example, in Mali/EPRP, tax reform will affect the payroll tax, customs tariffs, deductions for capital investment, business income tax and the establishment of a tax prepayment system.

Therefore, information requirements for monitoring program implementation and compliance with disbursement criteria include tracking constituent actions or sub-elements of the stipulated conditions. Disaggregating disbursement conditions into such constituent actions provides a set of benchmarks reflecting program progress. These benchmarks will, in turn, serve as short-term objectives for the office(s) involved with the changes and for the program management unit. Documenting the process toward meeting disbursement conditions should be a key management activity. For the most part, descriptive or qualitative data will be sufficient. Such data will be obtained by the program management unit from their interaction with the appropriate ministry offices.

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A useful way to record the current status of actions completed and actions pending is to establish a program monitoring file which contains periodic progress reports. Program management staff would submit a report to the file on a biweekly basis. Summaries of such reports should serve as the basis for documenting compliance with performance disbursement and for program reviews conducted jointly by the host country and AID. The file will also have utility for mid-term and final evaluations.

Establishing a documentation file of this sort is important because the individual actions or benchmarks, in and of themselves, might appear as trivial accomplishments. However, as a set, they constitute the "stuff" of policy reform programs. Moreover, such accomplishments are easily forgotten in light of more urgent day-to-day demands of program management. This makes it all the important to develop a system of recording implementation progress. Of course, judgement about the contents of the file will be required. On the one hand, the file should provide a comprehensive record of reaching benchmarks and fully satisfying disbursement conditions. On the other hand, the system will become unwieldy if every action, no matter how small, is recorded.

3.2 Institutional Improvement: Intermediate Effects

SUMMARY: Policy reforms lead to or require changes and improvements in the performance of public sector institutions. Data will be needed which track these changes as reform measures are enacted. For the most part, data collection should be limited to readily observable changes in specific institutions which result directly from the reforms (i.e., intermediate effects), rather than more global measures of public sector efficiency. Operational data will be very useful in this regard.

3.2.1 Focus Data Collection on Improved Performance of Selected Public Sector Institutions

Many policy reform programs support measures which should contribute to improved public sector performance, in general, and selected government institutions, in particular. Typically, these reforms affect budgetary and administrative policies and procedures. Where enactment of institutional reform measures is stipulated as a condition for disbursement, compliance data (discussed in section 3.1) will track implementation of the changes. But in addition to enactment, the effects of these on public sector institutions reforms should be assessed.

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In principle, improvements in public sector performance resulting from policy reforms ought to be measurable, especially when those reforms involve major changes in modes of operation. In practice, however, actually measuring improvements due to policy reforms is quite difficult. An example from EPRP/Mali illustrates the issue.

EPRP/Mali will support increased nonwage government expenditures for materials ranging from paper and pencils to fuel for government vehicles. The reason for increasing nonwage expenditures is that the efficiency of government workers is seriously constrained by the shortage of necessary materials. Therefore, increasing the supply of these materials will increase worker efficiency, and ultimately improve public sector performance. These improvements might include better service delivery, increased cost effectiveness of operations, and better allocation of public resources.

However, obtaining empirical evidence which links nonwage expenditures to broad patterns of public sector performance would be a difficult, if not impossible, evaluation task. First, time for performance improvements to occur will probably exceed the life of the program. Second, the effects of nonwage expenditures would have to be isolated from other factors which both positively and negatively influence public sector performance, such as institution building projects and other development activities which effect government operations. In most programs, the best that could probably be done in this regard is to argue that policy reforms are one among many factors contributing to improvements in the public sector. Third, the causal link between nonwage expenditures and public sector improvements is indirect. That is, its effects are mediated by intervening management systems - e.g., staffing levels, decisions concerning the use of funds for nonwage expenditures, etc. Determining the extent to which these intervening factors distort or deflect the effects of policy reforms on public sector performance could be quite speculative and lead to highly unreliable conclusions.

Similar problems will be encountered by other types of reforms comparable to those associated with estimating the effects of increased nonwage expenditures on overall public sector performance. In general, this type of association between specific reforms and broad public sector changes will not be a practical approach for meeting the information requirements of policy reform programs.

An alternative is to focus on the short-term, intermediate effects of reforms on specific public sector institutions. In most cases, policy reform measures affecting the public sector initiate or further a long-term process of improvement. Therefore, in most cases, the individual reforms supported by the program are necessary but not sufficient, in and of themselves,

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to cause significant or measurable improvements throughout the public sector (at least not in the time frame of the program). However, improvements in the performance of the specific public sector institution affected by the reform should become apparent. Theoretically, public sector performance will improve over time as additional institutional reforms are made (that is, there should a cumulative effect on performance). In the interim, data collection for program monitoring and evaluation should concentrate on the intermediate effects of reform measures - i.e., on changes within the institutions affected by the reforms. In some cases, reforms measures are targetted directly on a public sector institution; in other cases, the effects will be derivative - i.e., to carry out a reform measure, changes in procedures or operations will be necessary though not explicitly stated as a condition for disbursement.

In EPRP/Mali, for example, monitoring the intermediate effects of increased nonwage expenditures consists primarily of determining whether these expenditures have increased relative to wage expenditures (that will not be as easy as it sounds). At the very least, this should provide insight into the ability of the Ministry of Finance to make changes in budget allocations as forwarded by the reform program. To some extent, the beneficial effects of increased supplies can be inferred from how those funds were used.

3.2.2 Additional Examples of Intermediate Effects on Public Institutions

The Agriculture Sector Development Grant in Niger (ASDG/Niger) provides several good examples of intermediate effects on public sector institutions resulting from policy reforms. A major reform supported by ASDG/Niger is the reduction of government subsidies on agricultural inputs. Prior to the program, the subsidy system had the effect of actually limiting the supply of agricultural inputs. The government would set the total amount of funding available for subsidies and the final cost of inputs to the purchaser. Because the government held a monopoly on the supply of major inputs, the total amount of inputs available to farmers was determined not by market demand, but rather, by the amount of funds available for subsidies and offical input prices. It was estimated that demand for inputs, even at a higher cost, exceeded the supply under this system. By lowering subsidy levels and encouraging supply of inputs by cooperatives and private dealers, costs to the government should decrease while the supply of inputs should approach demand.

Reductions in input subsidies, therefore, will entail changes in the government's involvement in the agriculture sector and improvements in the performance of public sector institutions involved with input supply. Specifically, the parastatal which previously controlled input supply will be reorganized as a

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cooperative which will have to compete with private sector suppliers. This change constitutes an important intermediate effect of the program which will be monitored closely. Similarly, changes in the process by which government subsidies and prices for inputs are set (e.g., to what extent are official prices influenced by private sector market prices), and cost savings to the government as its subsidy program decreases are also indicators of intermediate effects of ASDG/Niger.

Another reform supported by ASDG/Niger is streamlining licensing for cross-border trade. Simplifying the licensing process and making license fees commensurate withthe value of the transaction should encourage more traders to purchase licenses. Easing cross-border trade regulations should also increase the volume of imports and exports. An intermediate institutional effect of these reforms will be improved performance of offices issuing licenses. Basic operational data should be available from the records of these offices, such as the number of licenses issued, their cost relative to the value of the commodity traded, and the number of licenses purchased by category (size) of operations. An increased number of licenses issued means that the workload of the office has increased. Additional revenue generated by licensing would also constitute an improvement due to policy reforms. The distribution of licenses by type or size of transaction will indicate whether the new system is servicing more or less equally the range of traders. In addition to operational records, interviews with staff working in licensing offices could identify problems with the new system and possible improvements.

A more straightforward example of intermediate effects concerns the reform of Niger's grain marketing parastatal - OPVN. In general, reforms supported by ASDG/Niger will lead to OPVN playing a more strategic role in the sector by using its supplies to moderate cereal price fluctuations. The size of OPVN will be reduced - e.g., fewer grain outlets and a smaller grain reserve. The procedure for government grain purchasing will also be changed to a tender and bid system. Clearly, these reform measures will have a direct effect on OPVN operations which should contribute to overall improvements in public sector performance. A mix of both quantitative and qualitative data will be collected to assess these improvements.

EPRP/Mali provides a number of examples of intermediate institutional effects. The program supports a package of tax reform measures which should lead to an expanded tax base and more effective operation of revenue divisions. Intermediate effects of the program should be evidenced by an increasing number of tax returns and a more equitable distribution of tax payments (i.e., the distribution of returns among individuals, corporations and economic interest groups). Computerization of tax records should contribute to better performance by the

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Internal Revenue Directorate. Indicators of improvement would include more timely reporting of revenues, better access to tax data, and improved projections of next year's revenues. Similar operational improvements are expected in the Collections Service and the Investigation Unit. For example, the number of cases investigated and completed would reflect performance improvements. Comparable changes in the operations of the Ministry of Finance pertaining to the budgetary process and in the Civil Service concerning personnel management will also provide evidence of intermediate effects of the policy reform program.

3.2.3 Data Collection Methods

In general, the same types of data and methods appropriate for institution-building projects will be applicable to policy reform programs regarding their effects on public sector institutions. As the above examples suggest, both quantitative and qualitative data are needed to assess improvements in institutional performance.

Improvements pertaining to institutional processes and procedures can be monitored largely by observational or descriptive information. That is, description of decision-making processes and changes in how decisions are reached will provide useful information for program monitoring and evaluation. Indicators of improvements or changes might include greater use of empirical data (e.g., study findings, recent statistics) to guide decision-making, reorganization of decision making bodies, shorter but more effective meetings, and better resource allocation or investment decisions resulting from decision making guided by sector policy objectives. This type of information could be obtained from observation or participation in ministry or office meetings, or from interviews with office managers. Similar observational data could be obtained concerning procedural improvements, such as faster processing of work assignments (e.g., issuing licenses, granting land titles) or expanded services.

In addition to observation and informal interviewing, operational records will often provide much useful data concerning performance improvements. For example, the number of cases processed, licenses issued and similar counts of services provided are usually recorded by the very offices which should be affected by the reform program. Much can be inferred from basic operational statistics when combined with informal interviews. For example, in EPRP/Mali, a reasonably accurate estimate of annual nonwage expenditures will be available from the Ministry of Finance. Fiscal data showing an increase in expenditures for basic office supplies, such as paper, combined with staff interviews concerning the use of those supplies could provide a relatively sound method for determining the intermediate effects

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of this reform - e.g., workers are now able to complete tasks faster, inter-office communications have improved, etc.

In some cases, small-scale studies might be required for mid-term or final program evaluations to assess the results of enacted reforms, or to evaluate special government programs created to advance specific reform measures. EPRP/Mali provides an example of both types of studies. A condition for disbursement under EPRP is the enactment of a new commercial code. A major change which will occur as a result will be streamlining the business registration system. The information plan for EPRP/Mali recommends a study based on registration records after the new code has been in operation for a year or two. The purpose of the study is to determine how well the new system is operating (e.g., have registrations increased, is the office in charge of registrations operating efficiently, have the time and costs required for registration been significantly reduced, etc.).

Second, EPRP will support a pilot Early Retirement Program (ERP) to expedite reducing the size of government. ERP will establish several types of funds to assist civil servants start businesses on leaving their government jobs. This includes a Severance Pay Fund, a Feasibility Study Fund and a Credit Guarantee Fund. After ERP has been in operation for at least one year, the implementation of the program should be reviewed. A very simple analysis of data from applications submitted by candidates - e.g., the number of applicants, their distribution by grade classification, their plans after retirement for employment, the number accepted, the procedures followed for selection, and differences between those selected and those rejected - combined with expenditure data for each of the special funds would provide useful information about the operation of the program. The purpose of the study is to determine and what changes are needed to improve the program prior to the conclusion of EPRP/Mali. Through this program is not a direct effect on a specific public sector institution, it could have a potential beneficial impact on the public sector if it succeeds.

3.3 Implementation Progress

SUMMARY: Joint Review Committees are commonly established in policy reform programs to assess implementation progress and the short-term effects of accomplishments. The Committees usually convene prior to the release of program funds to determine whether conditions for disbursement have been adequately met. Compliance data and institutional performance data will be central to this review. An important consideration in assessing progress is the economic and political context in which the program is currently being implemented. Changes in the program environment can significantly affect implementation requiring mid-course adjustments to the program.

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The management of policy reform programs includes a joint review committee which convenes periodically during the implementation of the program to assess progress. Typically, the joint review committee meets prior to each disbursement of program funds. The joint committee, consisting of host country representatives and their USAID counterparts, reviews actions taken to institute reform measures to decide whether conditions for disbursement of the next tranche have been met. The joint reviews are also an opportune time to assess the implementation process, action plans for the next round of reforms and contextual factors affecting the program. Clearly, adequate information is central to the joint committee's ability to carry out these management functions.

The program management unit (usually composed of appointed host country staff working with long-term advisors) has the responsibility of providing data for the joint reviews. Their principal data source will be the program implementation files they have been developing which document the actions taken to institute reform measures. Summaries based on file records supported by pertinent quantitative data (e.g., from operational records, budgets, etc.) which demonstrate compliance, or non-compliance with disbursement conditions should be submitted for committee reviews. Ideally, the various actions required of the host country under the terms of the program will have been implemented and convincing evidence demonstrating compliance will be available. In that situation, the joint committee should be able to reach agreement quickly to release the next tranche. However, in some instances, the question of compliance will not be so easily resolved -i.e., it will not be clear that disbursement conditions have been met. This could result from differing interpretations of what constitutes compliance , or perhaps reforms have only been partially enacted. When compliance is questionable, the information provided by the program management unit will be especially important. At the very least, their information serves as a common point for discussions between host country and USAID members of the joint committee. If the program management unit is unable to offer convincing evidence that required reforms have been satisfactorily enacted, that should raise serious doubts about whether progress is sufficient for release of the next tranche.

Both external and internal factors can affect implementation of policy reform programs. Internal causes of implementation delays or non-compliance with disbursement conditions generally reflect management problems. This includes the host country government offices which must enact the reforms, the capability of the program management unit to facilitate those actions, and AID's own management systems (e.g., contracting regulations, commodity procurement procedures, etc.). Like any other project, careful

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monitoring of the program will be needed to identify what is causing implementation delays. The joint reviews are a logical point at which changes in personnel or management systems could be made to expedite implementation. Though the information provided by the program management unit will be useful for this assessment, experience and sound judgement about what is wrong and what can be done about it will be even more important.

The economic and political context in which the program is being implemented should be a key concern for the joint review committee. A fundamental assumption of these programs is that the host country has the ability and resolve to enact policy reforms. This assumption is typically based on conditions as they existed when the program was designed. However, changes in external, contextual factors can significantly affect program implementation either positively or negatively. EPRP/Mali can be used as an example.

The price for cotton on the international market has recently declined substantially and is expected to remained at depressed levels for at least several years. This will have an adverse effect on Mali's export earnings. As a result of an economic downturn, GRM (Government of the Republic of Mali) revenues will decrease, creating the possibility that government priorities will change over the short-term. If this happens, EPRP/Mali's policy reform objectives might not be achieved within the time frame originally envisioned, which could have either a positive or negative impact on the program. On the one hand, adverse economic conditions could result in the GRM being unable to provide counterpart funding for certain components of EPRP (e.g., for the Early Retirement Program). On the other hand, further economic austerities might provide an added incentive for the GRM to accelerate implementation of reforms to expedite the disbursement of funds.

Economic conditions can also interact with political issues. For example, deteriorating economic conditions could make a reduction in the rate of Civil Service hiring (an EPRP/Mali policy reform) politically unacceptable on the grounds that this could lead to social unrest among the educated young who had expected government employment. Alternatively, in light of declining revenues and a growing inability to meet recurrent costs, the GRM might have to radically curtail hiring beyond the levels encouraged by EPRP out of sheer necessity. Failure to take cost-cutting actions of this sort would only exacerbate Mali's current fiscal crisis. The appearance of ineptness in managing the country's financial affairs could have serious political consequences for the government. In short, the interaction of economic and political factors could affect EPRP in any number of ways.

Similar scenarios could be developed for other policy reform

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programs. Therefore, an important function of joint reviews is to assess the contextual factors impinging on the program. Two questions should be addressed. First, if the host country has not fully met conditions for disbursement, the joint review committee should determine to what extent this has resulted from external factors which are largely uncontrollable and often unpredictable. If that is the case, then the committee must decide whether reforms which have been enacted are sufficient for disbursement given the new context in which the program is now being implemented. Second, the committee needs to determine whether modifications in future disbursement conditions are required. This could take the form of weakening certain conditions or delaying actions until later in the program.

Macro-economic data, national accounts data and sector specific data should be sufficient for making this assessment. Additional data pertaining to contextual factors should be available from the World Bank, IMF or U.N. agencies. The USAID program economist should be able to provide much of the necessary information. (In fact, the program economist should be part of the USAID representation on the joint review committees.) If it is determined that contextual factors are impeding the program and modifications in conditions are needed to continue implementation, a written justification for this decision supported by available data should be produced.

3.4 Achievement of Program Objectives: Impact of Policy Reforms and Private Sector Response

SUMMARY: In general, most policy reform programs are designed to reduce government control over market operations, decrease the costs of public sector operations while increasing their economic efficiency, and stimulate private sector development. Monitoring program implementation should generate information concerning the first two objectives. Additional information will be needed on the private sector's response to reform measures. In many cases, this will require special evaluation studies conducted during the latter stages of the program. This section describes a range of studies, varying in complexity according to program resources and other constraints. In general, the studies should examine whether the business community has reacted to the reform program as expected; if not, why; and whether private sector development is likely to result from the reform measures as enacted. An important additional use of the studies is to provide information for planning subsequent policy reform or private sector development activities.

Information concerning the effectiveness of policy reforms to achieve overall program objectives will be needed for program evaluation. In general, most AID funded policy reform programs

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will have, in one form or another, the objective of establishing conditions conducive to more rapid economic growth. Typically, this will involve reducing the role of government (or at least making it more efficient) and encouraging private sector development. Information concerning the effects of reforms on the public sector should result from monitoring improvements in the performance of public institutions (section 3.2) and, to a lesser extent, by compliance data (section 3.1). Additional information is needed about the achievement of objectives concerning the private sector and any special programs established in conjunction with reform measures.

For the majority of cases, assessing the impact of reform measures on the private sector (or the private sector's response to reforms) will be limited to the short-term effects of the program. (See section 4. for a more detailed discussion of the limitations of evaluating policy reform impact.) Evaluation studies will be needed to generate this type of information. The studies might require a survey to collect new data or a re-analysis of data generated for other monitoring and evaluation activities. Proper timing of the studies will be very important. Reform measures must have been in place long enough to have had an effect. Similarly, special sub-programs established to advance or support major reform objectives (e.g., EPRP/Mali's Early Retirement Program) must have been in operation long enough to have produced a "track record" to study. On the other hand, the studies should be completed prior to program completion to inform managers about achievement of overall objectives.

Though mounting yet more studies appears burdensome, examining the degree to which broad program objectives have been achieved serves two important purposes. First, the evaluation studies should capture general "lessons learned" about the program so that this experience is not lost to the Agency. Second, the ongoing program provides a convenient mechanism for funding studies which can produce information useful to the host country and the USAID mission for the design of follow-on programs.

Special evaluation studies do not have to be elaborate, expensive affairs. Rather, the scope of the study can be adjusted to fit the information requirements, budget, time-frame and other constraints of the program. To clarify the types of studies which might be required by a policy reform program, several examples proposed for ASDG/Niger and EPRP/Mali to assess private sector response to reform measures and the performance of a special program which advances policy reform objectives are briefly described.

3.4.1 Private Sector Response to Policy Reforms

A) ASDG/Niger

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The overall objective of ASDG/Niger is to reduce inefficiencies in the agriculture sector resulting from unnecessary government controls and poorly managed agricultural parastatals. Policy reforms, therefore, are intended to promote free market operations and development of the private sector. Direct cost-savings for the government will result from reducing the subsidy program on agricultural inputs and by increasing the efficiency of agricultural parastatals and/or re-organizing them as cooperatives. It is assumed that as the role of government is reduced, the private sector will expand by taking over activities the government previously performed, or by engaging in activities from which they were largely excluded. By increasing the supply of agricultural inputs and reducing government control over cereal marketing, the reforms are expected to ultimately benefit small farmers.

Without being overly pessimistic, it is reasonable to anticipate some difference between what is expected to happen in theory and what actually happens in practice. Moreover, there could be unpredicted adverse effects of the reforms particularly for small farmers. At the very least, information about the key assumptions concerning a) the business community's response, and b) the effects of reforms on small farmers should be obtained. The information plan for ASDG/Niger recommends that two small scale studies be conducted in these two areas.

As government subsidies on agricultural inputs are reduced and private dealers supply a greater proportion of inputs to farmers, the price of delivered inputs will increase. If those increases are too large, they could lead to a reduction in use of agricultural inputs. This will probably not occur immediately, but after two or three subsidy reductions, the effects of price increases on input use should be assessed. Initially, ASDG program management staff (i.e., long-term technical advisors and their Nigerien counterparts) should conduct informal surveys at local markets with input suppliers and farmers to determine whether price increases have been significant and whether those increases have become a disincentive to input use. Depending on the results of these informal interviews, a more systematic study of input supply businesses might be required. A complete listing of all input dealers will be needed to draw a sample. The purpose of the study would be to determine whether the private sector responded to policy reforms as anticipated, whether there is sufficient competition in the input supply market, and what effect subsidy reductions and price increases have had on input use by small farmers.

B) EPRP/Mali

The information plan for EPRP/Mali recommends conducting two studies to assess the business community's response to the

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enactment of a new commercial code and tax reform measures.

The new commercial code is expected to simplify the registration of businesses by reducing costs and time requirements. Previous restrictions on establishing new businesses (e.g., former employees are no longer barred from starting businesses identical to their former employer's) will be removed. Lower tax rates might also encourage the opening of new businesses. Given EPRP's objective of stimulating private sector development, a study of new businesses should be conducted.

The study should examine the motivation of new proprietors for establishing their businesses to determine to what extent EPRP policy reforms were a contributing factor. If the reform measures did not influence their decisions, this might indicate the need for a more concerted effort on the part of the GRM to explain the new commercial code, or to consider additional reform measures. The study would also verify whether the registration system has been satisfactorily streamlined under the new commercial code. A sample of new businesses could be drawn from registration records. Data could be collected on knowledge about EPRP reforms, business size, labor requirements, capital investment, credit availability and other pertinent factors effecting business operations and the potential for expansion. In addition to assessing the effectiveness of policy reforms to stimulate private sector development, the study should also provide useful information about additional interventions that could be made to further encourage the establishment of new businesses.

EPRP will also support a package of tax reforms. The tax system had been confiscatory in nature; consequently, many avoided paying taxes. The reforms should structure the system so that the tax burden is borne more equitably across the population. It is expected that compliance with tax laws should increase as reforms are enacted. Combined with the new commercial code, EPRP reforms could have a relatively direct and immediate effect on the private sector. On the other hand, the business community might not trust the GRM's commitment to maintaining the reforms. (In fact, there is a precedent for this mistrust.) Consequently, business proprietors might be reluctant to act solely on the basis of the reforms. To gain additional insight into the effectiveness of the reform measures, a study of private sector response and expectations was proposed for evaluating EPRP and designing a follow-on program.

The study would be based on a representative sample of businesses located in the major towns of Mali. The focus of the study would be the communication between the government and the business community and the response of the latter to the reforms. The new tax laws and the new commercial code make fundamental changes in the economic system. The changes, in turn, are designed to

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encourage the private sector to take actions which were previously forbidden or heavily regulated. Clearly, the business community must understand the reforms if they are to respond accordingly. Therefore, the government will mount a mass media campaign to explain EPRP reforms. The study should examine the success of this campaign - i.e., do the business operators understand the reforms and what actions have they taken in response. Additional data would be collected on their current operations, what changes in operations have been made since the enact of EPRP reforms (e.g., expansion into new areas, additional employment, increased capital investment) and other factors effecting business expansion.

3.4.2 Special Programs Established to Advance Policy Reform Objectives

An Early Retirement Program will established during EPRP/Mali as a pilot activity to test whether civil servants can be induced to retire from government voluntarily. The obvious effect of voluntary early retirement would be cost-savings for the government, an EPRP policy objective. If successful, the program could have considerable utility for the GRM for reducing the size of the civil service while minimizing the adverse effects of forced reductions in staff. Because the program could be expanded after EPRP is finished, it is important to evaluate its performance to determine how it has worked and what improvements are needed.

The information plan for EPRP proposes that a study of the Early Retirement Program be conducted during the last year of EPRP. The study would build on the review of initial implementation of the program to be conducted by EPRP management staff. The operation of the program and its utility for those selected should be the principal topics to be examined. A follow-up survey based on a sample of program participants will be needed. A descriptive study of their experience would be useful - e.g., the types of businesses they started, other sources of employment, common problems participants encountered, etc. Data from the participants' application to the program could be compared to survey results. For example, it would be useful to compare initial employment plans cited in the application to their actual employment after retirement. The level of financial compensation as well as funds for establishing a new business after retirement will be determined by the individual's grade ranking. It is important, therefore, to determine whether the compensation and assistance offered by the program were sufficient. A comparison of success rates among the three grades of civil servants retired through the program would offer insight into this question.

3.4.3 Data Collection Methods

The studies proposed for ASDG/Niger and EPRP/Mali illustrate the

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range of applied research methodologies which could be employed to obtain information about achievement of program objectives. The least complicated studies are those conducted to assess the implementation of a specific program activity, such as the initial review of EPRP/Mali's Early Retirement Program after one year of implementation. Typically, this can be performed by the program management staff without outside assistance.

The study of private sector dealers of agricultural inputs and the potential effects of price increases on the use of inputs by small farmers could be based primarily on informal interviews and rapid reconnaissance techniques. If this initial exploratory effort identifies problems which require more extensive study, then more systematic methods of data collection might be needed.

Small scale surveys based on a representative sample of participants in the EPRP/Mali Early Retirement Program exemplifies the type of operational studies appropriate for many policy reform programs. Such studies are not particularly complicated and should be relatively inexpensive, ranging from $10,000 to $20,000 depending on the amount of outside technical assistance required.

The new enterprise study proposed for EPRP/Mali illustrates a somewhat more complicated research effort because it require substantive understanding of private sector development in the host country in addition to methodological skills. A study of that type could cost $25,000 or more.

The study of private sector response to EPRP policy reforms, specifically the new tax system and the new commercial code, would require substantial methodological skills to properly design the study. A research methodologist working with a specialist in private sector development might be needed. Costs for a study based on statistically representative data covering the major urban areas of the country could easily cost $100,000 or more.

What should be recognized, however, is the scope of any of these studies could be either expanded or reduced to accommodate the special information requirements of the program or resource and time limitations. For example, the private sector study for EPRP could be simplified by limiting the sample to just the Bamako area and restricting the sample to businesses with gross profits above a certain level. Similarly, if exploratory work revealed that input use had decreased substantially following reductions in subsidies, ASDG/Niger might need to expand its study of the problem to obtain a more accurate assessment of the situation. In short, the studies needed by policy reform programs are not restricted to any one size or scale, but rather, they can be adjusted to the needs and resources of program management.

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Some Observations on
Rapid Rural Appraisal Systems

(from IDS/University of Sussex Conferences, Oct./Dec. 1979)

1) Rural appraisal can be made much more rapid if its objectives are absolutely clear, and if only the minimum amount of data required to achieve these objectives is collected.

2) Maximizing the use of local researchers is desirable, both to reduce the survey cost, to avoid linguistic or cultural misunderstandings, and to increase local commitment by maintaining continuity through the stages of appraisal; project formulation and implementation.

3) Keeping the sample as small as possible, using purposive selection to ensure coverage of the major variables and minimizing dependence on untrained investigators, is likely to reduce non-sampling errors and to achieve as reliable a result in the hands of a skilled researcher as a more extensive survey based on statistically acceptable sampling.

4) In collecting quantitative data existing published sources should be fully utilized, supplemented by selective data collection through simple questionnaires.

5). Attitudinal or qualitative information is best collected by the guided interview technique, cross-checking responses by asking the same question of groups and individuals in different situations, and by posing the same question in different ways.

6) Training of researchers and careful supervision of their work until they gain sufficient experience is essential to raise the reliability of rapid rural appraisal.

7) Rapid rural appraisal by outsiders (not necessarily foreigners), catalysing more detailed surveys where needed by those on the spot, may be the best way of combining rapid methods with traditional ones.

The fact is, however, that neither the use of rapid appraisal methods for project preparation, nor the training of local researchers in the application of such techniques, is generally occurring. This seems to be largely because international funding agencies continue to demand feasibility studies of the length and depth of a doctoral thesis, to prove that the projects put up to them are viable.

Yet there is little evidence that such elaborate studies increase the chances of a project succeeding, nor that those commissioning the studies have critically appraised their value. It is difficult sometimes to avoid the conclusion that the funding agencies demand laborious data collection and sophisticated analysis more to perpetuate demand for the services of their appraisal missions, and to increase disbursement of their funds, than because such appraisal is really needed to ensure the project's success.

Some countries are becoming aware that donor or lending institutions need to get rid of their money as much as the receiving countries need to get hold of it. And some donor agencies are less demanding than others in the information and analysis they require of a 'bankable' project. But this is not the general trend. Only when developing countries collectively put their feet down to convince the donor agencies that simpler appraisal and analysis, skillfully carried out, does not necessarily reduce the chances of rural development projects succeeding, will quick, inexpensive and appropriate methods of rural appraisal and project formulation become generally acceptable.

Adapted from IDS materials by
Malcolm J. Odell, Jr.

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AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: Working Groups | **Date:** Thursday, June 5
Lead Instructors: Wigton, Hermann | **Session #:** 2
Co-Trainer(s): Core Staff | **Time:** 11:00-12:00 pm

==========

OBJECTIVE(S): At the end of this session participants will be able to:

- o Apply concepts and learnings from today's sessions to group and individual action plans for presentation on Friday

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ABSTRACT:

None.

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READINGS: Required/Optional

- o None.

AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: **Building Institutional Capacity for Agricultural Policy Analysis** **Date:** Thursday, June 5
Lead Instructor: Odell **Session #:** 3a
Co-Trainer(s): Hanrahan, Bateson **Time:** 2:00-3:30 pm

==========

OBJECTIVE(S): At the end of this session participants will be able to:

- o Assess AID's experience in implementing agricultural policy analysis and planning projects.
- o Identify institutional and organizational elements of policy analysis systems.
- o Identify strategies and tactics for linking policy analysts to decision-makers.

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ABSTRACT:

This session will identify the impediments to an effective implementation of agricultural policy changes within the institutional context of the host government and the need for approaches and techniques to promote effective implementation. The session will highlight donor and host country perspectives on policy dialogue, and several strategies and tactics that have successfully brought analysts and decision-makers together. Presentations will include:

* A review AID's worldwide experience in implementing agricultural policy analysis and planning projects. (Hanrahan)

* A case study on the Sudan which makes special reference to the problems of developing a feasible work plan, planning process, and methods for monitoring progress and identifying constraints in order to improve the management of agricultural planning. The issue of developing annual and long-term work plans based on the concept of a derived demand for improved intellectual, material and budgetary inputs to policy analysis will be explored. (Bateson)

* A case study of a major national agricultural reform program in Botswana that initially failed to meet its objectives, and the information-generation and policy dialogue process that was instituted to successfully develop modifications in and effective implementation of policy. (Odell)

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READINGS: Required/Optional

- o Agricultural Policy Analysis Project Brochure, Abt Associates. X /___
- o Tilney, John, Riordan, James, "Agricultural Policy Analysis and Planning: A Summary of Two Recent Analyses," Abt Associates Inc., Contract No. DAN-4084-C-00-3087-00, May 7, 1986. ___/ X
- o Bateson, William, "Sudan Case Study", Checchi and Company, 1986. X /___
- o Chambers, Robert, Rural Development: Putting the Last First, Chapter 8, Practical Action, London, Lagos, New York, 1983, pp. 190-217. ___/ X
- o Uphoff, Norman and VanDusen, Katy, "Local Institutional Development for Agriculture", Local Institutional Development Series No. 5, Cornell University, 1985. / X

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Notes on Botswana Case Study

Malcolm J. Odell,

A decade ago Botswana embarked on one of the most comprehensive programs of agricultural policy reform--one th: Government admitted would "change the life of every Motswana." The Tribal Grazing Land Policy described in Government's White Paper of July 1975 sought fundamental changes in land management throughout rural Botswan seeking to halt advancing land degredation on the fragile Kalahari grasslands in a country where cattle outnumber people by 3 to 1. Early efforts, under the policy, included agricultural planning and a range and livestock managem projects financed by AID which were to provide information and analysis to the policy implementation effort as wel to introduce new forms of range management in communal areas where the majority of the population live. The cas: study, described in the attached paper, outlines, first, the information gathering and policy dialogue system that we developed (most of them in spite of the Ag. Planning Project) and the major policy changes that followed, including : radically redesigned and remarkably successful Range and Livestock Management Project that played an important p in the development of a long term communal area planning and development strategy that continues today.

Some of the salient features of the information system that spearheaded the policy changes:

- (As Mellor indicated) Linking good policy with good information requires a balance between dong the best can now with the information we have available while building the base, the institutions we need for bet and better information and analysis
- Types of information: What makes good policy? Will it work?
- Types of Data: Economics: price and non-price incentives to producers; sanctions
  Non-Economics: existing institutions and their capacities
  decision-making, incl. attitudes, sources of opposition, potential linkages for success
- Timing: Need for timely responses, even on a daily and weekly basis
- Purposes: Hypothesis generation; seeking the unexpected; shooting at a moving target; non-sampling errors--seeking more insight than precision
- Tools: (Drawing on Market Research techniques)
  --one card, simplified quantative tools for key indicators (Egypt, Botswana, Petlin Hotel examples
  --Focus Groups, structuring discussions with groups of farmers to identify problems, prospects
  --"Sondeo" (Hildebrand/FSR) Multidisciplinary teams, non-specialists asking questions, speciali taking notes to gain broad perspective rapidly with adequate level of accuracy
  --Rapid Rural Appraisal; direct observation, structured steps to limit bias

Key elements promoting the policy Dialogue:

- information flow:
  1. Answering the question, "Who has access to the information? (Harry Wing)
  2. Self-Discovery--facilitating host country decision-makers and their institut to find the answers themselves rather than from outside experts
  3. Involvement at national and local levels--local decision-makers using data for their own planning purposes at the local level
  4. Accuracy based on local knowledge--principle that accurate information will f when local population knows that there is something in it for them
  5. Principles: Simple is Optimal, Optimal Ignorance, Proportional Accuracy (RR
  6. Identifying key issues, e.g., Equity, Adoption to improve resource management
- analyst/decision-maker workshops and seminar programs
- rolling planning processes with strengthened host-country information and analysis capacities interacting with decision-makers
- institutional analysis and action programs involving the applied social and management sciences--training host country academics in realities of bureaucracies
- using non-governmental organizations for implementation of pilot projects under government monitoring/evaluation programs
- decentralization support, participatory communication/systems with joint/informal R & D with local institutions and/or farmers--village/community-based information systems

Within this framework the Tribal Grazing Land Policy, as indicated by the Range and Livestock Management Project its two incarnations, was analyzed. Key problems identified were land degredation, overcrowding in communal area and a potential land graab. The policy, and RLMP 1, addressed this by promoting the move of large herd owners out t relatively underutilized areas and organizing group ranches in communal areas, supported by a massive nation-wic radio-learning group consultation campaign. Key elements in the evolution of the policy for communal areas:

1. The group ranching program initiated by the Government of Botswana and USAID sought to "establish socially acceptable and economically viable groups of smallholders to engage in improved agricultural production." The project brought in technical range and livestock management specialists to organize some 16 group ranches. After three years it was deemed a total failure.

2. The Government of Botswana, drawing heavily on rural sociology and development anthropology studies facilitated by the Senior Rural Sociologist within the Ag. Policy Project, asked AID for a new project--with an identical purpose--which called for group development, community organization, and applied social science specialists rather than technical ranching specialists. Key elements of the new strategy:

(a) Extension service was given overall responsibility for the group development effort, with the project's expatriate staff serving in training and consulting roles to build community organizing expertise among field staff, and local agricultural staff providing technical backstopping

(b) Simplified social science, market research, and RRA techniques were used to identify existing community and farmers' groups (based on traditional social relationships or common interests) rather than to organize new groups

(c) Financial resources were provided in the form of matching mini-grants for community-initiated projects

Result: Group and community projects multiplied faster than Government could monitor. Within three years over 1200 group projects were identified and the number increased monthly. One community that had sent away the first project team, claiming that the group ranch proposed was not suitable for it, had completed 12 agriculture projects and was planning a group ranch of its own innovative design. A national program of Communal First Development Areas supported by group development officers, a Commissioner of Agricultural Management Associations, and enabling legislation designed and drafted by the applied research team was implemented nationwide and forms the basis for new AID, Swedish, Norwegian, and World Bank investments today. A current controversy, fueled by Jack Anderson and leading environmental groups, has attacked the most recent World Bank livestock project in Botswana as bearing an unfortunate resemblance to the earlier Range and Livestock Management Project and for not having learned as many of the crucial policy development lessons outlined here as it should.

AGRICULTURAL POLICY ANALYSIS PROJECT

Under contract to the Agency for International Development, Bureau for Science and Technology, Office of Agriculture
Project Office 4250 Connecticut Avenue, N.W., Washington, D.C. 20008 • Telephone: (202) 362-2800

WORLDWIDE EXPERIENCE IN AGRICULTURAL POLICY

One of the major elements of AID's strategy in the food and agricultural sector is improving country agricultural policies. To this end, missions are being encouraged to foster constructive policy dialogues with host governments. The Agricultural Policy Analysis Project (APAP), sponsored by the Office of Agriculture, Bureau for Science and Technology, is a major vehicle for assisting missions in establishing policy dialogues with host country officials, building host-country capacity in policy analysis, and supporting policy reform. Now in its third year, APAP has built up a strong capability to assist missions in achieving these policy goals.

APAP FOCUS

The Agricultural Policy Analysis Project has expertise in working with missions in the following policy areas:

- **Developing agendas** for an informed mission-host country **dialogue on economic policies** constraining progress in agriculture.
- **Defining food aid strategies and programs** that foster and support economic policy reform measures.
- **Identifying input and output price reform** programs that stimulate agricultural production and productivity.
- **Fostering private sector participation** in input supply and product marketing and redefining the role of parastatal institutions.
- **Developing the indigenous capacity of host-country institutions** to provide the information needed to evaluate, formulate, and implement policies conducive to agricultural development.

TECHNICAL ASSISTANCE

The project provides several types of assistance to AID missions and host governments in support of the above:

- Technical assistance to identify and evaluate agricultural policy issues important to individual missions and host country governments, as well as issues common to groups of countries.
- Guidelines for analyzing agricultural policies and managing policy projects.
- A network linking decision makers in many countries as a way of sharing experience and important materials and reports.
- Longer term assistance, provided by core APAP personnel and a roster of agricultural policy experts, to identify and diagnose policy problems and to design appropriate policy reform responses.
- In-country workshops to stimulate policy dialogue between AID personnel and host-country decision makers and among representatives of different host-country institutions.

LONG-TERM COUNTRY RELATIONSHIPS

APAP seeks to develop long-term relationships similar to those it has had with Niger, Sri Lanka, Mauritania, and the Dominican Republic. These entail sustained cooperation with the missions and host governments. Through long-term relationships, project activities can be coordinated into an overall policy framework, developed in cooperation with in-country personnel. Although APAP continues to respond to urgent requests by the missions, long-term relationships reinforce the gains made and lessons learned from various technical assistance assignments.

Prime Contractor: **Abt Associates Inc.**, 55 Wheeler Street, Cambridge, Massachusetts 02138 • (617) 492-7100
Subcontractors: **Robert R. Nathan Associates, Inc.** 1301 Pennsylvania Avenue, N.W., Washington, D.C. 20004 • (202) 393-2700
Abel, Daft & Earley, 1339 Wisconsin Avenue, N.W., Washington, D.C. 20007 • (202) 342-7620
Oklahoma State University, Department of Agricultural Economics, Stillwater, Oklahoma 74078 • (405) 624-6157

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WORKSHOPS — A STRATEGY TO PROMOTE POLICY DIALOGUES

APAP uses three types of workshops as one means to stimulate AID-host country government policy dialogue—not only dialogue between AID missions and host-country governments but also among local analysts in different agencies and between the analysts and the policymakers they serve. In the **policymaker and advisor workshop,** participants discuss the economic policy issues of their country and the experiences of other countries in addressing those issues. The purpose is to encourage greater awareness of policy issues and the potential value of analysis. In the **economic policy systems workshop,** host-country analysts participate actively in the preparation and delivery of workshop papers on critical national policy issues. This workshop entails several weeks or months of U.S. training for the host-country analysts and multiple country visits by APAP personnel. The third type of workshop is a **tool-technique policy analysis workshop.** Its purpose is to help technicians gain a fairly rapid acquaintance with analytical techniques, concepts, microcomputers and other tools used in policy analysis.

HIGHLIGHTS OF APAP EXPERIENCE

The following country highlights illustrate APAP's substantive and geographic experience:

Africa

- **Mauritania** — The multi-year PL-480 agreement with Mauritania in 1983 committed the Government to bringing basic grain prices to import-parity levels. APAP has aided this process by determining the most adequate course and speed of price changes on production and consumption. The APAP team recommended that to minimize the disincentive effects on local production, the timing and level of food aid distributions should be used as a tool to stimulate the domestic grain markets.
- **Senegal** — APAP helped the Mission frame its agriculture support strategy through an extensive assessment of the country's agricultural sector and government policies. The assessment analyzed (1) the performance of Senegal's production system, (2) the links of the agricultural system to the rest of the economy, (3) physical and institutional constraints on productivity increases, and (4) a general set of incentives aimed at production and structural change in the agricultural sector. The assessment developed policy-level recommendations for discussion between the Government and AID and contributed to the agricultural component of the Mission's Country Development Strategy Statement (CDSS).
- **Niger** — AID is supporting the Government of Niger in its commitment to phase out input subsidies, adopt free-market pricing of cereals, and privatize the input market. APAP contributed to the definition of the analytical and institutional issues regarding subsidy levels and liberalizing the agricultural sector. It also designed a system for monitoring the progress of the overall program of sectoral reforms and provided technical assistance to speed project start-up.
- **Liberia** — APAP assisted the Ministry of Agriculture in an examination of the linkages between domestic rice-pricing policy, commercial rice imports and the PL-480 program. Several Liberian analysts received training in the U.S. and returned to Liberia to present papers on these topics at an economic policy systems workshop. The workshop, attended by senior policymakers from ministries and parastatals, focused on policy alternatives to the pursuit of rice self-sufficiency.

Selected APAP assistance to other missions in the region includes:

- **Malawi** — Policy component of the Mission's CDSS.
- **Madagascar** — Seminar on policy issues.
- **Zaire** — Project to improve the analysis of agricultural statistics.

Asia and the Near East

- **Bangladesh** — The Mission required a package of programs and policy reforms to support negotiation of a new PL-480 Title III agreement with Bangladesh. An APAP team reviewed the major policies and programs aimed at providing producer incentives, as well as those focused on food consumption. APAP recommended a program of reforms to balance the conflicting needs of protecting poor consumers and increasing farm incomes and agricultural productivity.
- **Sri Lanka** — The Government requested USAID assistance in its efforts to define a new development strategy for its agricultural sector. APAP helped the Ministry of Finance and Planning in formulating this strategy, which was based on inter-ministerial cooperation. The strategy called for major re-orientation in agricultural policies, development approaches, and investment priorities.
- **Egypt** — APAP helped examine policy constraints (including pricing policy, import restrictions and limitations on access to credit) to expanded private sector activity in input supply. A package of policy reforms to promote the transition from the current input supply system implemented by the Principal Bank for Development and Agricultural Credit to private firms has been recommended. The analysis also explored alternative approaches to implementing the reforms so as not to undermine the viability of the bank's credit operations.

Selected APAP assistance to other missions in the region includes:

- **Thailand** — Evaluation of Thai Government agricultural policy project.
- **Pakistan** — Aided in the establishment of a network of economic analysts within the Government.

Latin America and the Caribbean

- **El Salvador** — The Mission sought help in identifying the critical issues for its policy dialogue with the new government. APAP responded with a methodology that inventoried and assessed policies according to their impact on the agricultural sector. The inventory included fiscal, monetary and trade policies as well as sector policies related to (1) agricultural marketing, (2) allocation and pricing of production inputs, (3) production incentives and controls, and (4) consumer policies.
- **Panama** — APAP helped the Mission and the Government identify avenues for private sector involvement in agricultural development and planning. APAP also helped define the structure of a special policy analysis unit within the Government, which included representatives of producer groups. The implementation of that unit will help develop and strengthen the level and quality of private sector participation in agricultural policy formation.
- **Dominican Republic** — For over two years, APAP has provided the mission with periodic assistance that has included (1) an analysis of the effect of U.S. duty-free imports of beef and sugar on domestic production and consumption, (2) advice on price policy reform and the creation of a policy analysis unit to provide essential information on the ramifications of alternative policies, and (3) a workshop on analytical techniques.

Selected APAP assistance to other missions in the region includes:

- **Peru** — Design of a research methodology for trade and pricing policy issues.
- **Ecuador** — Development of a Government agricultural planning project.
- **Bolivia** — Formation of a policy analysis unit.

PUBLICATIONS

A list of publications from APAP is now available. Publications include policy analysis guidelines, a manual for AID Agricultural and Rural Development Officers, staff papers on selected agricultural policy issues and a comparative evaluation of AID-financed planning and policy analysis projects.

INFORMATION

To obtain more information or arrange for project assistance, contact:

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APAP Staff Papers

AGRICULTURAL POLICY
ANALYSIS AND PLANNING:

A SUMMARY OF TWO RECENT ANALYSES

May 7, 1986

Authors: John S. Tilney, Jr.
Dr. James T. Riordan

AGRICULTURAL POLICY ANALYSIS PROJECT

Sponsored by the

U.S. Agency for International Development

Assisting AID Missions and Developing Country Governments
to Improve Food and Agricultural Policies

Prime Contractor: Abt Associates Inc

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AAI #86-25

AGRICULTURAL POLICY
ANALYSIS AND PLANNING:

A SUMMARY OF TWO RECENT ANALYSES

May 7, 1986

Authors: John S. Tilney, Jr.
Dr. James T. Riordan

Submitted to:

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FOREWORD

This publication is one of a series of staff papers that are part of the continuing effort of the Agricultural Policy Analysis Project (APAP), sponsored by the Office of Agriculture in AID's Bureau of Science and Technology, to disseminate the experience it has been accumulating in the area of agricultural policy analysis. Through interaction with policy makers, country analysts, and AID missions in Africa, Latin America and the Caribbean, the Near East, and Asia, APAP has identified and concentrated its technical resources on the following themes:

- Developing agendas for an informal mission-host country dialogue on economic policies constraining progress in agriculture.
- Defining food aid strategies and programs that foster and support.
- Identifying input and output price reform programs that stimulate agricultural production and productivity.
- Fostering private sector participation in input supply and product marketing and redefining the role of parastatal institutions.
- Developing the indigenous capacity of host country institutions to provide the information needed to analyze, formulate, and implement policies conducive to agricultural development.

This paper reviews, in summary form, AID's worldwide experience in supporting agricultural policy and planning projects. It presents preliminary findings of two studies; a comprehensive comparative analysis of AID's agricultural policy projects that APAP has in progress, and a completed evaluation of similar policy projects in Latin America. The authors conclude that while AID has had considerable success in building capacity to analyze policy issues in host-country governments, it has had less success with these projects in fostering policy reform.

We hope that this and forthcoming APAP Staff Papers in the series will provide useful information and analysis to all those involved in the continuing agricultural policy dialogue between AID and host country governments. We welcome comments, criticism, questions, and suggestions from our readers.

ABSTRACT

This paper summarizes the findings of two studies that reviewed 129 AID-sponsored agricultural policy and planning projects carried out since 1970, ranging from three-week studies to multiyear sector assessments, in Africa, Asia, the Near East, and Latin America and the Caribbean. Impact analysis of 61 of the projects revealed that in a narrow sense the projects were successful in achieving their purpose, which was primarily to improve the analytical capacity of host country personnel. Less common were projects that had an impact on policy reform or that yielded programmatic change that increased the awareness of decision makers about the importance of analysis and changes in policy. A three-pronged diagnostic approach for future project design is recommended that includes (1) a consideration of the agricultural sector and the policies that constrain sector development, (2) a review of what key decision makers want and need, and (3) an examination of the capacity of host-country governments to engage in policy analysis and planning.

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I. SUMMARY AND CONCLUSIONS

Over the past 20 years, the Agency for International Development (AID) has funded a broad range of agricultural policy and planning projects worldwide. The agency has supported many types of activities, including development of agricultural sector data bases, creation of planning units within government, training of host country staff in policy analysis, and implementation of policy and programmatic changes.

This paper synthesizes the findings of two recent studies which reviewed AID-sponsored agricultural policy and planning projects worldwide over the past 15 years. The first was the final report of a study[1] which examined the impacts and effectiveness of AID-sponsored agricultural planning projects in Latin America and the Caribbean region. The second was an interim report[2] of a study which examined agricultural planning and policy analysis projects in Africa, Asia, and the Near East since 1970. The results of the interim report are included here because the final report is not yet complete, but the interim report did produce a number of valuable findings concerning projects undertaken in these three regions. The two studies used essentially the same methodology and therefore provide a consistent way of examining the effectiveness and impacts of AID-sponsored projects worldwide.

The intent of these studies has been to glean information from past projects that will help in the design of better agricultural policy and planning projects. This paper summarizes the results of these two studies so that the findings can be widely disseminated to professionals involved in the agricultural policy and planning arena.

The major conclusion of the analysis is that, in a narrow sense, the agricultural policy analysis and planning projects sponsored by AID during the 1970s and early 1980s successfully achieved their primary purpose, which was

[1] Abt Associates Inc. Evaluation of Agricultural Sector Planning Activities in Latin America and the Caribbean, June 1982

[2] Agricultural Policy Analysis and Planning Project, A Comparative Analysis of Agricultural Policy and Planning Projects in Africa, Asia and the Near-East, October 15, 1984.

to improve the analytical capacity of staff in host country governments. The projects were less successful, however, in triggering policy and programmatic change. Policy issues were often not given sufficient emphasis in project design and subsequently downplayed during project implementation.

If AID is to have its support contribute more directly to policy reform and programmatic change, it appears that its approach to, and design of, policy analysis and planning projects needs to be modified. First, there needs to be more diagnosis of what the major problems of the agricultural sector are and what policies constrain development. The diagnosis needs to be done prior to, or as part of, project design so that the projects can be more specific about what policy issues need to and can be addressed. Secondly, far greater attention should be given to the needs of host country decision makers. Without this support and active participation, experience suggests there is little reason to initiate a project. Finally, the strategy for targeting assistance to host country governments needs to be re-examined. Assistance should be targeted to those government units which decision makers rely on for policy analysis; these units may be located outside the Ministry of Agriculture.

More specific recommendations are enclosed in the body of this report for the design of future AID-sponsored agricultural policy and planning projects. It is encouraging to note that some of the recommendations which are made in this report concerning AID projects implemented in the 1970s and early 1980s have been incorporated into a new group of projects which AID designed in the mid-1980s and is currently implementing in countries such as Niger, Ecuador, and the Philippines. It will be interesting to observe what these new projects accomplish in the years to come.

II. PROCEDURES FOLLOWED IN THE ANALYSIS AND A DESCRIPTION OF PROJECTS

Procedures followed in the Analysis

Although AID has conducted numerous evaluations of individual projects, relatively little attention has been paid to assessing the overall impact of agricultural policy and planning assistance. The two studies summarized here are an exception because, in the aggregate, they compare and contrast the results of AID-sponsored agricultural planning and policy analysis projects across all four regions of the world. These studies also focus on the impacts of AID-sponsored projects, and the reasons why certain projects have achieved greater impacts than others.

The studies identify four different kinds of impacts that agricultural policy analysis and planning activities can have. The four kinds of impacts are capacity-building impacts (that is, impacts on the capacity of institutions to conduct policy analysis and planning and to provide input to policy making effectively), interinstitutional impacts (that is, impacts of policy analysis and planning institutions on other public or private sector institutions), decisionmaker impacts (that is, impacts on the awareness, of or demand by, decisionmakers for policy analysis and planning), policy and program impacts (that is, impacts on policy and programmatic decisions).[1] In these studies, the effectiveness of agricultural policy analysis and planning activities is assessed according to the impacts that have resulted from them.

The Agency for International Development's own project evaluations were used to identify these different types of impacts, and in the Latin American study a series of site visits and case studies were used to expand upon the information available in AID evaluations. The Africa, Asia, and Near East study has not yet had the benefit of such site visits and case studies, but these will take place in the future.

[1] In the Africa, Asia, and Near-East study, the socio-economic impacts of policy analysis and planning projects were also examined. This type of impact was not considered in the LAC study, however, and so it has not been included here for the sake of consistency.

These studies attempted to review all agricultural policy and planning projects funded by AID since 1970 or other types of AID-sponsored projects which had had a major policy or planning component. A list of all of the projects included in the two studies is shown in Appendix A. Even though most of the policy analysis and planning projects sponsored by AID were identified, only about half of these projects had been evaluated by them. Thus, the impact analysis considered only those projects which had been evaluated. It is entirely possible that the additional projects had different types of impacts, but the sample was sufficiently large that the major findings are applicable to the universe of policy and planning projects. The type of information available on each of the projects is also shown in Appendix A.

A Description of AID-Supported Agricultural Policy Analysis and Planning Projects in Africa, Asia, Latin America and Caribbean, and the Near East

The intent of these studies has been to review the experience of all AID funded agricultural policy analysis and planning projects in Africa, Asia, Latin America and Caribbean, and the Near East since 1970. In Latin America and the Caribbean Regions (LAC), 63 policy analysis and planning activities were identified, while in Africa, Asia, and the Near East, 66 projects[1] were identified from available documentation. The reason that the LAC region had such a relatively large number is that 23 small planning or policy activities which were not formal projects were included, while this type of activity was excluded from the Africa, Asia and Near East study because of the difficulty of obtaining good documentation.

The 129 projects and activities represent assistance to 47 countries worldwide. In Africa 18 countries received assistance compared with 9 in Asia, 16 in Latin America and the Caribbean, and 5 countries in the Near East. Ten of the projects are regional in scope -- 3 in Africa and 7 in Latin America and the Caribbean.

The amount of funds which has been allocated to agricultural policy and planning since 1970 amounts to $464 million, as shown in Exhibit 1. This sum

[1] These were the projects included in the Interim Report. It is anticipated that the Final Report will have a somewhat modified list of projects.

Exhibit 1

FUNDING OF AGRICULTURAL
POLICY AND PLANNING ACTIVITIES

Region	Number of Projects and Activities	Funding in $000s				
		AID GRANT	AID LOAN	HOST COUNTRY	OTHER	TOTAL
Africa[1]	40	$121,193	$ 5,400	$ 41,493	$15,275	$183,361
Asia[1]	16	32,850	16,000	65,189	5,684	119,723
Latin America and Caribbean[2]	63	29,986	19,528	38,106	6,011	93,631
Near East[1]	5	52,837	0	11,429	3,606	67,872
TOTAL	124	$236,866	$40,928	$156,217	$30,576	$464,587

[1] In Africa, Asia, and the Near East, funding information was available for only 61 of the 66 projects.

[2] The LAC Region contains 23 small policy analysis and planning activities which were not formal AID Projects. The funding for the LAC Region is from 1970-82, while the funding in the other regions is from 1970-84. Thus, the LAC would be higher if the additional two years were included.

does not include amounts spent on activities other than agricultural planning and policy analysis, such as inputs of commodities or sector loans which were incorporated in some of the projects. It should be noted that we used a broad definition of policy and planning projects and included activities such as data collection, survey implementation and training, which are part of the policy analysis and planning process. This is the reason for the large amount of total funds spent on these activities. AID's contribution has amounted to $277.8 million, or approximately 60 percent of the total, most of which has been grants. The total amount allocated to policy analysis and planning has been greatest in Africa ($183 million), followed by Asia ($119 million), LAC ($93 million), and the Near East ($67 million). As this information indicates, AID, host countries, and other donors have made a sizeable investment in agricultural policy and planning since 1970.

III. PROJECT GOALS, PURPOSES AND IMPACTS

Project Goals and Purposes

It is useful to review the goals and purposes in the logical framework of AID-sponsored policy and planning projects. Project goals tended to be general and called for overall improvement in agricultural sector performance and improvement in the life of rural people. Goals were highly consistent across projects.

Project purposes were more concrete and defined the substance of projects in more detail. Analysis of project purposes revealed several generalizations applicable to the entire set of policy analysis and planning projects. In the first place, most projects had capacity building as an objective. Second, most projects included training of host country personnel as a major purpose. Third, few projects were designed specifically to analyze and bring about changes in defined areas of agricultural policy. Policy analysis and policy reforms were rarely identified as key project purposes.

Impacts of AID-Sponsored Policy Analysis and Planning Projects

AID-sponsored agricultural policy analysis and planning projects have had a substantial impact on the capacity of host country governments to engage in policy analysis and planning. In fact, capacity-building impacts were, by far, the most prevalent. Fully 58 of the 61 projects[1] (see Exhibit 2) have had capacity-building impacts. Capacity impacts usually resulted from the formation of a new policy analysis or planning unit, the addition of new qualified staff to existing units, or the upgrading of staff in existing units through long-term training. In Liberia, for instance, the Agricultural Program Development Project resulted in the formation of a Statistical Division and a Planning Bureau in the Ministry of Agriculture, while in Thailand the Agricultural Sector Analysis Project succeeded in establishing a unit which was able for the first time to apply economic analysis to policy problems in the agricultural sector. The presence of capacity impacts did not tend to vary by region. Given the purposes of most projects, it is not surprising that their major impact has been capacity building.

Interinstitutional impacts were observed in 64 percent of the projects reviewed (39 of 61 projects). These impacts have resulted from improved coordination between agricultural policy analysts and planners and their counterparts in other public sector agencies or private sector organizations. The major type of interinstitutional impact has been the establishment of interagency boards or commissions, which by their nature improve institutional coordination. In Indonesia, for example, the Assistance to Agriculture Project was responsible for the formation of an interdepartmental fertilizer management board, while in Honduras an Agricultural Policy Commission was established through an AID project and was able to promote common methodologies for policy analysis across institutions involved in the agricultural sector. Improved communications between units in government was also a frequently noted interinstitutional impact. In Tunisia, staff working on the Agricultural Economic Research and Planning Project were responsible for the first effective collaboration between the Ministry of Planning and the Ministry of Agriculture

[1] As mentioned on page 3, a total of 129 projects were identified, but only 61 of these had been evaluated, so this is the number of projects considered in the impact analysis.

Exhibit 2

DISTRIBUTION OF PROJECT IMPACTS BY REGION

IMPACTS	REGION									
	Africa		Asia		Latin America and Caribbean		Near East		Total	
	Number n=24	Percent	Number n=12	Percent	Number n=22	Percent	Number n=3	Percent	Number n=61	Percent
Policy-Program	6	25%	5	42%	9	41%	0	0%	20	33%
Decision maker	9	38%	6	50%	9	41%	0	0%	24	39%
Interinstitutional	10	42%	7	58%	20	91%	2	66%	39	64%
Capacity-Building	21	88%	12	100%	22	100%	3	100%	58	95%

on medium-term investment planning. *Interinstitutional* impacts were most frequent in LAC projects (91 percent) *followed* by the Near East (66 percent), Asia (58 percent), and Africa (42 percent).

Decisionmaker impacts were observed in 24 of the 61 projects (39 percent). Decisionmaker impacts have been quite varied, but the most prevalent has been *increased demand* for information and analysis by decisionmakers. The other relatively common impact has been the development of greater understanding by decisionmakers of the agricultural sector and its relationships with other sectors of the economy. In Kenya, the Rural Planning Project provided a great deal of information to key officials about the needs of small farmers, which eventually translated into the targeting of more *assistance* to this group in the country's Development Plan. *Similarly*, in Bangladesh the staff working on the Rural Finance *Experimental* Program provided key officials with information and insight *about* the agricultural credit system and possibilities for *revising their programs*. Asian projects have been slightly more *successful* than LAC and African projects in this regard; no decisionmaker impacts were observed in Near East projects.

Policy and program impacts were observed in 20 of the 61 projects (33 *percent*). Such impacts result when AID-sponsored projects contributed to actual changes in policies or programs. Some examples included changes in commodity pricing policies, credit policies, marketing policies, legislation on land redistribution, commodity distribution policies, and investment policies. In Indonesia, for instance, a flexible fertilizer pricing system and an expanded rice storage program were *established because* of work on the Assistance to Agriculture Project. In *Ghana*, the staff working on the National Agricultural Planning *Project* developed proposals for a National Fertilizer and *Seed Program* which were accepted and funded by the government. The regional distribution of policy and program impacts follows a pattern similar to those of of interinstitutional and decisionmaker impacts. In Asia and Latin America, policy and program impacts were observed in approximately 42 percent of the projects in question. In Africa and the Near East, the corresponding percentages are 22 and zero. It should be stressed, however, *that this* simple calculation does not account for the differences among the policy/programs impacts identified. As might be expected, some impacts were more dramatic than others.

The major conclusion of the impact analysis is that in a narrow sense the projects were successful in achieving their purposes, which dealt primarily with capacity building and training. Policy reform and programmatic change were not major purposes of the projects in question, so it is not surprising that these types of impacts were not as common as capacity-building impacts. The projects also had some impact on increasing the awareness of decisionmakers about the importance of analysis and changes in policy, but these were also considerably less frequent than capacity-building and interinstitutional impacts.

Another major conclusion has to do with regional differences in impacts. Projects in Asia and Latin America and the Caribbean have had substantially more policy/program and decisionmaker impacts than African and Near Eastern projects. The reason that the Near Eastern projects have had such little impact is quite straightforward. There were only three Near Eastern projects in our sample, and the projects in question focused on data gathering and analysis. They were not designed to result in decisionmaker or policy impacts. The relatively low level of policy impacts in Africa as compared with Asia and Latin America has three major explanations:

- Asian and LAC countries have placed greater emphasis on agriculture than African countries and have tended to provide more support to AID-sponsored projects.
- AID-sponsored projects in Africa have been more involved in basic institution building and less involved in actual policy analysis and implementation issues than projects in Asia and Latin America.
- The logistics of carrying out projects have been more difficult in Africa than in other regions.

These three reasons appear to account for most of the differences in performance between African, Asian, and LAC projects. This was to be expected given the limited manpower and institutional resources in Africa as compared with the other regions.

IV. LESSONS LEARNED AND SUGGESTIONS FOR FUTURE DESIGN

While it is important to understand the types of impacts AID-sponsored policy analysis and planning project have had, it is also critical to understand what factors have contributed to the relative effectiveness of these projects. As mentioned earlier, AID has funded a number of different types of activities under these projects, and these activities have somewhat different objectives and different reasons to explain their relative effectiveness. In this section, the three major activities undertaken as part of these projects -- policy analysis and planning, institution-building, and data collection and analysis -- are examined separately.

Policy Analysis and Planning Activities

Policy analysis and planning activities have been major components of these projects. These activities have ranged from multiyear sector assessments and modeling efforts to three-week studies undertaken by short-term advisors. While it is difficult to compare activities which are so different in scale, there are a number of conclusions which can be drawn overall:

- Real contact between analysts and decisionmakers needs to be established. In prior projects, there has been a general and pervasive lack of such contact. Institutionally, there appears to be little real demand for policy analysis and planning, that is, a demand that grows out of policy concerns and is formulated in specific terms. Analytical units often have no clear mandate as to what they are supposed to do and, as a consequence, operate in a vacuum. In the design and implementation of projects, major issues of concern to decisionmakers need to be identified and addressed. The approach to this is discussed in more detail below.
- Agricultural policy analysis and planning should generally concentrate on fast turn-around, highly focused, problem-oriented studies. Long-term data-intensive activities are wont to run into technical difficulties, become disengaged from pressing policy issues, and often cost far more than initially estimated. In general, policy analysis activities should be relatively short-term, that is, they should not take longer than a year. There is also a role for long-term developmental ef-

forts, but these projects need to produce findings on a periodic basis and engage in short-term analytical efforts as well.

- Flexibility is a critical ingredient. There have been a number of relatively open-ended projects designed to address key problems as they arise. Such projects have more often resulted in policy and programmatic change than tightly defined, highly structured projects. Flexibility can be built into a project by setting money aside for special activities and by providing mechanisms for project staff to identify and work on open-ended activities.

- The quality of the technical advisory team is critical to the success of a project. An advisory team heavily laden with dogma or preconceived ideas will quickly isolate themselves. The most effective teams have taken a low-keyed, hard working posture and have appeared to be working for key people in government -- not vice-versa. Identifying this type of technical advisory staff may be the single most important element of the project design and implementation process.

- It is necessary to free up technical advisory personnel from administrative demands on their time. In the case of expatriate advisors, it is generally unrealistic to expect a Chief of Party both to exert technical leadership and to serve as project manager without a capable on-site administrative assistant.

- Analytical methods need to be kept simple. In technology transfer activities, the absorptive capacity of host-country technicians must be kept clearly in mind. There is a real danger that esoteric techniques may never be used after AID support ceases. As a rule, therefore, keep it simple.

Institution-Building

Institution-building or capacity building have been prevalent activities in all of the projects examined. These activities have included support for the creation of new analytical units; training of host-country staff; and the provision of technical advisors for long and short term assistance to support host country institutions. A number of lessons have become apparent from the evaluation:

- Targeting of assistance is a critical ingredient for institution-building and will often explain whether a project results in impact on decisionmakers or policy and programs. Too often, project assistance has been targeted to isolated units which serve primarily a data collection and statistical function. Effective projects have targeted assistance to people in Ministries who can bring about change. The actual location tends to be less important than the organizational influence of the manager of the unit, the analytical capability of staff in the unit, and the level of interaction with decisionmakers.

- The policy agenda should be set jointly by decisionmakers and analysts. As mentioned above, there has been a pervasive lack of contact between decisionmakers and analysts. Workshops, seminars, or working meetings involving the Minister or Secretary are necessary to bridge the gap between analysts and decisionmakers. The most effective way to involve the decisionmakers, however, appears to be to produce a study whose findings they can use in the restructuring of policies and programs.

- Effective planning and policy analysis requires leadership and continuity of technically capable personnel. Host countries have problems in attracting and retaining qualified people. The payscale and opportunities for advancement are usually poor. Long-term overseas training has been demonstrated as an effective incentive to attract qualified candidates. Incentives to retain qualified staff also need to be built into projects, such as improvements to office space and equipment, the provision of housing and vehicles, and short-term training courses and seminars. If AID-sponsored projects can result in a small number of well-trained and dynamic host country staff, this is usually sufficient to make an effective policy analysis unit.

- The level of host country support will often determine the outcome of a project. When the host country government provided the type of support originally envisioned in terms of finances, staff, and facilities, the project was far more likely to be completed successfully and to have had impacts. This has several implications for the design and implementation of projects. Project designers need to be more realistic and careful about what support the country will actually provide on a project. If a country is unwilling or unable to provide the agreed upon support during the project, AID should consider either a major restructuring or termination of the project because it is unlikely that the project will achieve its purposes.

Data-Related Activities

The third major component of many projects was data-intensive activities. These included agricultural censuses, household and consumer surveys, production surveys, and the construction and use of other data bases on the sector. The main lessons learned concerning these activities are listed below:

- Data-related activities can support, but not trigger, analytical work. In many instances, the collection and maintenance of data has grown into a far larger and more expensive undertaking than anticipated and has often become a large isolated undertaking. Data activities should grow from, and be directly tied to, the requirements of a specific analysis or series of analyses.

- Inadequacy of existing data is not, in and of itself, a sufficient rationale for launching major new data collection initiatives. Analysts are wont to complain that data at their disposal are flawed and therefore unusable. In many instances, this can be a pretext for policy analysts and planners to sidestep their responsibility to perform analytical work. No data are ever perfect and, as a rule, much more can be done with what is at one's disposal than is generally the case.

- Agricultural policy and planning units should generally not have direct responsibility for data-related activities. It is important for agricultural sector analysts to have a say in what data are collected, but, on balance, it is probably preferable that the statistical and analytical functions of planning and policy analysis be assigned to distinct institutional units.

- Consistency checks should be built into all data collection and processing efforts. With the magnitude of some of the data sets developed, errors are highly likely to occur. If errors are not found and corrected before data are presented in statistical reports, the whole credibility of a statistical activity can be brought into question. As a consequence, explicit attention needs to be paid to data review and evaluation. Whenever possible, data should be carefully assessed through consistency tests, error analysis, sensitivity analysis, tracking tests, or, at a minimum, review by knowledgeable professionals. For survey data, secondary sources of data should be checked as a rough gauge of accuracy and reliability.

- Improved planning for computers is required. In many cases it appears that insufficient forethought and planning has gone into the use of computers. In computer-intensive activities, substantial up-front planning is generally required to guarantee an appropriate mix of hardware, software, and in-country support services at a reasonable cost.

An Approach to Future Project Design

The set of projects reviewed in these two studies have not, as a rule, had policy or program change as stated objectives. Consequently, it should not come as a surprise that the projects in question have had relatively little impact on policies and programs. They have, however, definitely contributed to the building of host country capacity for policy analysis and planning. Unfortunately, it is not at all clear that the creation of such capacity translates itself into constructive policy and program changes. This may be true in the long run, but experience indicates that the translation is far from automatic in the short run.

If AID is to have its support contribute more directly to policy reform and programmatic change, it appears that its approach to, and design of, policy analysis and planning projects needs to be modified. First, there needs to be more diagnosis of what the major problems of the agricultural sector are and what policies constrain sector development. The diagnosis needs to be done prior to, or as part of, project design so that projects can be more specific about what policy issues need to and can be addressed.

The second area of diagnosis which also needs far greater attention is the review of what key decisionmakers want and need. Decisionmakers will likely have their own ideas about what constrains the growth and productivity of the agricultural sector, and they will usually have more insight than expatriate advisors or USAID Mission staff about what policy areas are politically possible to address. This second area of diagnosis was referred to in the Latin America and Caribbean study as a demand baseline study.

The third area of diagnosis is to examine the capacity of host country governments to engage in policy analysis and planning. This review of capacity should seek to identify which analysts the decisionmakers rely on for in-

formation as well as to examine the training and number of staff in planning or analytical units. This review should be used to reveal those units or analysts that can effect change.

In more specific terms, the elements of this three-pronged diagnostic approach would include:

Elements Concerning the Agriculture Sector

- What has been the performance of the agricultural sector over the past one and five years?
- How has this compared to other countries of similar size and physical conditions?
- Have there a been major differences in performances among segments of the agricultural sector? What explains these differences?

Elements Concerning Agricultural Policies and Policymakers

- What are the major policies which affect the growth and productivity of the agricultural sector?
- Why were these policies instituted?
- Which policies have the potential for change over the next five years?
- Who are the major actors in the policy arena?
- In what kinds of activities do Ministry of Agriculture and other decisionmakers spend the bulk of their time?
- What other public sector institutions have influence?
- What are the key interest groups in the agricultural sector?
- What is the nature of the relationships that exist among the Ministry of Agriculture, the National Planning Office, and the Ministry of Finance?
- What institutional mechanisms come into play in decisions on what to fund and what not to fund?

Elements Concerning the Agricultural Sector Planning or Analytical Unit

- Which analytical units do decisionmakers rely upon for policy analysis?
- In what specific activities is the agricultural sector planning or policy analysis unit involved?
- What are the relative priorities of these different activities?
- Who defines what the agricultural sector planning or analysis unit does?
- How many people work in the unit?
- What are their qualifications?
- What role does the analytical unit play in the preparation of plans and the development of projects?
- How extensive are the contacts of the analytical unit with other institutions, in both the public and private sectors?

The objective of these questions is to provide a basis for making informed judgments as to the kinds of activities that can be expected to have the most impact in upcoming projects. This three-pronged diagnosis may be incorporated into the Country Development Strategy Statement (CDSS) as well as the background work for a project paper. The underlying premise is simply that the point of departure for designing future agricultural sector planning and policy analysis activities must be things as they are, not things as one might like them to be.

It should be stressed that this diagnosis is usually an involved and complicated process and may require adjustments to the project design process. In many cases, project designers come with definite preconceptions as to what the major elements of the project should be. The design process, therefore, is often marked by a search for evidence that will buttress the validity of preconceptions rather than by a search to identify the key elements that currently drive the planning and decision making enterprise. This is really a matter of degree, of course, but the tendency is still there. Meetings between a Minister of Agriculture and a project design team, for example, are

often a forum in which the Minister reacts to the team's ideas, rather than vice-versa. And when a team does make a conscious attempt to use these meetings to learn what makes the Minister "tick," it often feels frustrated by an inability to elicit more than generalities, at one extreme ("Our objectives are to increase production, increase incomes, and improve the distribution of income"), or, at the other extreme, to get much beyond what it considers to be picayune details ("We're having trouble in getting everyone to sign off on the release of the rice project equipment from customs").

The moral of the story, therefore, is that a diagnosis of concerns and problems generally can not be put together from a series of brief meetings between the design team and the Minister. The diagnosis takes time and often requires piecing together a variety of details to see the whole picture. Frequent contacts with agricultural sector planning and analytical units can be key to this process, but the guiding philosophy of the contacts should be different from what has often been the case in the past. Rather than viewing these contacts as a mechanism for identifying things that planners and analysts would like to do, project designers should rely on them more as a means of finding out what decisionmakers would like them to do.

This three-pronged approach to the design of policy analysis and planning projects is considered essential to the project design process and therefore has been highlighted separately. Not all of this work can be incorporated into the project design process all the time. It will also have to be undertaken as part of project implementation and background work for the Country Development Strategy Statements. In any case, this information needs to be considered in order for projects to be effectively designed and implemented in the future.

APPENDIX A

AGRICULTURAL POLICY AND PLANNING PROJECTS INCLUDED IN THE TWO STUDIES

Project[1,2]	Project Paper	Mid-term, Interim, or Special Evaluation	Final Evaluation
AFRICA			
Botswana			
1. Agricultural Planning (633-0067)	X	X	
Cameroon			
2. Agricultural Management and Planning (631-0008)	X	X	
Ethiopia			
3. Agricultural Advisory Services (663-0111)	X	X	
4. Agricultural Sector Planning (663-0172)	X	X	
5. Drought Recovery and Rehabilitation (663-0187)	X	X	
Gambia			
6. Mixed Farming and Resource Management (635-0203)	X	X	
Ghana			
7. National Agricultural Planning (641-0048)	X	X	
8. District Planning and Rural Development (641-0073)	X		X
Kenya			
9. Agricultural Planning (615-0133)	X	X	
10. Rural Planning (615-0162)	X	X	X
11. Rural Planning II (615-0189)	X	X	
12. Arid and Semi-Arid Land Development (615-0172)	X	X	
Lesotho			
13. Agricultural Sector Analysis (632-0064)	X	X	
14. Agricultural Planning (632-0218)	X	X	
Liberia			
15. Agricultural Program Development (669-0123)	X	X	X
16. Agricultural Cooperative Development (669-0127)	X	X	
17. Agricultural Sector Analysis and Planning (669-0137)	X	X	
18. YMCA Agricultural Training and Development (669-0141)	X		
Mali			
19. Livestock Sector I (668-0203)	X	X	
Mauritania			
20. Renewable Resources Management (682-0205)	X	X	
21. Rural Assessment and Manpower Survey (682-0211)	X		X
Niger			
22. Evaluation Assistance to Ministry of Planning (683-0229)	X		
23. Forestry and Land Use Planning (683-0230)	X		
24. Integrated Livestock Production (683-0242)	X		
25. Agricultural Production Support (683-0234)	X		
26. Cereals Research (683-0225)	X		
Rwanda			
27. Agricultural Survey and Analysis (696-0115)	X		

[1] In a number of instances, sector assessments or other activities (usually funded by the PDS mechanism) were included. These did not have project papers or evaluations, but all available documentation on these activities was obtained.
[2] Numbers in parentheses following each project title are the numbers AID has assigned to each project

Best Available Document

APPENDIX A (continued)

Project	Project Paper	Mid-term, Interim, or Special Evaluation	Final Evaluation
Senegal			
5. Casamance Regional Development (685-0205)	X	X	
7. Agricultural Research and Planning (685-0223)	X		
Sudan			
3. Agricultural Planning and Statistics (650-0047)	X		
1. Rural Development Planning (650-0012)	X		
2. *Southern Region Agricultural Development I* (650-0046)	X		
Tanzania			
3. Livestock Marketing Development (621-0122)	X	X	X
Upper Volta			
4. Grain Marketing Development (686-0243)	X		
5. Eastern REgion Food Production (686-0244)	X		
Zaire			
6. Agricultural Economic Development (660-0050)	X	X	X
7. Agricultural Sector Studies (660-0070)	X	X	
Zambia			
6. Agricultural Training, Planning, and Institutional Development (611-0075)	X	X	
RICAN REGIONAL PROJECT			
9. Gambia River Basin Development (625-0012)	X		
0. Niger River Development Planning (625-0915)	X		
1. Entente Food Production (626-0205)	X	X	
IA			
Bangladesh			
2. Agricultural Sector Assessment			
3. Rural Finance Experimental Project (388-0025)	X		X
Indonesia			
4. Assistance to Agricultural Planning (497-0189)	X	X	
5. Agricultural Development Planning and Administration (497-0625)	X		
Korea			
6. Rural Policy Plan and Development (489-0594)	X	X	
Laos			
7. Agricultural Development - Administration & Planning (439-0065)	X	X	
Nepal			
8. Strengthening Institutional Capacity (367-0144)	X		
9. Administration and Management (367-0101)	X		
0 Resource Conservation and Utilization (367-0132)	X	X	
Pakistan			
1 Agricultural Research (391-0296)	X	X	
2. Agricultural Inputs (391-0319)	X	X	

Appendix A (continued)

Project	Project Paper	Mid-term, Interim, or Special Evaluation	Final Evaluation
Philippines			
53. Small Farmers Income and Production (492-0259)	X		
54. Integrated Agricultural Production and Marketing (492-0302)	X	X	X
55. Agricultural Research (492-0280)	X	X	
56. *Agricultural Research II* (492-0286)	X	X	
Sri Lanka			
57. Agricultural Sector Assessment			
58. *Development Services and Training* (383-0044)	X	X	
Thailand			
59. Agricultural Planning (493-0317)	X		
60. *Rural Off-Farm Employment Assessment* (493-0506)	X		
61. Agricultural Sector Analysis (493-1004)	X	X	X
LATIN AMERICA			
Bolivia			
62. Basic Foods Production and Marketing (511-0451)	X	X	
63. Agriculture Sector Loan (511-0455)	X	X	X
64. Agriculture Sector *II (511-0465)*	X		
65. Rural Development Planning (511-0471)	X	X	
66. Farm Policy Study (511-0485)	X	X	
67. Departmental Development Corporations (511-0511)	X		
68. Agricultural Sector Assessment			
69. Southern Valleys Assessment			
Chile			
70. Agricultural Production Credit (513-0294)	X	X	
71. Agricultural Sector Assessment			
Columbia			
72. Colombian Agricultural Sector Analysis		X	
Costa Rica			
73. National Development Information System (515-0139)	X		
74. Agricultural Sector Assessment			
Dominican Republic			
75. Agricultural Sector Loan II (517-0116)	X		
76. Agricultural Sector Analysis Phase II (517-0117)	X	X	
77. National Employment Policy (517-0121)	X	X	
78. Agricultural Sector Analysis (598-0554)	X	X	X
79. Comprehensive Resource Inventory & Evaluation System (931-0236)	X	X	X
80. Agricultural Sector Assessment			
Ecuador			
81. REE Baseline Study			
El Salvador			
82 Development Planning (519-0166)	X		
83 Multi-Purpose Household Survey (519-0176)	X		
84. Reform and Policy Planning (519-0260)	X		
85. Rural Poor Survey (931-0236)			
86. Progress Indicators for the Rural Poor (931-0236)	X	X	
87. Agricultural Sector Assessment			

Exhibit A (continued)

Project	Project Paper	Mid-term, Interim, or Special Evaluation	Final Evaluation
Guatemala			
88. Small Farmer Development (520-0233)	X	X	
89. Integrated Area Development Studies (520-0249)	X	X	
90. Farm Policy Analysis			
Guyana			
91. Agriculture Sector Planning (504-0077)	X		
92. Agriculture Sector Assessment			
93. REE Baseline Study			
Haiti			
94. Agricultural Development Support II (521-0092)	X		
95. Agricultural Sector Assessment			
Honduras			
96. Agriculture Sector Program (522-0100)	X		X
97. Agriculture Sector II (522-0150)	X	X	
98. Agricultural Sector Assessment			
Jamaica			
99. National Planning (532-0039)	X	X	X
100. Agricultural Planning (532-0061)	X		
101. Agricultural Sector			
102. REE Baseline Study			
Nicaragua			
103. Agricultural Planning and Statistical Services (524-0105)	X		
104. Rural Development Sector Loan (524-0118)	X		
105. Agricultural Sector Assessment			
Panama			
106. Agricultural Sector Assessment			
Paraguay			
107. Agricultural Planning and Statistics (526-0104)	X	X	X
108. Agricultural Sector Assessment			
109. Small Farmer Survey			
Peru			
110. Integrated Regional Development (527-0178)	X		
111. Agricultural Research, Extension and Education (527-0192)	X		
112. ONERN -- Land Use Inventory Environmental Planning (527-0202)	X		
113. Iowa - Peru Program		X	X
114. REE Baseline Study			
Caribbean Regional			
115. Caribbean Institutional Development (538-0016)	X	X	
116. Caribbean Agricultural Planning (538-0033)	X		
117. Project Development Assistance (538-0042)	X		
118. Agricultural Development Survey			
ROCAP			
119. SIECA Institutional Assistance (596-0040)	X	X	X
120 Agricultural Research and Information Systems (596-0048)	X	X	
121. Agricultural Secretariat (596-0094)	X		
LAC Regional			
122. Agricultural Sector Analysis Support (598-0554)	X		

Appendix A (continued)

Project	Project Paper	Mid-term, Interim, or Special Evaluation	Final Evaluation
S&T/AGR/EPP			
123. Latin American Planning Network (931-0236)	X	X	
124. A Framework for Appropriate Agricultural Planning in LDCs			
NEAR EAST			
Egypt			
125. Agricultural Development System (263-0041)	X	X	
126. Data Collection and Analysis (263-0142)	X		
Jordan			
127. Agricultural Economics and Planning (278-0137)	X		
Tunisia			
128. Agricultural Economic Research and Planning (664-0237)	X	X	
Yemen			
129. Agricultural Development Support (279-0052)	X	X	

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SUDAN CASE STUDY
AGRICULTURAL PLANNING AND STATISTICS PROJECT

William Bateson
Checchi and Company

Background

The attached paper reports efforts to date to provide an over-arching framework for the formulation of annual and long-term work plans for the Agricultural Planning and Statistics Project (Sudan) in particular and the Planning and Agricultural Economics Administration (Ministry of Agriculture and Natural Resources, Sudan) in general.

The APS project was initiated almost four years ago. Implementation was uneven. The first agricultural statistician arrived in the summer of 1982; the final two members of a five-person team joined the project in the spring of 1984. The project has had three (USAID) project officers and will soon have its fourth. There was a generally favorable evaluation in the summer of 1985. USAID/Sudan is preparing the necessary documents to extend the project for a second four-year term.

The APS project was designed to enhance the capacity of the PAEA to collect accurate and timely agricultural statistics and to perform policy analysis for the Ministry of Agriculture. Although the PAEA had been part of the Ministry for some years, it was under-funded and ill-equipped to address its (implied) mandate. As a result, the Ministry was seldom able to speak with credibility in inter-ministerial policy discussions. Domestic wheat price policy was set by the Ministries of Finance and Commerce; investment allocations within the agricultural sector were made by the Ministry of Finance; cotton price policy was dominated by the concerned parastatals; etc.

Prior to the infusion of USAID technical and budgetary resources, the PAEA had little need for a formal work plan. With a limited market for its output and a severely limited budget, it did well to collect routine statistics and pass files for comments. In the face of declining real salaries and budgets for field work, work habits followed their inevitable course. As the project enters its final year, it has become apparent that a revitalized institution is possible and that continued USAID support is essential to that revitalization. There is competition for resources within the PAEA and a clear need to formalize annual and long-term work plans.

The attached document reflects our efforts to link a PAEA policy analysis agenda to budgetary and staff inputs in a way which is useful to the Sudanese project director, instructive to contractors, meaningful to expatriate and Sudanese staff, and helpful to the project monitoring activities of future USAID project officers. The framework is intended to be responsive to the needs of policymakers and to focus PAEA resources toward those needs through a malleable work planning process.

A FRAMEWORK FOR THE DEVELOPMENT OF

ANNUAL AND LONG TERM WORK PLANS

Introduction

The development of annual and long term work plans for an institution as large as the Planning and Agricultural Economics Administration is not a simple task. The addition of Agricultural Planning and Statistics Project staff and resources makes the task both more difficult and potentially more productive.

A work plan can be developed by a process of bundling/integrating the activities of individuals in pursuit of what they perceive to be their own and their respective departments' interests and professional strengths. Such an approach may be successful if an institution's objectives are clearly defined, if staff is stable and if the tasks involved are repetitive or tied to a calendar.

In circumstances which require an organization to shift its activities in order to bring resources to bear on changing targets, the work planning process can be enriched by mechanisms which illuminate the linkage between objectives, activities and resources. In this note, a mechanism is offered by which the PAEA can establish priorities among activities and see more formally the relationship between ends and the resources required to meet those ends.

Role of the PAEA

The PAEA has multiple functions. Among them are the acquisition of basic data about the agricultural sector, the presentation of those data to a wide variety of users, the processing of data for use by planners and policymakers and the development of its own staff. Figure 1 is a schematic representation of how resources (domestic and international) are directed to the PAEA where they are organized into a plan of work in the context of the internal organization of the PAEA. These resources include budget, manpower, training, and commodities such as vehicles, computers, offices, etc. In Figure 1, the resources, organization and activities of the PAEA are directed to a single goal of planning and policy formulation. The role of the PAEA in serving users outside the Ministry of Agriculture and Natural Resources is also shown.

The work of the PAEA is shown in terms of four functional products:

1. Information Acquisition
2. Information Dissemination
3. Intermediate Products
4. Planning/Policy Analysis

[XTHD;PAEAFRAM.139]

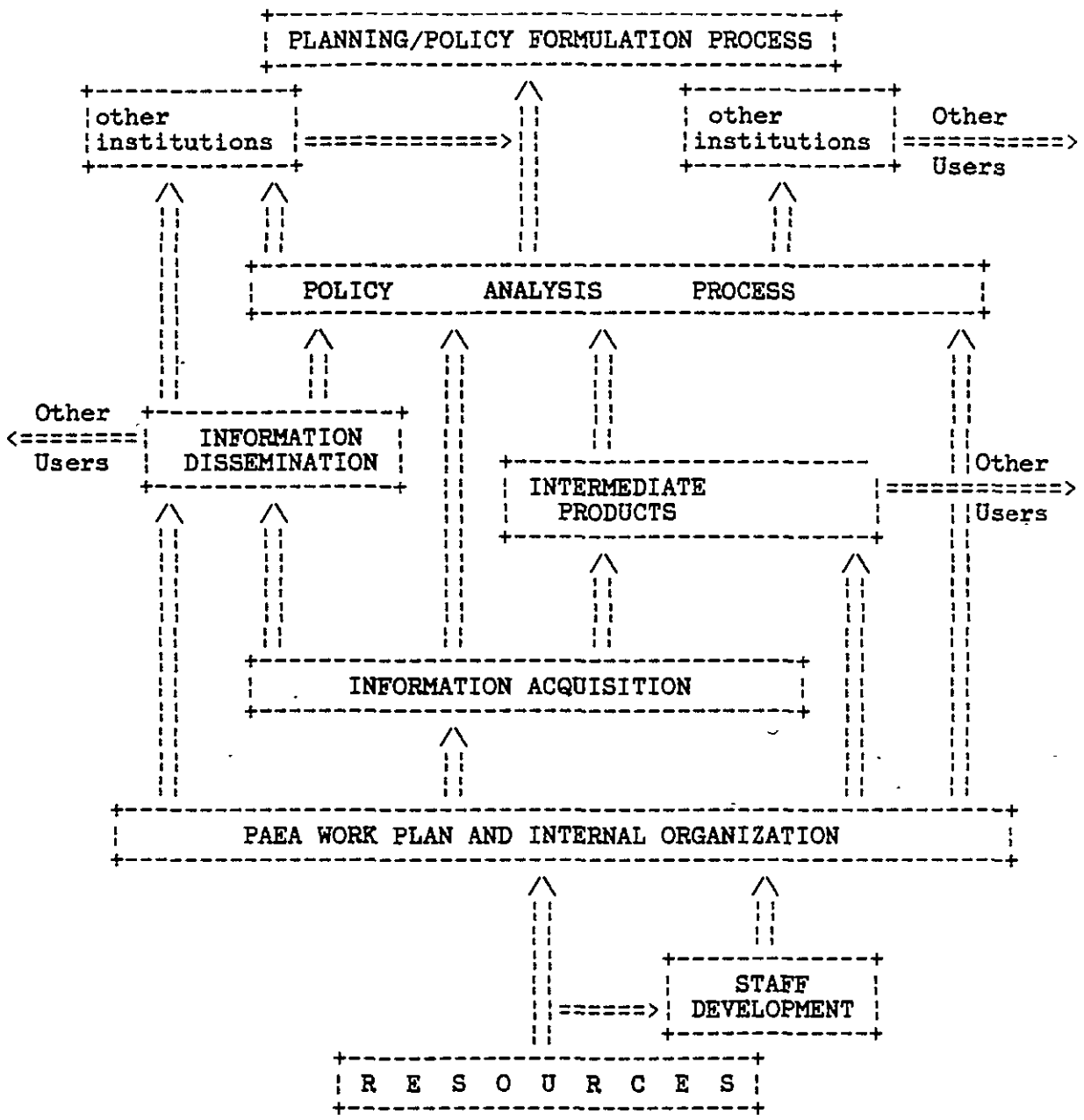

FIGURE 1: Schematic Representation of the Flow of Resources, Intermediate and Final Products from the PAEA

The Information Acquisition function is the cornerstone of PAEA activities. Without sound and timely agricultural statistics, price data and measures of current economic variables, planning and policy analysis can only be based on guess work and normative propositions. Further, there would be little in the way of useful information to disseminate.

The Information Dissemination function serves the PAEA in its policy analysis work as well as other institutions which are involved in policy formulation and non-policy oriented users. Intermediate Products are used by the PAEA as well as by other users.

Planning/Policy Analysis is a process in which information, intermediate products and resources are brought together in an analytical framework for the use of planners and policymakers. Good analysis offers planners and policymakers an understanding of the costs and benefits of a plan or change in policy relative to the costs and benefits of other alternatives, including the status quo.

A Derived Demand for Policy Analysis and Data

Other institutions have a role in the formulation of policy, as well. For example, the Ministry of Finance and Economic Planning and the Sudan Gezira Board are institutions which play a role in setting prices paid for cotton. Information (and analysis) from the PAEA can be instrumental in the formulation of the positions of these institutions.

The concept of derived demand is central to this framework. Policy and planning decisions require information. Thus, there is a derived demand for information arising from the demand for policy and planning decisions. Information is not costless. Thus, there is a derived demand for resources arising from the demand for information.

Figure 2 illustrates the relationship between the demand for resonses to broad policy issues and the derived demand for resources to provide that analysis.

The demand for responses to broad policy issues (e.g. growth with equity, resource conservation, etc.) is disaggregated into a "manageble" set of development strategy questions, policy studies and issues (e.g. sectoral investment alternatives, agricultural credit needs, production incentives, price policy effects etc.) which are, in turn, futher disaggregated. At this level of disaggregation the questions are amenable to analysis through a number of analytical processes.

It is to be expected that a single analytical process is capable of generating inputs to several elements of the disaggregated set at one time. For example, a model of the mechanized rainfed sector will generate information which is useful to

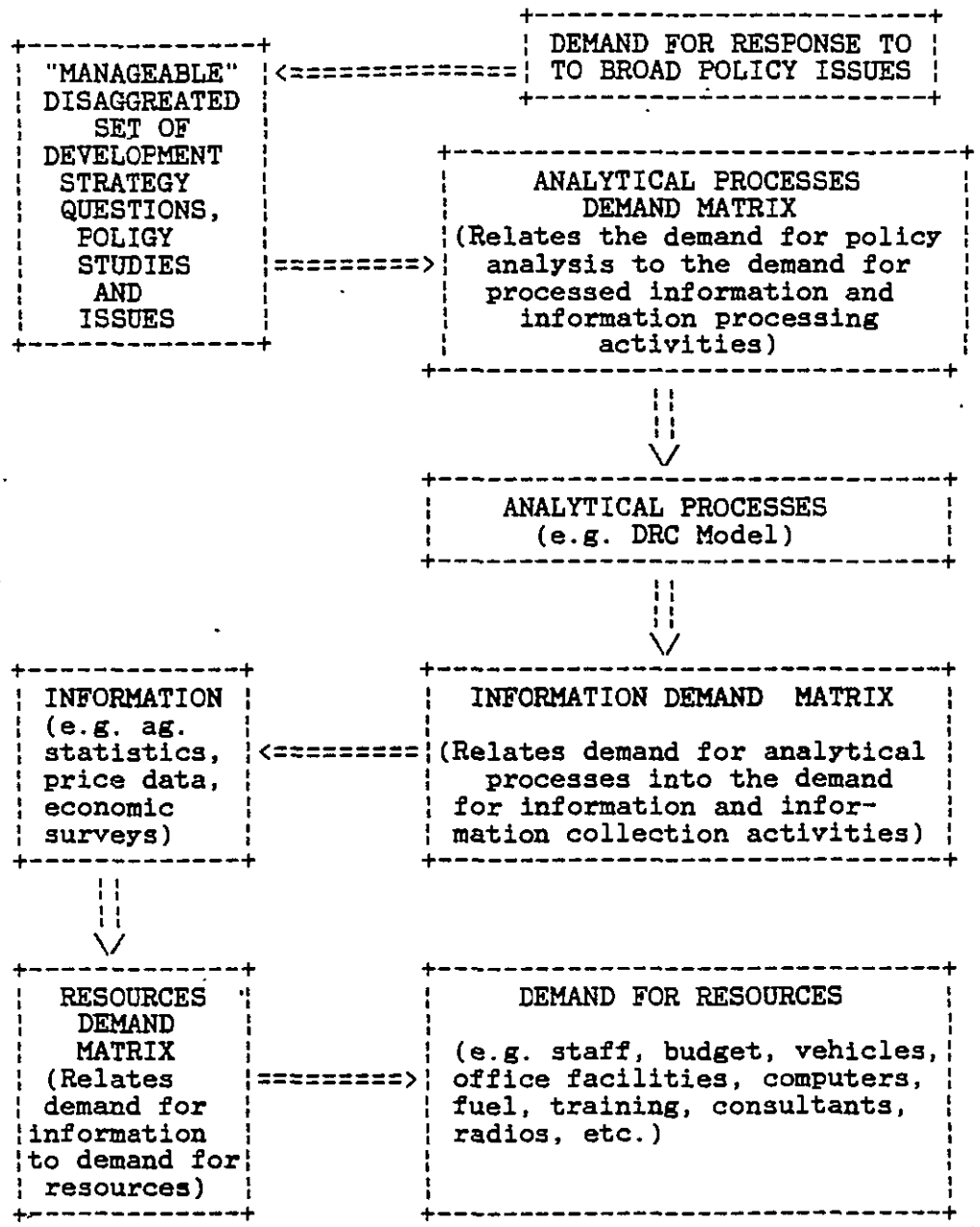

FIGURE 2: Schematic Representation of the Derived Demand for Inputs to the Policy Analysis Process

policy analysts and planners in examining questions about imported input requirements, price policy effects, production incentives and sectoral investment priorities.

It is instructive to see the interaction between the outputs of the analytical processes and demand for responses to the "disaggregated set" as a stylized supply-demand nexus. There is not a one-to-one correspondence between the output of individual analytical processes and elements of the "disaggregated set", however, because analytical processes are not, by their nature, specific to the elements of the "disaggregated set". Indeed, it would be inefficient to try to make them so.

The value of an analytical process can be found by placing values on each element of the "disaggregated set" and assessing how well an analytical process responds to the needs of those elements. The box in Figure 2 labeled "analytical processes demand matrix" is intended to represent that "market" for analytical processes.

Analytical processes require raw information. The information demand matrix provides that relation. Information collection activities require resources. A resources demand matrix provides that relationship.

Information is not free. USAID and the Government of Sudan make investments in the generation of information in the form of commodities, manpower, administrative resources, budget and training. The demand for the inputs is derived from the demand for information and analysis. For example, if the PAEA requires regional offices in order to collect basic statistics and conduct village level studies to support policy and planning models, it has a derived demand for staff (budget) and vehicles (commodities).

The greater part of the resources of the current APS Project has been devoted to infomation acquisition activities. The progress has not been even because the need for information and the cost of obtaining it is not uniform. Serious analytical efforts have been constrained by the limits of the data base. Studies on such subjects as the domestic wheat procurement price, the effects of gas-oil pricing on agriculture and marketing costs have been produced; but these studies have either been narrowly focussed or subject to being quickly out-dated by the effects of inflation. These studies may be regarded as intermediate products. If these studies are to be kept current and/or incorporated into analytical efforts which support serious policy discussions, they must be supported by data bases which are durable in the face of inflation and other exogenous events. Further, these studies must be internalized in the form of policy analysis models which are kept current and are readily accessible to policymakers who desire to know the costs and benefits of a given change in policy.

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Figures 3 and 4 are an enlargement of the upper two thirds of Figure 2. Figure 3 represents the relationship between four major policy areas which are within the mandate of the Ministry of Agrculture and Natural Resources and a larger set of more detailed or specified policy studies and issues. Figure 3 encourages PAEA staff and others to see the relationships which obtain between specific studies and issues and the broader policy areas.

It is proposed that PAEA staff "value" the relationship between between each of the four central policy thrusts and each element of the "disaggregated set" with weights from zero through four. For example, the relation between crop and livestock research in the irrigated sector and food security might be valued as "3" while the relationship between the same policy issue and resource conservation might be valued as "Ø". The priority of each element of the "disaggregated set" (rightmost column in Figure 3) might be established as the sum of the weights assigned in the four columns on the left of the table. This system of establishing priorities is flawed by the conversion of ordinal weights to a cardinal value for priority, but it offers a point of departure for a process which must be addressed in some fashion or another.

Figure 4 permits PAEA staff and others to evaluate the linkages between the list of planning and policy studies and issues and the analytical processes through which data are organized and analyzed. The importance of individual analytical processes--e.g. Domestic Resource Model, Gum Arabic Model, Irrigated Sector Model, Mechanized Sector Model, etc.--can be evaluated by examining the linkages between the analytical processes and the set of planning and policy studies issues. This method of valuing different analytical processes is imperfect, of course, but it is better than no method. The exercise of showing linkages also has the advantage of stimulating discussion on the multiple uses to which the output of a single analytical process can be put and the degree to which analytical processes are substitutes for each other. For the process to live up to its potential, those responsibile for each analytical process should be as explicit as possible about the content of their work and how it relates to elements of the "disaggregated set".

Note that "housekeeping" and information dissemination activities have not been shown explicitly in Figure 4. For example, there is no reference to training or publications. Training is a basic input and is properly placed in the demand for resources category (not shown in Figure 4). Publications (e.g. Agricultural Situation and Outlook Report) are essential to making information available to users, but so are such things as buildings, electricity, etc.). Reference to specific intermediate products has also been omitted in favor of presenting a broader spectrum of temporally more robust and comprehensive policy models.

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The first column in the upper part of Figure 4 (entitled "Planning and Policy Issues") is a list of planning and policy issues of interest to the agricultural sector (the "disaggreagted set"). This list is divided into two parts: "Planning and Strategy Issues"; and "Annual Policy Issues". An effort has been made to group related items within each of these two major groups.

The second column of the upper part of Figure 4 (entitled "Priority of Issue") indicates the priority which the PAEA attaches to each of these issues. The "demand" half of the column is derived from Table 3. The "supply" half is determined from an evaluation of how well the several analytical processes address the particular policy study or issue. This process can be enriched if the "supply" column is further split to show the current situation and the situation projected into the future as improved data bases enable additional analytical processes.

The first column in the lower half of Figure 4 (entitled "Critical Informational Inputs to Planning and Policy Formulation") is a list of information acquisition activities. These activities are roughly grouped by function rather than by departmental or sectional jurisdiction.

The second column of the lower half (entitled "Work Plan Priority") will be completed on the basis of information to be supplied in remainder of the lower half of Figure 4. (See below for a description of how this may be done.)

The remaining columns in the lower half of Figure 4 are headed with the titles of on-going and potential major analytical activities of the PAEA, e.g. "DRC Model", "Mechanized Sector Model". The two items described as "Special Studies" (Structural Change and Historical Prices) are not analytical policy models, although they may be analytical. They represent an intermediate form or output which may be seen as relatively highly processed information which can be used by policy makers and development planners.

The upper right part of Figure 3 ("Impact Matrix") indicates the linkages between analytical models and the list of planning and policy issues. It is proposed that linkages be denoted by the numbers zero through four in the indicated linking matrix cells, with zeros indicating little or no functional relationship and higher numbers indicating stronger linkages.

The cells in the lower right quadrant of Figure 4 are intended to contain information which relates the information/data requirements of the analytical models with the information/data categories in the first column of the lower half of the figure. These cells may be split to show both the importance and the current state of the required information/data.

It is proposed that the cells in the lower right quadrant be filled in by the technical staff and professionals concerned with

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the formulation of the analytical models. They are the best judges of the amount and quality of data required and the current state of the data available. The use of values zero through four is suggested for this process.

When the importance and completeness of the data/information categories have been scored by the users of that data/information, priorities can be assigned to completion or improvement of an informational element by judging its importance to the entire range of analytical activities of the PAEA. The column headed "Work Plan Priority" is intended for that purpose. The "summation" process is clearly subjective and judgemental, but it is better than no process at all.

A final step is implied but not identified in Figure 4. That is the estimation of costs associated with filling the informational gaps which are identified. The staff responsible for information/data collection are presumably the most able to do this.

Work Plans

Work plans may be drawn up on the basis of priorities which emerge from Figure 4. It may be useful to divide the activities in work plans into three categories:

1. Strengthening the data base where required

2. Constructing policy analysis models as soon as the data base is minimally adequate

3. Up-dating planning and policy analysis models as and when better data are available

Other activities of the PAEA would of course include information dissemination, training, etc.

Each activity in the work plan should have a calendar by which its progress can be monitored and constraints identified. Such a calendar should clearly identify needs for resources so that conflicts over vehicles and staff can be minimized. A final step in the work plan formulation should be the construction of budgets needed to support the individual activities.

Figure 5 illustrates the relationship between PAEA policy and planning outputs and the policy formulation process. Although the policy formulation process goes on at a higher level than the PAEA, it is useful to have a concept of what happens in order to time the delivery of PAEA products and to shape the form of the output to the needs of policymakers and the policy formulation process. Figure 5 provides guidance for the senior most staff of the PAEA. They may wish to indicate interactions as trivial/non-existent, modest and strong.

FIGURE 3

FOUR CENTRAL POLICY ISSUES				ECONOMIC PLANNING AND POLICY STUDIES AND ISSUES	
FOOD SECURITY	NET FX EARNINGS	INCOME GROWTH WITH EQUITY	RESOURCE CONSERVATION		
				Irrigated Sector	CROP AND
				Mechanized Sector	LIVESTOCK
				Traditional Sector	RESEARCH
				Livestock Sector	PRIORITIES
				Irrigated Sector	ANALYSIS OF
				Mechanized Sector	SECTORAL
				Traditional Sector	INVESTMENT
				Livestock Sector	ALTERNATIVES
				Primary Producers	PUBLIC VS. PRIVATE OWNERSHIP
				Trade, Processing and Storage	
				Extension	ECONOMIC BENEFITS OF PUBLIC AGRICULTURAL SERVICES
				Seed Supply	
				Plant Protection	
				Soil Survey	
				Opportunity Cost of Land	NATURAL RESOURCE MANAGEMENT
				Opportunity Cost of Water	
				Economics of Forest Use	
				Economic Value of Pastures	
				Desert Control Benefits	
				Identification of Constraints	AGRO-INDUST. INVESTMENT STUDIES
				Project Identification	
				Supply & Demand, Trad Lenders	AGRICULTURAL CREDIT NEEDS AND BENEFITS
				Supply & Demand, ABS	
				Supply & Demand, Cooperatives	
				Supply & Demand, Agric. Corps.	
				Export FX Policy Effects	PRODUCTION INCENTIVES AND PRICE POLICY EFFECTS STUDIES
				Import FX Policy Effects	
				Producer Subsidy Effects	
				Producer Price Ceiling Effects	
				Floor Price Mechanisms/Effects	
				Ag. Taxation Levels and Effects	
				Land and Water Charge Issues	
				Rationing & Consumer Subsidies	
				Retail Price Control Effects	
				Effects of Export Quotas	
				Marketing Efficiency Issues	
				Domestic Storage Incentives	
				Irrigated Sector	IMPORTED INPUTS REQUIREMENTS
				Mechanized Sector	
				Small Holder Sector	
				Irrigated Sector	AREA ALLOCATION DECISIONS
				Mechanized Rainfed Sector	

[D=J20;BIGFOUR.APS//XTHD;FIG3.APS]

FIGURE 4

ECONOMIC PLANNING AND POLICY STUDIES AND ISSUES			PRIORITY Demnd	PRIORITY Suply	IMPACT MATRIX	
PLANNING AND STATEGT ISSUES AND STUDIES	CROP AND LIVESTOCK RESEARCH PRIORITIES	Irrigated Sector				
		Mechanized Sector				
		Traditional Sector				
		Livestock Sector				
	ANALYSIS OF SECTORAL INVESTMENT ALTERNATIVES	Irrigated Sector				
		Mechanized Sector				
		Traditional Sector				
		Livestock Sector				
	PUBLIC VS. PRIVATE OWNERSHIP	Primary Producers				
		Trade, Processing and Storage				
	ECONOMIC BENEFITS OF PUBLIC AGRICULTURAL SERVICES	Extension				
		Seed Supply				
		Plant Protection				
		Soil Survey				
	NATURAL RESOURCE MANAGEMENT	Opportunity Cost of Land				
		Opportunity Cost of Water				
		Economics of Forest Use				
		Economic Value of Pastures				
		Desert Control Benefits				
	AGRO-INDUST. INVESTMENT STUDIES	Identification of Constraints				
		Project Identification				
	AGRICULTURAL CREDIT NEEDS AND BENEFITS	Supply & Demand, Trad Lenders				
		Supply & Demand, ABS				
		Supply & Demand, Cooperatives				
		Supply & Demand, Agric. Corps.				
ANNUAL POLICY ISSUES AND STUDIES	PRODUCTION INCENTIVES AND PRICE POLICY EFFECTS STUDIES	Export FX Policy Effects				(gum arabic)
		Import FX Policy Effects				(wheat)
		Producer Subsidy Effects				
		Producer Price Ceiling Effects				
		Floor Price Mechanisms/Effects				
		Ag. Taxation Levels & Effects				
		Land and Water Charge Issues				
		Rationing & Consumer Subsidies				
		Retail Price Control Effects				
		Effects of Export Quotas				
		Marketing Efficiency Issues				
		Domestic Storage Incentives				
AND STUDIES	IMPORTED INPUTS REQUIREMENTS	Irrigated Sector				
		Mechanized Sector				
		Small Holder Sector				
	AREA ALLOCATION DECISIONS	Irrigated Sector				
		Mechanized Rainfed Sector				

CRITICAL INFORMATIONAL INPUTS TO PLANNING AND POLICY FORMULATION				WORK PLAN PRIORITY	DOMESTIC RESOURCE COST MODEL		DOMESTIC FLOOR MODEL	
					Economic	Financial	Economic	Financial
AG	I	PUBLIC SECTOR	Area					
			Yield					

FIGURE 4 (cont)

CRITICAL INFORMATIONAL INPUTS TO PLANNING AND POLICY FORMULATION

																DOMESTIC FLOOR PRICE MODEL	
																Economic	Financial
AGRICULTURAL STATISTICS	IRRIGATED	PUBLIC SECTOR			Area												
					Yield												
					Livestock												
					Inputs												
		LARGE PRIVATE SCHEMES			Area												
					Yield												
					Livestock												
					Inputs												
		SMALL-HOLDERS			Area												
					Yield												
					Livestock												
					Inputs												
	RAINFED	MECHANIZED	DEMARCATED		Area												
					Yield												
					Livestock												
					Inputs												
			UNDEMARCATED		Area												
					Yield												
					Livestock												
					Inputs												
		TRADITIONAL			Area												
					Yield												
					Livestock												
					Inputs												
PRICE REPORTING	PRINCIPAL CROPS AND LIVESTOCK				Farm Gate												
					Wholesale												
					Retail												
	INPUTS				Machinery												
					Fuel												
					Fertilizers												
					Pesticides												
					Herbicides												
	CONSUMER GOODS																
MARKETING COSTS	TRADED INPUTS				Transportation												
					Processing												
					Storage												
					Handling												
					Inputs												
					Capital												
	NON-TRADED INPUTS				Transportation												
					Processing												
					Storage												
					Handling												
					Inputs												
					Capital												
					Labor												
					Profits												
TAXES	INLAND	BY COMMODITY															
		BY PROVINCE															
	BORDER	ON IMPORTS															
		ON EXPORTS															
WORLD MARKETS	TRANSPORTATION																
	PRODUCTION INPUTS																
	COMMODITIES				Exports												
					Imports												
CONSUMPTION STUDIES					Urban												
					Rural												
PRODUCTION COSTS	RAINFED	MECHANIZED			Farm Mgt/CoP Studies												
					Cost & Profit Functn												
	FED	TRADITIONAL CROPS AND LIVESTOCK			Farm Mgt/CoP Studies												
					Farm-Household Mods												
	NOMADIC SECTOR																
ECONOMICS	IRRIGATED	PUBLIC SECTOR			Computable Models												
					Farm Mgt/CoP Studies												
					Farm-Household Mods												
		PRIVATE SECTOR	LARGE		Farm Mgt/CoP Studies												
					Cost & Profit Functn												
			SMALL		Farm Mgt/CoP Studies												
					Farm-Household Mods												

Best Available Document

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	ECONOMIC PLANNING AND POLICY STUDIES AND ISSUES		PRIORITY OF ISSUES	INTER-INSTITUTIONAL AC					
				MIN OF AGRICULTURE & NATURAL RESOURCES					
				NRC	AG.SERVICE	MFC	ARC	AC's	AUAC	Fina
PLANNING AND STATEGIC ISSUES AND STUDIES	CROP AND LIVESTOCK RESEARCH PRIORITIES	Irrigated Sector								
		Mechanized Sector								
		Traditional Sector								
		Livestock Sector								
	ANALYSIS OF SECTORAL INVESTMENT ALTERNATIVES	Irrigated Sector								
		Mechanized Sector								
		Traditional Sector								
		Livestock Sector								
	PUBLIC VS. PRIVATE OWNERSHIP	Primary Producers								
		Trade, Processing and Storage								
	ECONOMIC BENEFITS OF PUBLIC AGRICULTURAL SERVICES	Extension								
		Seed Supply								
		Plant Protection								
		Soil Survey								
	NATURAL RESOURCE MANAGEMENT	Opportunity Cost of Land								
		Opportunity Cost of Water								
		Economics of Forest Use								
		Economic Value of Pastures								
		Desert Control Benefits								
	AGRO-INDUST. INVESTMENT STUDIES	Identification of Constraints								
		Project Identification								
	AGRICULTURAL CREDIT NEEDS AND BENEFITS	Supply & Demand, Trad Lenders								
		Supply & Demand, ABS								
		Supply & Demand, Cooperatives								
		Supply & Demand, Agric. Corps.								
ANNUAL POLICY ISSUES AND STUDIES	PRODUCTION INCENTIVES AND PRICE POLICY EFFECTS STUDIES	Export FX Policy Effects								
		Import FX Policy Effects								
		Producer Subsidy Effects								
		Producer Price Ceiling Effects								
		Floor Price Mechanisms/Effects								
		Ag. Taxation Levels & Effects								
		Land and Water Charge Issues								
		Rationing & Consumer Subsidies								
		Retail Price Control Effects								
		Effects of Export Quotas								
		Marketing Efficiency Issues								
		Domestic Storage Incentives								
	IMPORTED INPUTS REQUIREMENTS	Irrigated Sector								
		Mechanized Sector								
		Small Holder Sector								
	AREA ALLOCATION DECISIONS	Irrigated Sector								
		Mechanized Rainfed Sector								

Notes: NRC = Natural Resources Council; Ag. Service = the collective departments in MANR providing pu
MFC = Mechanized Farming Corporation; AC's = the agricultural corporations; AUAC = Advisory Un
Corporations.

[XTHD;FIG5A.APS]

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ROBERT CHAMBERS

CHAPTER EIGHT

Practical action

That low man seeks a little thing to do,
Sees it and does it:
This high man, with a great thing to pursue,
Dies ere he knows it.
That low man goes on adding one to one,
His hundred's soon hit:
This high man, aiming at a million,
Misses an unit.
Robert Browning, *A Grammarian's Funeral*

Although the freedom and power of individuals vary enormously, all can do something. One starting point is to question values that put the last last, such as the belief that the poorer and weaker people are, the less they should be paid. Another is to exercise imagination in thinking through the distant but real effects on the rural poor of technical and policy decisions and of outsiders' actions and non-actions. Yet another is to increase contact with and learning from the rural poor, offsetting the anti-poverty biases of rural development tourism, and using methods of rapid rural appraisal. Reversals in learning can take many forms, including sitting, asking and listening; learning from the poorest; learning indigenous technical knowledge; joint R and D with rural people; learning by working; and simulation games. Reversals in management entail changes from authoritarian to participatory communication; fewer staff transfers and better staff in poor and remote districts; and enabling and empowering weak clients to make effective demands for services and for their rights. To achieve reversals, it is best to start by acting and learn by doing. Most of the time, the best way forward is through small steps and little pushes, putting the last first not once but again and again and again. Small reversals then support each other and together build up into a greater movement. Many already put the last first, some from a distance, and some directly. The hope of this book is to support all of them, and to encourage others to do what they can.

The scope for personal choice

Some social science tends to minimise the scope for personal choice. Negative social science (pp. 30–33) does this in two ways. First, it stresses how awful things are, and how they are worse than they appear. This emphasis has often been salutary. By repeatedly pointing out how rural elites act as a net to intercept benefits, how poorer people are exploited, how capital-intensive technology can destroy the livelihoods of the poor, how women so often suffer, how transnationals exploit poorer countries, and so on, social scientists have exposed scandals and myths and helped to free practitioners from delusions. But negative social science can be accompanied by a sort of fatalism in which the worse things are the less hope there seems to be for doing anything about them.

Second, social science seeks uniformities and laws. While practitioners get on with the detail of doing things, some social scientists try to generalise through theory,–the laws of capital and of the market, and the analysis of class, dependency, comparative advantage, supply and demand, and the like. Such theory and generalisation can lead towards determinism, postulating forces which can imply individual impotence in the face of great historical movements. The awfulness can then appear inevitable and those who seek to achieve change can seem deluded.

Some negative social scientists may now be waiting for the next sentences which, in a now well-established tradition, would call (lamely) for the (improbable) exercise of political will to effect the desired reversals; and would see this call as yet another example of a naive reformism which calls upon and expects the wealthy and powerful to act against their interests.

The argument here is different. It is based on the premise that individual behaviour is not fully determined, a premise on which all, including determinists, appear to base their lives. Political, social and economic forces do operate; but when they are dissected, sooner or later we come to individual people who are acting, feeling and perceiving. They may be women or men, poor or rich, rural or urban, illiterate or educated, from less developed or more developed countries; landless labourers, artisans, small farmers, workers in voluntary agencies, government field staff, prosperous farmers, traders, workers, business people, politicians, senior officials, aid agency staff, professionals, diplomats, international bankers. All are found deciding what to do and all are to some degree capable of changing what they do.

What varies is the scope they have to act differently and the extent to which those different actions can change what happens.

This depends on their freedom and power. Poor rural people have little of either: a landless labourer locked into a single 'hedgehog' relationship or a 'fox' busily struggling to survive, has little room for manoeuvre or influence. The President of the World Bank, by comparison, has vast scope. And in between these extremes there are outsiders with varying degrees of freedom and power. For most of them, most of the time, the opportunities are for small steps and little pushes. To the individual these may seem insignificant, but the sum of small actions makes great movements.

Many such small actions are indicated by the themes and detail of earlier chapters – needs to perceive rural poverty and to understand its nature; to span the three cultures of academics, practitioners, and rural people; to devise and use cost-effective ways to find out about rural situations; to sit down, listen and learn from rural people; to load the dice differently for the rural poor; to think well in seeing what to do; and to foster a new professionalism which asks who gains and who loses and which puts the last first. Each of these presents an agenda of action. The question is who should and can start where and how, and to do what.

For outsiders, the answer is that all of them can do something.

Those in the rich world are spatially remote from the rural periphery but are part of the global system which maintains rural poverty. They can help themselves and others better to understand the issues and linkages; they can lobby for better terms for Third World trade and for better programmes of aid; they can support campaigns to stop abuses which harm and impoverish those who are already poor, like the export to Third World countries of drugs which are dangerous or needlessly deer; they can support voluntary agencies which take direct and effective action. Academic researchers, through their choices of topics and of methods to investigate them, can illuminate processes of enrichment and impoverishment, the patterns of power, ignorance and prejudice, the nature of rural deprivation, and successes and failures in rural development. Those who work in aid agencies can argue and work for programmes and projects which help the poor and against programmes and projects which harm the poor. They can ally themselves with and support those in host country governments who share their aims. Rich country professionals, whether in the medical, engineering, physical, biological or social sciences, can question their values and the influence which they have outside their immediate rich country environments.

And always, at its simplest and most direct, with OXFAM, Christian Aid, Catholic Relief Services, War on Want, Save the Children Fund, Terre des Hommes, and other international voluntary agencies which work on rural development with and for the poor, impact on rural misery is no further away than the cheque book or money order and the post office.

For Third Worlders, closer to the action, the opportunities are more obvious but the difficulties greater. This final chapter is for all outsiders, including those from rich countries, but most of the points try to address the predicament of that great majority of rural development professionals who are nationals in Third World countries. These include especially the field and headquarters staff of government organisations, parestatals, voluntary agencies, and organisations in the private sector, and the staff of universities and research institutes. Many of them feel trapped. Others feel that their efforts against enormous obstacles and powerful forces will be of no avail.

What can they do?

It is easier to write about what to do than to do it. Writing does not require courage, but courage can be needed for action. Though much rural development, especially in Africa, is welcomed by the whole population and does not involve outsiders in personal risk, much also, especially in Asia and Latin America, involves conflicts of interest where the weak are dominated, exploited and cheated by the powerful. Where that happens, many of the rural poor and those who work with and for them face abuse, discrimination and danger; the bravest and most direct are often threatened; some are assaulted; and some are killed. However much such people should be applauded and honoured, I doubt whether foreign outsiders like myself, protected by passport, police and the state, can be justified in urging others to risk their livelihoods, their families' well-being, or their lives. To take risks for oneself is one thing. To encourage others to do so is quite another. Even more, for any outsider to encourage vulnerable poor people to take risks raises ethical questions, especially when it is they, and not the outsider, who will pay the price of failure. The most honest and painstaking reflection is demanded first.

There are anyway many degrees of negotiating force and pressure short of physical violence, and skill and self-control can be exercised to choose the best level. It has to be recognised, though, that where exploitative interests are entrenched, force and pressure which are succeeding against them can trigger violence from the other side. Nothing that follows should undermine those whose justified non-violent acts against

exploitation provoke abuse and violence against themselves. From those of us who are far from the sharp end of rural development, they deserve respect and admiration.

At a less dramatic level, action can take many forms. My hope in this chapter is that by showing several sorts of straightforward action, more people will be encouraged to do more; to add their steps and pushes, however small, towards those great reversals which are needed; and that those who read this will find at least something that will make sense to them, that they can do, and that will work.

Beliefs, values and imagination

Action and introspection go together. It is often best to start with action. But to put the last first confronts basic beliefs, challenges personal values, and demands the exercise of imagination. Beliefs and values here refer to what an outsider considers right and fair for the rural poor; and imagination refers to the willingness and ability to think out and recognise the effects of outsiders' actions and non-actions on them. To support action, a reversal of beliefs and values is often required, a sort of 'flip', a switch to seeing things the other way round, from the other end.

Take, for example, the basic belief that the poorer people are, the less they should be paid. It is important here to distinguish the factual statement, that the poorer people are the less they are paid, from this moral statement, that the poorer people are the less they should be paid. The factual statement is true; but when the objective is to reduce poverty, the moral statement is starkly perverse, since the more poor people are paid, the less poor they become. To say that poor people should be paid less is to say that they should stay poor. Yet whatever private and public views are expressed about reducing and eliminating poverty, the perversity persists. It is almost universal. Women are paid less than men; the disabled receive less than the able-bodied; the illiterate get less than the educated.

Nor is this just a straight economic question of paying for results, or for value added. There are deeper, ingrained attitudes. Here is an official's opinion about payments to people in India, mainly Tribals, who pick *tendu* leaves for making *bidis* (local cigarettes):

> The present wage rate (1 paisa for 20 leaves) is not remunerative. But then it is not meant for able-bodied persons. It is to be appreciated that *tendu* provides seasonal employment to women and children or to the old. It provides employment to those who otherwise will not be able to get employment elsewhere. Thus, whatever he or she earns, should be accepted as fair.
>
> (quoted in Sarin and Khanna, 1981)

Should it be accepted as fair that poor people who have no alternative employment should be paid an unremunerative wage? Can the answer be anything but no? Yet practices which follow this principle are very widespread. There are, it is true, public works programmes which pay minimum wages, and among which the Employment Guarantee Scheme in Maharashtra in India (Reynolds and Sundar, 1977) stands out as an example. But in spite of such exceptions, the perverse principle of 'pay the poor less' is deeply rooted, both as an axiom of the market and as a precept of the privileged.

That the principle is applied in the private sector is only too well known: some employers pay pitiable wages when labour is in surplus and when they see this serving their private interests. Less well recognised, the same principle prevails in governments, including governments which profess to be at war with rural poverty. Reinforced by urban biases, the principle becomes 'pay the rural poor less'.

The point can be illustrated by government-regulated producer prices in Zambia. As Table 8.1 shows, between 1971 and 1979, the prices for four rural products all rose less than the low-income urban price index, suggest a shift in the terms of trade against rural producers; and among these four, maize (the major product of the larger and commercial farmers) almost kept pace,

Table 8.1 Changes in some rural producer prices in Zambia, 1971—79

	1971	1979	Percentage change 1971—9
Low-income urban price index	100	242	142
Maize	4.00	9.00	125
Dried fish	31.00	50.00	61
Charcoal	1.75	2.50	43
Sorghum	4.70	6.00	28

Source. ILO, 1981, p 65.

while the marketed products of the poorer rural people – dried fish, charcoal, and sorghum – lagged far behind, indicating how government action or neglect made poorer those who were already poor.

The producer price for honey in Zambia is an even more striking case. In 1980, some 70 per cent of the population of the remote and poor Kabompo District were believed to be beekeepers and the dispersed population had little to sell but its honey. But the Forest Department paid them only 0.41 kwacha per kg, a mere 12 per cent of its selling price of 3.50 kwacha on the Copperbelt; nor could this be justified in terms of intermediate costs, since almost all processing, transport and other expenses were paid for through a German aid programme. When pressed to raise the price paid to honey-gatherers, an official replied that this could not be done unless there was evidence that production costs had risen, as though such a question was relevant where government was already exploiting poor people so much, and so much more than any private trader might have dared. It is in ways such as these that the urban and class reflexes of bureaucrats keep poor rural people poor. They can use such arguments with impunity. The rural poor are, after all, powerless. The rich would never stand for it: but then they do not have to.

These examples are both distressing and hopeful: distressing because of the mindless insensitivity which they expose; hopeful because ignorance, lack of imagination, lack of feeling, and urban and class reflexes on the part of those who make decisions present an opportunity for change. It is true that on one level these are questions of organisation and power: in Zambia and elsewhere, urban workers and commercial farmers are well organised as pressure groups, while no one may represent the interests of scattered, peripheral and uneducated fisher-people, charcoal-burners, sorghum-growers, honey-gatherers and women labourers. But it is also true that the interests of these poor groups can be represented in many ways by those who are powerful. To reverse the trends against the rural poor requires that more and more of those powerful people know, care and act. In the case of the producer price for honey, perhaps all it needed was for some key person, or some coalition, to realise what was happening and to argue on paper, in committees, and in the press that the publicly proclaimed objectives of helping the rural poor could be admirably served by raising the price. When other government programmes were struggling to improve the lot of the poor, here was an opportunity to augment the incomes of precisely those who were hardest to reach, with a minimum of administration and a maximum of self-reliance on their part. The opportunity

could have been seized if a few people had exercised their imagination, cared and acted.

Imagination is vital. Outsiders need to envisage the distant but real and ramifying effects of their actions and non-actions, thinking through the causal chains which flow from them. The research of social scientists could help more here: it has rarely traced through such centre-outwards linkages in the human detail of case studies, what Stephen Biggs has called 'slice' research. But even without the empirical description of the personal detail of these links, reflection can suggest the connections: between the decision to install a Modern Rice Mill, displacing poor female labour, and the resulting misery of widows and women heads of the household and mortality among their children; between the low priority which courts give to cases brought on behalf of the poor, and the inability of the poor to stand up against exploitation; between the decision to breed crop varieties for ideal controlled conditions and the lack of benefit to resource-poor farmers; between the rapid transfer of officials in peripheral areas and the ineffectiveness of anti-poverty programmes there; between the allocation of low import quotas to soap and the scourge of scabies; between building big hospitals while failing to mount a programme to popularise oral rehydration, and the avoidable suffering and deaths of children; between denying vehicles and fuel to staff in remote areas with scattered and deprived populations, and the resulting paralysis of services; between the removal of a dedicated official and the rural misery and hopelessness that might have been averted.

The list can be lengthened. Examples are legion. But the point is made: the connections are there; they are real and they are unseen. It takes imagination to recognise them.

What counts, though, is action. Values – putting the last first – and imagination to visualise the distant effects of actions and non-actions, are points of entry. But concentrating on these can be a postponement. It is often best to get on with doing whatever can be done, however small. To help those who want to start or to go further, what follows are some points of entry, for themselves and for others, all leaning in the same, reverse, direction. These actions are designed to be realistic and feasible, bearing in mind human weakness and constraints on personal action. Readers will see more scope for themselves in some than others; but hopefully all will find something which they can use, or which will lead them to yet other actions which put more of the last first.

Practical appraisal for outsiders

A first and obvious point of attack is for outsiders to change the ways they learn about rural conditions. One problem here is the tension between the two cultures over time and timeliness: academics inclined to favour longer, unhurried, appraisals; and practitioners needing instant information to meet the deadlines of seasons, budgets, committee meetings, and ministers. As we have seen in Chapter 1, shortage of time contributes to the anti-poverty biases of rural development tourism and to careless and misleading investigations. These problems can, realistically, be tackled by those involved in two ways: by improving rural development tourism; and by developing and using techniques for rapid rural appraisal.

i) Tactics for tourists

Offsetting the anti-poverty biases

For that majority of outsiders concerned with rural poverty who practice rural development tourism, measures can be taken to offset the anti-poverty tendencies of contact. Urban, tarmac and roadside biases can be countered by going further afield and by walking away from roads; project bias by visiting not only projects but other areas and by non-scheduled stops; biases of personal contact by deliberately seeking out the poorer people, by making a point of meeting women, by taking time to see those who are sick at home and not at the clinic, by asking about those who have left or who have died; dry season bias by visiting during the rains, or at least asking about the worst times of the year; the biases of politeness by breaking away from the courtesies and making it clear what is sought; professional biases by trying through introspection to see the limitations of professional conditioning, by learning from other disciplines, by being observant, and by asking open-ended questions.

Spending longer and going further

In many ways the poorer people are at the end of the line. They take the longest to reach; they are the last to speak; they are the least organised, the least articulate and the most fearful. They often keep a low profile. Some are migrants. Women sometimes hide from male visitors. In visits that are rushed, the poorer are those least likely to be encountered. It is after the courtesies, after the planned programme, after the tourist has ceased to be a novelty, that contact becomes easier.

Remoteness is a special problem. Ingrid Palmer (1981, p. 38) has observed that 'Rocketing around in a Land Rover over rough roads for hours on end can be tiring and dispiriting, but there is no other way to reach the furthest and usually poorest villages', and more time must be set aside for reaching them. But the delays and disasters to which rural development tourism is prone prevent or curtail precisely such visits to remote villages and encounters with the poorer people in them. The serious outsider will do well to allow plenty of time in one place, to tour slowly, to spend the night, and to talk and listen after dark. Vehicle and fuel shortages for field staff can be turned to advantage, with a return to the overnight rural stops which were once common in many countries in the days of the trek or safari on foot, by horse, or by slow vehicle on bad roads. Field staff can make more of limited resources for travel by moving less fast, spending more time out, and learning more.

Being unimportant

The cavalcade of cars, the clouds of dust, the reception committees and the protracted speeches of the VIP's visit generate well-known problems. By contrast, the visitor who comes simply, by bicycle or on foot, fits more easily and disturbs and distracts less. Unscheduled visits, walking and asking about things that are seen, planning not to have a special programme, and avoiding the impression of having influence over the benefits which a community might receive, all reduce the dangers of misleading responses and impressions.

ii) Rapid rural appraisal

As we saw in Chapter 3, questionnaire surveys and statistical analysis limit investigations to what can be asked in interviews and what can be counted. The realities of rural deprivation are often missed. The challenge is to question the conventions of academic purity and find better approaches. Rapid Rural Appraisal (RRA) is one family of techniques of cost-effective ways in for outsiders.

These techniques have been widely practised but until recently little written about.[1] They recognise the trade-offs between the cost of information-gathering, and its quantity, accuracy, relevance, timeliness and actual use. Using 'dirty' as a term meaning not cost-effective, they try to avoid both the 'quick-and-dirty' of incompetent rural development tourism, and the pathological 'long-and-dirty' of some questionnaire surveys

Where time is short they look for an intermediate and appropriate technology, an approach which is 'fairly-quick-and-fairly-clean'.

Many techniques have been suggested. Some are obvious, if neglected. They include searching for and using existing information; identifying and learning from key informants – social anthropologists, social workers, group leaders, university students doing field research, and so on; direct observation and asking questions about what is seen; guided interviews; and group interviews with informal or selected groups. Other techniques are less obvious, like inspecting an area from the air and using aerial photographs. Perhaps most important are the composite approaches, designed for particular purposes such as identifying priorities for agricultural research, like those of Collinson (pp. 67–9), Hildebrand (p. 68), and Rhoades (1982). Other promising approaches are the compilation of family profiles, combining the methods of social anthropology, journalism, and statistical methods (Roberts, 1980); and the approach of BRAC (pp. 72–3) and Swift (1981b), working with rural people themselves as investigators.

Regarding poverty, systematic observation goes a long way. To assess deprivation and identify those who are worst off can also be helped by key indicators. These may show the relative deprivation of an area or group, or pick out those individuals or households who are worst off. Quality of housing is frequently referred to (Honadle, 1979; Longhurst, 1981b; Moore, 1981). Other indicators include wealth in land and animals, and tangible assets such as tools, beds, cooking utensils, and clothing. Anthropometric indicators of nutritional status also have their uses. Or communities may themselves be asked who are the most deprived among them. All these methods have weaknesses, but separately or combined with others they can be used to shortcut lengthier approaches.

One danger with RRA is that it will always be rushed. A corollary of Parkinson's law is that whatever is planned exceeds the time available for doing it. If this occurs, it will once again be the remoter areas and the poorer people who are left out. The opportunity presented by RRA is, by avoiding lengthy methods, so to save and budget time that the poor are let in, as individuals and as families, to be learnt from and understood in more depth. If the tyranny of quantification can be held in check, there is mere time to find out about relationships and processes. Techniques of RRA, carefully developed and used, can raise awareness and understanding of rural poverty, and improve actions to attack it.

Nothing here should detract from the importance of sustained, detailed and careful research, statistically rigorous

where necessary, and whether in one or several disciplines (pp. 58–9). The argument is rather to devise and use methods which fit resources, problems and needs. As a technology intermediate between rural development tourism and full-scale research, RRA has many applications for outsiders who are serious about rural poverty.

Reversals in learning

Putting the last first means reversals in learning. The litanies of rural developers include 'We must educate the farmers' and 'We must uplift the rural poor'. These can be stood on their heads. Outsiders have first to learn from farmers and from the rural poor. But meny outsiders are hindered from such learning in reverse by their educational attainment, urban status, and roles as bearers and dispensers of modern knowledge. Staff working in rural areas distance themselves from rural people, showing their separate style and standing through clothing, shoes, vehicle, office, briefcase, documents, and manner and speech. Hierarchy, authority and superiority prevent learning 'from below'. Knowledge of one sort perpetuates ignorance of another. Learning has to start at the other end. The farmer must educate outsiders; the poor must bring outsiders down to earth.

Conventional learning through formal schooling, university courses, and staff training can contribute to these reversals through changes in syllabus. One example is to illuminate the problems and rationality of small farmers through the insights which have come out of farming systems research.[2] But for learning in reverse, this is not enough. There are two further methods which deserve to be developed and included in courses and training.

The first of these is learning directly from rural people, trying to understand their knowledge systems and eliciting their technical knowledge. This is still rare as a part of education and training. The second is trying to experience the world as a poor and weak person. The problem here is to enable professionals to step over and see and feel the world from the other end. The humanistic psychotherapies[3] may have methods to offer for this, but their application to the training of rural development professionals has so far been slight.

Reversals in learning can cover many aspects of life and can take many forms Many more of these should be devised and developed. For the present, any repertoire might include the six which follow.

i) Sitting, asking and listening

Sitting, asking, and listening are as much an attitude as a method. Sitting implies lack of hurry, patience, and humility; asking implies that the outsider is the student; and listening implies respect and learning. Many of the best insights come this way. Relaxed discussions reveal the questions outsiders do not know to ask, and open up the unexpected.

Different approaches are possible. The pooling of knowledge and mutual stimulation of a small casual group can be an excellent source of insight. The composition of a group can also be designed for a purpose. Gill Gordon (1979) reports an effective way of finding out about changes in child-rearing practices in Ghana. Small groups of women drawn from three generations were asked to discuss the changes that had taken place. They checked, reminded and confirmed each other, enjoyed the discussion and themselves learnt in the process. Similar approaches, with small groups selected to bring together specialised knowledge, may often be an exciting and efficient method of investigation. It is not only the outsider who holds the initiative or who gains; all who take part can influence the direction of the discussion, and be absorbed in learning. Evening meetings may be ideal, going on into the night, when the outsider's presence is less obtrusive and distorted responses less likely.

ii) Learning from the poorest

The poorest are usually considered to be the most ignorant, those from whom there is least to learn. But how much do outsiders know about how the poorest cope? To enable the poorest to do better, the starting point is to understand how they manage at present. And on this the poorest are the experts – they know more than ignorant outsiders who have not bothered to try to find out.

Let one example suffice. Paulus Santosa of the Bethesda Hospital, Jogjakarta, Indonesia, trains nutrition workers through learning from the poorest. He asks, 'Shall we try to teach the under privileged, or shall we rather try to learn about nutrition from them?' Trainee nutrition workers are required to learn from families of the poor whose children are healthy and of normal weight. As Santosa puts it, 'it would be very hard to find professional nutrition workers in Indonesia today who can raise a family of five with US$0.50 per day and stay healthy'. It is after learning how some of the poor manage to have healthy children that plans are formulated with villagers for combatting

malnutrition. These are usually in agriculture, animal husbandry, cottage industry, health education, safe water, improved sanitation and the like. They have never included a direct feeding programme, since the trainees have realised, through their research, that it would not solve the problem. Through learning from the poorest, they come to understand that the direct, obvious, solution to physical weakness (see pp. 163–5) is only temporary and a palliative; other measures to tackle poverty itself will be more lasting and effective.

Learning from the poorest is rarely any part of anti-poverty programmes and projects; yet it is a key to enabling them to improve their lot.

iii) Learning indigenous technical knowledge

All rural people know things which outsiders do not know, and some know more than others. There are many ways for outsiders to learn from them. There is the comprehensive approach of a social anthropologist concerned with knowledge systems, including concepts and patterns of thought. But short of this, there are less complicated or abstruse approaches, including compiling glossaries of local terms, and games, quantification and ranking.

a) Glossaries of local terms

Compiling glossaries of local terms and concepts has been proposed by a team working in Nigeria on local participation in environmental monitoring. They suggest

> the compilation of a dictionary of local terms and definitions of ecological significance. In some languages, names of plants, insects and soil types are specific to the town or village in question. The identification and systematic recording of local terminology and the investigation of the taxonomic basis of their meanings not only lead to improved communication but often provide information vital to an understanding of local environmental conditions.
>
> (Barker et al, 1977, p. 50)

In their own work they found that the literal meanings of names for a harmful insect provided information about its habits and habitat.

The compilation of such glossaries together with descriptions of each item should be easy to incorporate in training

courses for rural extension staff in, say, agriculture and health. The range of subjects to be covered depends upon needs, but can include colours, climate, time, soils, plants, topography including micro-environments, animals, insects, foods and diets, diseases, cures, pests, weeds, seasons, space, measurements, proverbs, social relations, and ceremonies. Finding out about these, writing down names, describing and explaining their meanings, and then comparing notes with colleagues, is interesting in its own right. The insight and information elicited is likely to be directly useful. The exercise should improve understanding of local beliefs and practices as well as communication between staff and their public through enabling staff to use categories and expressions which are locally familiar.

b) *Games, quantification and ranking*

As a way for outsiders to learn from rural people, games have the advantage of suspending status and social differences besides being fun. They can take many forms. To elicit values and constructs social scientists have used sentence completion, and also back-to-back guessing where one respondent describes one of a class of objects (a rice variety, a fertiliser etc.) while another, who cannot see it, guesses the name.

Paul Richards (1979) has used another game to find out the way different groups of people see weeds. Respondents were given different sorts of weeds in groups of three and asked to say which two were most similar and which was most different. They were then asked to explain the 'construct' underlying their choice. This was repeated with different combinations of three weeds.[4] The game, with the same weeds, was given to three groups. The first, Sierra Leonian university botany and geography students, differentiated the weeds by their shape and appearance and by scientific classification. The second group, who were farmers, had totally different, utilitarian, constructs such as ease or difficulty of clearing. The most startling finding was that the third group, extension trainess, had constructs which were almost identical with those of the university students and quite different from those of the farmers. This led to

> a spontaneous 'seminar' by the trainees on how they would communicate with farmers if their 'scientific' approach to farming made them think in textbook botanical terms rather than in terms of farming utilities. Tentative action proposals for syllabus development and for studying alongside the farmers were beginning to emerge at the end of the period.
> (ibid, p. 32)

Without such exercises, outsiders, including agricultural extension staff, may not realise how radically differently they and their clients are seeing and thinking about the same things.

Indigenous methods of counting and quanitification are often supposed to be weak; and this view may be used to justify top-down statistical surveys. Before such surveys are designed and undertaken, however, prior questions can be asked about how rural people measure and count, and whether these methods can obviate or fit into a survey. A first step is to list, investigate and calibrate the units used by rural people and their applications. Farmers' units for land under crops may, for example, represent not area but labour inputs – such as the length of a row that could be worked before standing up and stretching (Richards, 1979, p. 31) – and these units may be more meaningful to farmers and for some survey purposes than standard geometrical measures of area.

Local games can also be used to help farmers quantify and scale their estimates and preferences. David Barker has described how a traditional African board game, ayo, involving holes in a board or in the ground and employing seeds or stones, has been adapted to explore farmers' decision-making, their estimates of the relative severity of a pest outbreak, and their preferences for different patterns of farm returns over several years. Farmers in Sierra Leone prefer this game format to a questionnaire survey. The ayo board passes the initiative in providing information to the local people. This 'seems to be very important in oral cultures where questionnaire schedules can act as both steering wheel and brakes on the free flow of discussion' (Barker, 1979, p. 40).

With pastoralists in West Africa, Jeremy Swift has developed a variant of the ayo board to generate discussion about priorities, using camel pellets and holes in the ground. He makes eight holes, and then asks a group to name their eight most important problems, with a hole to represent each. This takes some time and provokes lively debate. He then gives the group 25 camel pellets and asks them to put the pellets in the holes according to the importance of the problem. The lesser problems are gradually eliminated and the pellets redistributed to those that remain. With the two or three biggest problems, the next stage of analysis is to make five further holes for each, and to ask the group to name the most important aspects of each problem. Swift found that the same problems recurred – how to obtain food at reasonable prices in the dry season; how to get credit to build up herds; animal and human health; how to get just treatment in dealings with the Forest Department; how to deal with government and the modern world. One discussion which started at five o'clock in the evening

went on until after midnight.

Approaches such as these shift the initiative from the outsider. Things on the ground – drawings on the sand or in the mud, holes, stones or pellets – provide a common focus which distracts from differences of status, dress, style, or speech. The way is open for inventiveness in changing the game or the model through physical acts – taking a stick and drawing on the ground, moving pellets from one hole to another. Vigorous debate reveals a spectrum of views. Teaching by 'respondents' is uninhibited, and learning by outsiders can be deep and direct.

iv) Joint R and D

Other reversals in learning can come from the location and mode of research. The strong reasons for carrying out much agricultural and agricultural engineering research jointly with farmers in their fields and under their conditions are now widely accepted. Research conducted outside the rural environment (on a research station, in a laboratory) often entails heroic simplifications or gross distortions. In the past, much agricultural research undertaken without the small farm and the small farm family has had the wrong priorities and has generated misleading 'findings'. There are, to be sure, some stages or forms of research which require stringent controls or special equipment which only a research station or laboratory can provide. But professional biases weigh heavily towards working in research station and laboratory cores instead of in field condition peripheries.

Here, too, therefore, a reversal is required, recognising small farmers as professionals and colleagues, as fellow experimenters and developers of technology. Peasant farmers in Sierra Leone, for instance, have their own experimental methods which are said to render expensive, supervised on-farm trials unnecessary (Johnny and Richards, 1980). Informal R and D is continuously practised by farmers and there is much to be learnt from it (Biggs, 1980). A handbook for learning about and improving farmers' own experimental methods has yet, to my knowledge, to be written. And the potential of collaboration between farmer experimenters and agricultural scientists is still far from being realised.

v) Learning by working

For many outsiders, there is scope for learning by physically working with farmers and others, and doing what they do. This is

not new to social anthropologists. Paul Devitt, living in the remote village of Kuli in the Kalahari desert, kept a dozen cattle in order to understand village life and economy by experiencing it from the inside. Paul Richards found that working at farm tasks with farmers in their fields elicited information he would not have known to ask for and his informants would not have known to volunteer. John Hatch, in Peru, having abandoned a conventional questionnaire survey, worked systematically through the many operations of maize cultivation, hiring himself out to farmers as an unpaid labourer on condition they would teach him the task to be performed

> The scheme worked beautifully. Most small farmers took to their role as teacher very conscientiously. Rather than waiting to respond to my questions, they often volunteered task information I would never have known enough to inquire about. In fact, most of the information I gathered was gained in this way. Hired labourers often proved excellent instructors as well.
>
> (Hatch, 1976, p. 16)

Among other things he found out that crop labour requirements might be half as much again as those previously estimated by outsiders.

These are all examples of individual researchers who found working at rural tasks a source of understanding. But the method has also great possibilities in training. As part of the training of social workers in Madras, Viji Srinivasan required them to buy food for a poor family's meal for only one rupee, and then cook it for the family, assisted only by technical advice from the woman of the family. One lesson brought home to the trainees was how diet is constrained and simplified by having only two cooking pots. The application of similar approaches in training courses would seem to have enormous potential, with foresters collecting firewood or other forest produce, agriculturalists working as farm labourers, animal husbandry staff and veterinarians herding animals, and irrigation engineers and agricultural engineers applying water in farmers' fields; in each case advised by local experts, the rural people themselves.

vi) Simulation games

The most effective way of experiencing the world as a poor person is to go and be that poor person in as complete a manner as

possible. But for that most outsiders have neither time, courage nor opportunity. This being so, simulation games are one of the most promising methods for enabling outsiders to understand the life and problems of the poor. Such games are used in other fields such as business management, and war gaming has a long history. Much has been written about them.[5] In development, they have been used in the training of foreign voluntary agency staff and by the Economic Development Institute of the World Bank. Yet in the Third World itself they are little used in training professionals concerned with rural development, such as administrative officers, planners, agricultural extension staff, and those concerned with animal husbandry, education, forestry, health, irrigation and social welfare.

One family of games already developed simulates small farmers. These are the Green Revolution Game (Chapman, 1973; Chapman, Dowler and Elston, 1982), the Peasant Farming Game (Mitchell, 1982), and Ganeshpur (Blaikie, 1982). These are conducted in a single room and participants are usually paired. Each participant or pair is allocated the resources (labour, land, food, money) of a small or near-landless farmer. Decisions are then made, season by season, about crops to grow, inputs to purchase, loans to take, and so on. Random disasters occur and the seasons wait for no one.

The experience of players varies and these simulations take a different form each time. Social relations quickly develop between players (small farm families) as farm employment is sought, money borrowed, and patron-client relations formed. The poorest face a struggle which taxes their energy and ingenuity as they try to save their children from starvation by selling land, by begging for work, loans and food, and even by stealing. The experience of standing in a queue to secure payment for one crop in order to be able to buy inputs for the next, while the rains are imminent and time running out, is not easily forgotten. Nor is the death of a child because an employer was dilatory in paying out wages for work done. To be effective, such simulations need participants who enter into the spirit of the thing, and plenty of time for discussion afterwards to allow participants to remember, describe and analyse what happened and what they felt. Given these, they can be a remarkable way into the experience of others and a powerful source of learning. They can contribute to changes in understanding and in feeling and to a new empathy with poor rural people.

The development and effective use of such games is a priority. They can be applied to many aspects of rural life to capture and illuminate the linkages of poverty with agriculture,

the seasons, risk, input supplies, wages, food prices, health, mortality, exploitation, and the position of women. They can enable participants to feel powerlessness and vulnerability, and to experience ratchets of impoverishment. They can show those who provide services what it is like to be poor clients – as bankers play farmers seeking credit, foresters play villagers dependent on forest products, and irrigation engineers play farmers at the tails of canals. Simulations such as these have a key part in training staff and changing bureaucracies. They should be in the curricula of training institutes and of university courses concerned with rural development. To be effective, they must be well designed and well used. They also need to be prepared for different purposes and different environments. The most efficient way to develop them quickly may be workshops for creative researchers, teachers and trainers who will learn how to devise and manage simulation games based on empirical data which they themselves obtain. In the meantime, some good games already exist[6] and should be widely used.

Conclusion

These six approaches – sitting, asking and listening; learning from the poorest; learning indigenous technical knowledge; joint R and D; learning by working; and simulation games – all reverse the learning process. They encourage and enable those being trained or educated to learn from the many below and not just from the few above. They vary in ease and utility. But they share strengths: they transfer initiative to rural people, for them to volunteer information and develop ideas; they encourage an equal relationship between questioner and informant, and the attitude which Peter Berger (1977) calls 'cognitive respect' – respect on the part of the more educated and more influential for the less educated and less influential; and they add to the body of centralised knowladge and understanding. For both rural teachers and outsider students, they can be acts of sharing and learning together.

These and similar approaches should be feasible in many institutions and at many levels. Some have already been tested and are already being used; others are yet to be devised. Researchers and consultants who span the three (academic, practitioner, and rural) cultures are well placed to develop new reversals in learning: a good example is John Hatch's experiment in enabling peasants in Bolivia to write a textbook on their subsistence farming (Hatch, 1981). The adoption of these

approaches may, however, face difficulties, notably in those universities and university departments which are fossilised in conservative orthodoxy. It is perhaps in government training institutions that the potential is greatest. Required learning from rural people could help to reorient whole bureaucracies. Nor should it be limited to the junior staff who are most considered to need training. Senior staff should not be deprived of such opportunities for learning. It may even be best to start with the senior staff, both to test and develop the approaches and so that they appreciate the value of the approaches and ensure that they are supported and spread.

Reversals in learning will sometimes be seen as an affront to the dignity, status and professional propriety of outsiders. But learning in reverse can give pride (having worked as a labourer), fun (playing games), the excitement of discovery (learning ITK, how poor people cope, and so on), and practical insight (how realistically to help people to help themselves). It can be intellectually rewarding and practically useful. It can bring together the disciplines. The sociologist and the soil scientist, the agronomist and the economist, can sit down together and find a common activity and common understanding in learning from those other professionals – the rural people – who do not distinguish disciplinary domains. By giving pride, pleasure, intellectual interest, and practical value, reversals in learning ought to appeal to many outsider professionals and gain the wide acceptance they deserve.

Reversals in management

Reversals in learning cannot take place in isolation. They are hindered or supported by the way in which organisations are managed. There are many useful analyses and reviews of management for rural and social development.[7] As usual, local variations of style, culture, structures, procedures and conventions make generalisation difficult, as do the many varieties of organisation involved – government departments, parastatals, banks, voluntary agencies, and business houses. Almost all, though, have a centre-periphery orientation, and those most pointed towards the centre are usually the largest, the field departments of government like agriculture, animal husbandry, community development, education, forestry, health, irrigation, public works and water development.

Most of these departments in most countries face inwards and upwards, away from rural clients. Their structure and style

are often authoritarian, hierarchical and punitive. From the centre and top come targets, commands, exhortations and threats. From the periphery and bottom comes a weaker flow of filtered information which placates and misleads. In meetings, subordinates are upbraided, cajoled and given orders. They are asked for reports of targets achieved, not for problems encountered. Poor performance or deviant initiatives are rewarded by punishment or posting. Promotion comes, if at all, through compliance or through working in headquarters. Real problems of implementation or impact are repressed; appearances of achievement applauded. Senior officers do not learn from their subordinates; and subordinates do not learn from their rural clients.

This pattern is common, but neither universal nor inevitable. An exception is the National Irrigation Administration in the Philippines (Alfonso, 1981; Bagadion and F. Korten, 1980; D. Korten, 1980, pp. 492–4) which has evolved a participatory philosophy and style. It is geared to providing services and to responding to its farmer clients. Upward flows of information about problems are encouraged. Social science research is commissioned to explore critical questions and is openly discussed. Staff are allowed to remain for years working in the same post without the disruption of transfer. Learning and improvement within the organisation are a conscious and continuous aim.

The contrast between hierarchical and participatory organisations corresponds with the useful distinction between the blueprint and the learning process approaches (Korten, 1980; Moris, 1981, pp. 19–22). The blueprint approach emphasises planning from the top and then implementation below. The more successful learning process approach starts below. From his analysis of five Asian rural development success stories David Korten concludes that

> the blueprint approach never played more than an incidental role in their development. These five programs were not designed and implemented – rather they emerged out of a learning process in which villagers and program personnel shared their knowledge and resources to create a program which achieved a fit between needs and capacities of the beneficiaries and those of the outsiders who were providing the assistance. Leadership and teamwork, rather than blueprints, were the key elements.
>
> (Korten, 1980, p. 497)

The learning process approach is easier to achieve for small voluntary agencies than for the great field bureaucracies of government. A major challenge over coming decades is bureaucratic reorientation (Korten and Uphoff, 1981), including a change from authoritarian to participatory styles and a shift in responsiveness from orders from above to demands from below.

For those who work in authoritarian bureaucracies, such change may seem remote. It will not come quickly. The key is to search for 'soft spots' (p. 157), interventions which present the best chances for starting change. The introduction of reversals in learning is one starting point. In addition, three others can be suggested: *styles of communication; transfer policy and practice;* and enabling and empowering poor clients.

i) Styles of communication

Styles of communication can be changed in several ways. Senior staff can alter the tone of their interaction with subordinates. They can talk less and listen more. Procedures can be introduced to require joint planning and programming with junior staff taking part in drawing up their own work plans. Training can support such changes. Target-setting by those above can be reduced or abolished. Efforts can be made to learn from junior staff, and to encourage them to learn from their clients.

Such changes do not come all at once. Nor are individuals always consistent. A District Collector in India is reported to have said

> ... most of my staff have worked under many difficult superiors so they have become more cautious. There is this great willingness to agree. They would rather agree then set out the difficulties and present their objections. They are afraid of rubbing their superior the wrong way. I try to make them feel relaxed and give them a feeling of partnership in these programs. I find this is the best way of doing things. This kind of dialogue leads to them feeling free to express themselves.

Yet earlier that same day his tone to his staff had been one of 'open and rough criticism' (Heginbotham 1975, pp. 126–7) which can hardly have helped them feel free to express themselves. Changes in style to encourage subordinates to be frank and to exercise initiative do not come easily for those trained and socialised in a hierarchical tradition; but they are something that each person in

a large bureaucracy, however difficult his or her situation, can work on.

ii) Transfer policies and practice

Rapid transfers are the slipping clutch of rural development administration. Again and again, they incapacitate field organisations of government. Transfers of field staff are made for many reasons, including political pressures, chain reactions in which one posting provokes others, and to solve personnel problems. Of East African administration, Jon Moris has put forward the hypothesis that

> In the face of a lack of enforceable sanctions, the top officials use the transfer of subordinates as the main administrative solution to almost every problem. Consequently, top officials are constantly being moved around the country within the bureaucracy. Problems having to do with corruption or personality are not solved, but merely exported to some other locus in the system.
>
> (Moris, 1977, p. 79)

Postings seem to be most rapid in the remoter and poorer areas. In East Africa, turnover in district staff in pastoral areas has been so rapid that there could be only very temporary and superficial contact between two systems of nomadism – that of the pastoralists and that of the administrators. In 1970 a District Development Committee meeting in the remote Samburu District in Kenya had as the major item on the agenda a land use plan for part of the district, but only one of the ten or so government officers present had been in the District for more than a year. In India, for the very poor tribal area of Dharampur in Gujarat, Ranjit Gupta (1981, p. 121) reports that in two years there were six different District Collectors, five District Development Officers, and three Project-cum-Tribal Development Officers. He attributes the high rate of transfers to the three Ps: probation for young staff; promotion for some who can only rise by accepting an unpopular posting, after which they at once negotiate for a re-transfer, carrying their promotion with them; and punishment – the penal posting – for those who have misbehaved or otherwise earned disfavour.

It is difficult to exaggerate the bad effects of these practices. Young staff on probation lack the experience to do much. Older staff who are trying to negotiate a re-transfer do not apply their

best energies to their work. Staff who are in disgrace may be incompetent, or if competent, have low morale. And staff who expect to be posted in a matter of months have little incentive to get to know the people of an area, or to work for longer-term or participatory development. Reversing this tendency may not be easy; but it is often a precondition for sustained and better support for rural development in poor and remote areas that government staff be able and committed and that they remain in post for a matter of years.

Many measures can be suggested. At the personal level, individual staff can seek to stay in their posts and try to resist transfer; those in senior positions can resist pressures for their subordinates to be moved; politicians can deny themselves short-term gains from moving staff for the sake of longer-term gains from development. At the policy level, rules can be made to require substantial periods of continuous service in poor and remote areas, making this a condition for promotion. But once again popular demand may be the most effective measure. One approach is to publish annually, for each administrative area, the rate of turnover of staff in different departments over the previous few years. In Kenya, the publication of examination results by school and by district led parents in low performance areas to organise, protest, and secure better services and improved performance (Somerset, 1982). The same technique could expose the extent to which poor areas are deprived through rapid transfers of officials and might generate demands for greater stability and better service.

iii) *Enabling and empowering poor clients*

The third management reversal involves shifting power and initiative downwards and outwards. Decentralisation – the deconcentration of staff and resources, and the devolution of authority – is usually seen as the result of central decisions. To some degree this is inevitable. But there is another angle. Administrative and service organisations are regarded as providers: they spread facilities, pass on knowledge, treat the sick, educate the children, and so on. They can better be seen as enablers, enabling those who are variously poor, powerless and remote to control more of their lives, to have more choice, and to demand and use more services.

For this reversal, two conditions help. The first is clear specification of the rights of poor clients – rights of forest dwellers to forest produce; of small farmers to irrigation water in stated

amounts at stated times; of communities to schools and teachers; of mothers and children to health care; of labourers to off-season employment on public works; of poor producers to fair prices for their produce. These rights can be published, proclaimed in meetings, and displayed on noticeboards. The second condition is the formation of groups around common interests, encouraging them to demand their rights – forest dwellers to demand their forest produce and protection of the forest from pillage by contractors; small farmers to demand their irrigation water; communities to demand teachers for their schools; mothers to demand health care; labourers to demand employment; and specialised groups like the fisher-people, charcoal-burners, and honey-gatherers of Zambia, to demand fair prices. The role of the service organisation is, then, not just to provide the service; it is to see that clients know their rights and have power to demand them, enabling them to ensure quality of service and access.

Reversals in management can require vision, courage and effort. Obstacles to them include hierarchy, authoritarianism, corruption, administrative inertia, and fear of fostering popular demands. But there are enough positive examples to give grounds for hope. Some are reported in the substantial literature on participation.[8] Many, many others represent the quiet personal achievements of people determined, in however small a way, to make things better than they would have been.

The primacy of personal action

So it comes back to personal choice. Analyses of 'the problems of rural development' again and again halt at the stage of a general statement which suggests that nothing can be done unless something else is done first. Once participatory management has been introduced, or corruption wiped out, or training reorganised, or personnel policies reformed, or political interference reduced, or a new head of department appointed, or the workload rationalised, or target-setting abolished, or whatever, then end only then, it is tempting to say, will better performance be possible. But these are excuses. There is always something that can be done; some scope for personal action. Anyone can ask these questions:

how do my actions affect the poorer rural people?
how should I and can I change them?
what more can I do?
how can I help others to do more?

Some may feel that their position is hopeless, that there is nothing they can do. The 'system' is too strong for them. Perhaps the best antidote to this despair is to study the examples and lives of those who have fought against the odds and succeeded. In every country there are some courageous people – political and religious leaders, civil servants, workers in voluntary agencies, academics, scientists, and others – who have refused to give in, who have stuck by their principles and whose lives shine as examples to others of what can be done. For those who side with the poor, too, there may be unexpected floods of support. Arun Bhatia, the Indian District Collector who exposed corruption in the Maharashtra Employment Guarantee Scheme, received massive popular acclaim for his actions, even though in the short term he was transferred to another post.[9] But not all can expect recognition or to become folk-heroes. For most of those who put the last first, the satisfaction and rewards are not fame, but in knowing that they have done what was right, and that things are, however slightly, better than they would have been. Their small deeds may not command attention; but in merit, they may equal or exceed the greater and more conspicuous actions of those with more freedom and power.

Personal choices are both strategic and tactical. At the strategic level, there are choices about career and specialisation. More professionals are needed who span the three cultures and who organise their lives so that they move more freely between them. More are needed, too, who are multi-disciplinary not just in tolerance but in themselves. Many who make the greatest contributions are those who decide to spend more of their lives working in difficult conditions in difficult places.

At the tactical level there are choices of timing and degree. Not everything can be done at once. Small gains well consolidated as part of a sequence can mean more than big gains which are unstable and short-lived. There are times for confrontation and the big reversal; there are critical periods when small pushes can move major decisions, resources or systems one way or another; but most common are the times for patient work on small things: the items on the agenda paper and their order (is the last first?); the question raised and the argument put in the committee; the condition negotiated in the agreement; the detail of the syllabus in the training course; the programme for the VIP; the way visitors behave and the questions they ask. Small moves to put the last first all count, and they add up.

It is action that matters. Much of the analysis in this book has been about knowing – about how outsiders perceive or do not perceive rural deprivation. But knowing does not guarantee a

change of feeling; and a change of feeling does not guarantee a change of behaviour. So we come to the final, paradoxical, reversal: to start by acting. Changes in feeling and perception can come back to front, from changed behaviour and the experiences it generates. The traditions of science, scholarship and management are to begin with data collection, analysis, and planning, often protracted, often delaying action. But there are usually some obvious things that can be done at once. Not everything can or should be foreseen. It is often best to start, to do something, and to learn from doing.

For the test is what people do. Social change flows from individual actions. By changing what they do, people move societies in new directions and themselves change. Big simple solutions are tempting but full of risks. For most outsiders, most of the time, the soundest and best way forward is through innumerable small steps and tiny pushes, putting the last first not once but again and again and again. Many small reversals then support each other and together build up towards a greater movement. The lives of many people already show a will to make reversals, to put the last first. Some contribute from a distance. Others work directly with and for those who are rural and poor, helping them to gain more of what they want and need and to demand and control more of the benefits of development. The hope of this book is to support all those people, in however slight a way, and to encourage others to do what they can.

Notes

1 See Barnett, 1979, for a review of a workshop on RRA. The rationale and some techniques of RRA are described in Agricultural Administration, 1981; Chambers, 1981; Longhurst, 1981a; and Pacey, 1981; each of which lists references. Rhoades, 1982, is a practical guide to the informal agricultural survey. The Oxfam Field Directors' Handbook (Oxfam, 1980) is an admirable source of information and guidance about rural conditions and development.

2 There is a large literature. See Gilbert, Norman and Winch, 1980, for a selected bibliography, and the reports of the Farming Systems Group at Michigan State University.

3 Four sources are James and Jongeward Born to Win: Transactional Analysis with Gestalt Experiments, 1971; Fagan and Shepherd, Gestalt Therapy Now, 1972; Binder, Binder and Rimland, Modern Therapies, 1976; and Rowan, Ordinary Ecstasy: Humanistic Psychology in Action, 1976

4 The method is called the triads test and is connected with G. A.

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Robert Chambers

Longman

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Kelly's personal construct theory. See Kelly, 1955, and Fransella and Bannister, 1977.

5 As a start, see Oxenham, 1982, which contains short descriptions of several games, and overview articles by Oxenham and Walford, who also provides a short bibliography.

6 The Green Revolution Game is available on sale from Marginal Context Limited, 36 St. Andrew's Road, Cambridge CB4 1DL, UK.

7 A short list is Lele, 1975; Leonard, 1977; Hunter, 1978; Bryant and White, 1980; Knight, 1980 (especially for Esman and Montgomery;) Korten, 1980; Korten and Alfonso, 1981; Moris, 1981.

8 For a review see Cohen and Uphoff, 1977. Good sources are the *Rural Development Participation Review* and other publications of the Rural Development Committee, Cornell University, Ithaca, New York.

9 *Indian Express*, 22 June and 29 July 1982, and *Times of India*, 18 September 1982.

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LOCAL INSTITUTIONAL DEVELOPMENT FOR AGRICULTURE

1.0 ACTIVITIES IN AGRICULTURAL DEVELOPMENT

Agricultural development in any country basically involves improvements or increases in three categories: technology, resources and institutions. Identifying or devising appropriate new technologies, and then getting them effectively disseminated, is extremely difficult. Mobilizing and managing the money, manpower and other material inputs needed to take advantage of technological opportunities is not much easier. Given the effort required to deal with technology and resource issues, it is not surprising that the additional attention and energy necessary to foster supportive institutional arrangements are often lacking.

Institutional development must often seem like an extra burden or obstacle in agricultural development programs. Yet it is as essential a part of such programs as the technology and resources provided for. Most of what effort has been put into institutional development for agriculture to date has been devoted to establishing or strengthening national institutions.[1/] Here we are concerned with the development of institutional capacities for supporting agricultural development at the local level. We begin with these basic analytical understandings:

- Agriculture requires converting natural resources, including plants and animals, into useful products through the application of human resources, which are made more productive by the use of capital --infrastructure, equipment, credit, etc.

- Local institutional development (LID) for agriculture is more complicated than for the activities reviewed in Report No. 2, 3 and 4 (natural resource management, rural infrastructure, and primary health care) which provide inputs to agriculture, because two different kinds of institutions, or potential institutions, are involved: (i) units of production, and (ii) supporting institutions.

1/ An important exception has been the many programs or projects to set up "cooperatives" in developing countries. But the way these have been introduced has been too often ill-conceived and mismanaged, producing caricatures of co-ops with little value and little longevity (e.g., Hamer, 1981; for review of experience, see Bennett, 1983). The "community development movement" also engaged in local institution-building, but seldom with an agricultural capability, one of the reasons for its decline (Holdcroft, 1978; Uphoff, Cohen and Goldsmith, 1979; Blair, 1982). Even some of the current work on "farming systems" is surprisingly preoccupied with national-level institutions (e.g., USAID, 1980). Reasons for including local institutions in farming systems work are elaborated in Whyte and Boynton (1983).

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- The activities of agriculture fall into three sets: (a) acquiring or preparing inputs, (b) turning them into products through labor and management efforts, and (c) handling the outputs to best advantage, as listed on the next page.

- Over and above these activities, there needs to be support for agriculture in the form of favorable policies and investments from institutions at the national and regional levels, e.g. in research, extension and infrastructure.

- The complexity of agriculture comes in part from the variety of units and institutions which are involved and the difficulties of getting a good "fit" among the sets of institutions. We will be focusing in this monograph mostly on what we are calling supporting institutions.

Activities are focused at different levels which range from the individual to the international arena, as discussed analytically in Report No. 1. In the figure below, we show in somewhat abbreviated form the levels at which activities concerning agriculture may be undertaken, and the sets of functions to be considered when thinking through appropriate LID for improving agriculture. Figure 2 on the next page identifies more specifically the input, production and output activities involved.

FIGURE 1: LEVELS AND FUNCTIONS FOR AGRICULTURAL DEVELOPMENT

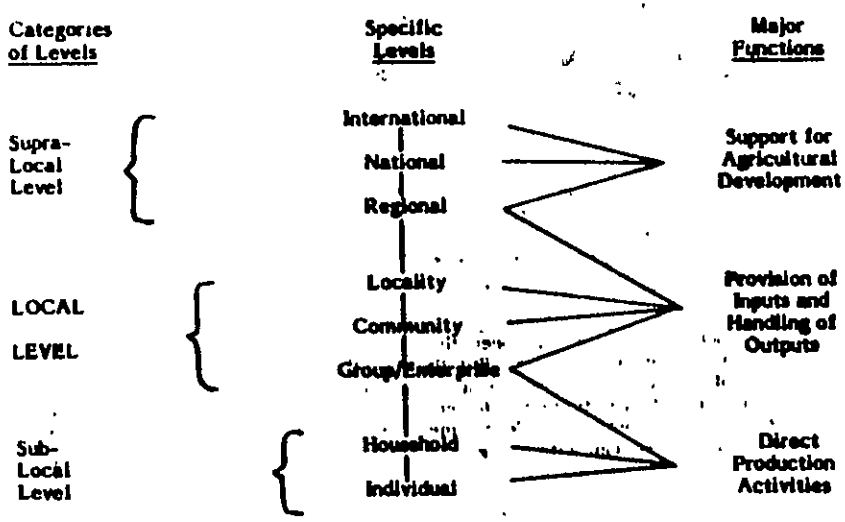

FIGURE 2: AN ANALYSIS OF AGRICULTURAL ACTIVITIES

I. INPUT ACTIVITIES -- commonly mediated by local institutions

A. PHYSICAL INPUTS

1. Seeds and seedlings: purchased, exchanged, preserved
2. Fertilizer: chemical fertilizer usually channeled through local institutions; other sources of nutrients, animal manure, green manure, compost, more often provided by households
3. Chemicals: herbicides, insecticides, fungicides
4. Traction: oxen or buffalo power, tractor power
5. Implements: plough, hoe, shovel, machete, etc.
6. Veterinary medicines
7. Animal feeds: fodder usually provided by households; other feed often purchased

B. CAPITAL INPUTS

1. Short-term (production) credit, for crop season
2. Medium-term credits, for equipment or other purchases
3. Long-term credit, most often for land purchases

C. INSTITUTIONALIZED INPUTS -- usually managed by national institutions

1. Land access: land tenure systems, rental or share-crop arrangements, etc.
2. Technology: information about new products, practices or techniques, commonly developed through research and conveyed through extension system; may use communications or education systems
3. Policy: price relations, subsidies, etc.

D. INDIRECT INPUTS -- considered in Reports No. 2, 3 and 4, respectively

1. Natural resource management: preservation and provision of soils, water, forest and natural resources
2. Rural infrastructure: roads, water supply, housing, etc.
3. Human resource development: education, literacy, health, etc.

II. PRODUCTION ACTIVITIES -- usually carried out by individual producers; may involve some exchange of labor or inputs like traction power; do not often entail real pooling of resources with joint risk

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A. LABOR

1. For annual crops
   a. Land preparation, fencing, etc.
   b. Planting, including possibly nursery work
   c. Thinning and weeding
   d. Fertilizing
   e. Plant protection, pest and disease control, bird scaring, etc.
   f. Water management (where irrigation possible)
   g. Harvesting
   h. Seed selection (re-starts cycle of production)

2. For perennial crops (same as under 1, except)
   a. Less frequent land preparation and planting
   b. May involve grafting and/or pruning

3. For animals
   a. Feeding, includes grazing as well as bringing fodder
   b. Housing
   c. Disease control
   d. Milking, shearing, slaughtering, etc.
   e. Breeding

B. MANAGEMENT — decision-making activities which

1. Procure or ensure inputs (covered in section I.)
2. Mobilize, coordinate, supervise labor inputs (section II.A.)
3. Determine amount, kind and duration of production
4. Ensure balance between inputs and outputs to achieve a value of latter greater than former

III. OUTPUT ACTIVITIES — commonly mediated by local institutions

A. STORAGE: post-harvest and/or post-processing

B. PROCESSING: manually and/or by machine

C. TRANSPORTATION: for processing, storage and/or sale

D. MARKETING: wholesale and/or retail

Note: At the point where produce is sold to a non-household enterprise, it is generally considered that "non-agricultural" enterprise begins. This classification is conceptually objectionable, equating sector with kind of unit, but the boundary between what is "agriculture" and what is not will be invariably somewhat ambiguous.

Production is carried on by individuals, by households and by groups or enterprises, the three lowest levels in Figure 1, with households being the most common locus of production activity (Ralston et al., 1983: 34-35). The provision of inputs and handling of outputs, in contrast, ranges from the group or enterprise level through the community level and up to the locality or possibly the regional level. This schematization indicates that no input or output activities come directly from the national level to production units. All need to be mediated through intervening institutions, many of them "local." It also points to the various, less proximate supports that come from regional or higher levels and are not really "local" in nature. A great range of levels are involved in agricultural development, and if the structures and capabilities at any one level are lacking, the whole system will function less satisfactorily.

Hunter (1980) has summarized the four main problems which governments and donors confront in agricultural development as:

(1) the large number of farmers who will make their own decisions about how to run their own farms (in addition to which there is a large non-farm-owning rural population who survive by pursuing a wide variety of other activities, many of which affect agricultural possibilities);

(2) the large variations in physical, social and political environments between communities and localities;

(3) the great variety of facilities and activities involved in agriculture; and

(4) the difficulties in coordination and organization of a complex series of ministries, extension services, marketing boards, corporations, authorities, cooperatives, local governments, etc.

In light of these requirements, there may be some temptation to try to manage this far-flung, demanding task from above. But the very magnitude and complexity of the task, and the limitations on coordination from above being achieved at field level, make increasing local capacity part of the solution rather than just another part of the problem (Rondinelli, 1984:74-88, 136-140).

Local institutions can help to reach large numbers of small producers in scattered and remote locations. They can achieve economies of time in communication with producers, and economies of scale in handling the inputs and outputs involved in an improved agriculture. Moreover, they can augment external resources and management with funds, labor, information and other local inputs. Local institutions are useful for adapting programs and activities to the variety of conditions encountered in the rural sector, so as to use scarce human and material resources to best advantage.

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Perhaps most important, for dealing with the variety of facilities and activities involved in agricultural development, local institutions make possible more planning and coordination from below to relieve some of the burdens on higher-level administrators and technicians.[2/]

What is becoming known as "the fiscal crisis" in underdeveloped countries will become, if anything, more severe in future years. Even in the event that central government personnel have enough commitment, knowledge and talent to pursue a transformation of the agricultural sector, they are unlikely to have the material means. Accordingly, the role and capability of local institutions will have to increase if agricultural development is to be achieved in the years ahead. The concomitant "energy crisis" facing LDCs, even if it abates somewhat in its financial dimensions, will continue in physical terms and will reinforce a tendency to move away from large-scale, capital-intensive patterns of investment, toward the kind of dispersed, labor-oriented development efforts more appropriate to management by local institutions.

2/ The conventional model of bureaucracy presents inherent contradictions when it tries to achieve coordination of activities across departmental lines. Coordination requires horizontal communication with a view to accommodation and adjustment which contrasts with the vertical patterns of communication in bureaucracy which aspire to command and control. Within a bureaucratic structure, subordinates are accountable only to their administrative superiors and will have little interest in taking risks or incurring inconveniences that benefits others (unless the latter are organized or powerful enough politically to influence superiors to discipline any poor performance of subordinates). To the extent that staff of any organization are accountable to clients (such as customers of enterprises or voters in a local government jurisdiction), coordination is more attainable since customers, users or voters will be able to assess bureaucratic performance better than superiors ever can.

2.0 LOCAL INSTITUTIONAL OPTIONS

Local institutional development for agriculture as we have said covers both production units and supporting institutions, though we will be focusing on the latter. Production units usually take one of three organizational forms, but especially the first:

(a) private operations, usually household enterprises, though in more "modern" agriculture they may operate as corporations;

(b) cooperative enterprises where individuals pool productive resources and share both risk and output, with decisions made on the basis of one-person, one-vote rather than in proportion to resources contributed; and

(c) state-owned enterprises, operating according to public laws and with public resources.

Household enterprises are "not local institutions" as we have defined the term. LID does not seek to develop them as institutions but rather to assist them by government and donor efforts which strengthen supporting institutions. The other two kinds of production units are considered local institutions but we will not deal with them except in passing. We find few production enterprises that are true cooperatives in the sense that all inputs including land are pooled and production is shared accordingly.[3/] Cooperative enterprises that provide inputs for members' own production qualify as "supporting institutions" rather than as production units. State enterprises in agriculture will not be analyzed because they are seldom productive, for reasons we need not elaborate.[4/]

3/ A study of farmer organizations in the communal (tribal) areas of Zimbabwe found that "production groups" were the most common form of agricultural organization (35%). Yet even here, the pooling of resources included only labor, implements and draft power, but not land, and each member received the produce only from his or her own fields (Bratten, 1983). A review of mutual aid work groups by Ralston et al. (1983:106-107) supports this generalization that real cooperative production is unusual.

4/ State farms in Ghana, for example, were spectacularly unprofitable (Miracle and Seidman, 1968). Experience in other countries has been similar if not so extreme. Some "group" farming has been moderately successful (Wong, 1979), but the state is seldom a good manager of agricultural production. Collective agriculture in China has been largely rejected by the leadership there, because the incentives it gave for investment and for hard and careful work, which agriculture requires, were not sufficiently strong. Even when production from a common plot is divided in proportion to labor inputs, this is seldom satisfactory because the quality of such inputs, which has a crucial bearing on output, cannot be taken adequately into account and rewarded.

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In our discussion we are therefore considering households as the operative production units. Agriculture, as we know, entails considerable risk -- from weather, pests, disease, fluctuating prices or labor supply. Cooperative or collective enterprise could offset such risks. But by and large, rural households prefer to keep their respective production activities separate and to deal with risk through other institutional mechanisms such as mutual aid, labor exchange, joining credit or marketing cooperatives, or working with state agencies.

Among the supporting institutions for agriculture dealing with inputs and outputs, there are multiple possibilities:

(1) local administration (LA), field staff of government agencies such as the Ministry of Agriculture, rural credit programs, parastatal corporations, etc.;

(2) local government (LG), possibly having some functions that deal with agriculture, as discussed below;

(3) membership organizations (MOs), made up of producers who hire machinery, take out insurance, lobby government for more services and better prices, or undertake other collective actions;

(4) cooperatives, a special kind of membership organization where producers pool resources and share some risk (such as price fluctuations in a marketing cooperative) in order to improve their economic and social position;

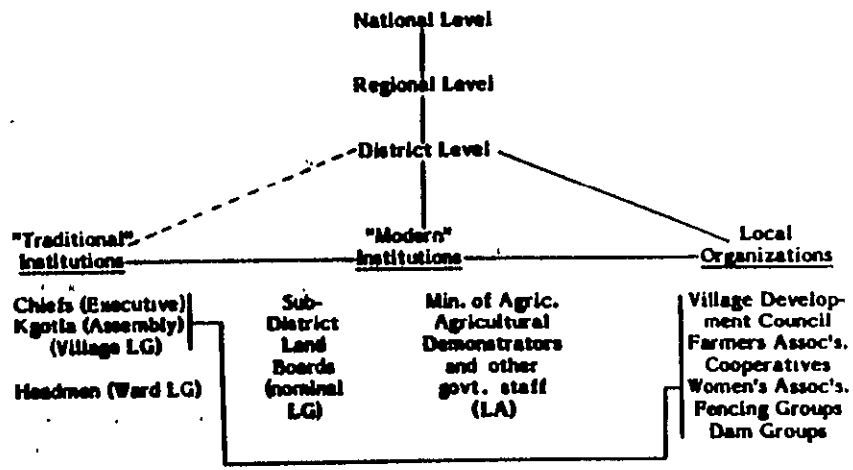
(5) service organizations (SOs), providing goods and services on a charitable or non-profit basis; and

(6) private businesses, selling goods and services to producers or buying commodities from them for profit.

Alongside such "modern" institutions there can be "traditional" ones which may have a role in agriculture. Elaborate crop rotation schemes are managed by traditional local authorities in some communities of Peru and Bolivia, for example, where they still determine what crops will be planted, the work schedule for farm cycles, and the length of cropping and fallow periods (Brush, 1983). Whether such decision-making roles are to be considered as a form of local administration or local government depends on whether the persons in these roles are more accountable to government authorities or to members of the community. The role of village headmen (kepala) in Indonesia functions as an arm of local administration, for example, whereas the traditional authorities in Peru and Bolivia function more as local government. There are many kinds of

indigenous cooperatives -- Seibel and Massing (1974) document 16 different kinds of rotating savings and credit associations in Liberia alone -- and of course there are innumerable "traditional" businesses dealing with agriculture, often in the roles of traders or middlemen (Bennett, 1983).

In thinking about local institutional development for agriculture, all of these channels for moving resources and information upwards, downwards and horizontally should all be considered. We are focusing here on the more "modern" institutions, since they are more amenable to support and strengthening from outside the locality. But cooperative relations among the various local institutions, "traditional" and "modern," should enhance both local and outside efforts to improve agriculture. The kind of network of local institutions which can exist has been diagrammed in the case of rural Botswana by Willett (1981).[5]



5/ On this complex of institutions, roles and organizations, see also Brown et al. (1982) and Kloppenburg (1983). There are a number of service organizations at the local level such as Red Cross Societies and Social Service Committees but they are not involved in agricultural work.

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Each country's configuration of local institutions will be different, of course. In Botswana, the "modern" local government (LG) institution is the District Council, which is not really a "local" institution because it is at too high a level. Also, there is very little private activity connected with the provision of inputs and outputs because of low levels of production and commercialization, so government agencies cover these functions. This will probably change over time, though in semi-arid environments like most of those in Botswana, it will be a while before the level of income and sales will support much of a network of private suppliers and buyers. Elsewhere one would find private commercial organizations to be more important, and we consider them below as one of the major local institutional channels for aiding agricultural development.

We would emphasize that none of these channels is suggested as an exclusive option. Our review of literature for this study has confirmed our earlier conclusion based on an analysis of Asian experience, that agricultural development proceeds better when there are multiple channels that link rural communities to regional and national centers of trade, technical assistance and policy (Uphoff and Esman, 1974). Private businesses, like government agencies, are an important kind of channel but not the only one to be developed. As a rule, whether their relations are cooperative or competitive, different kinds of local institutions function better when operating in association with other kinds, as part of a network of agricultural support institutions.

2.1 LOCAL ADMINISTRATION

Any efforts to encourage or accelerate agricultural development will have some prominent role for the staff of various government agencies working at the local level. This does not mean however that they can or should try to "administer" such development. It is one thing to administer agricultural credit or manage crop purchase schemes, where there can be reasonable control over the factors involved. But agriculture itself is in the hands of thousands, even millions of producers and subject to so many fluctuations of weather, disease, market prices, etc., that it remains beyond the reach of "bureaucratic" or "technocratic" approaches to development.[6] Local

6/ This problem was aptly phrased in an editorial in the Economic Weekly of Bombay when it said: "The clue to the failure of rural development (in India) lies in this, that it cannot be administered, it must be organized." (Cited in Huntington, 1968:395.)

personnel of the central or state government are essentially involved in providing technical, economic or organizational support to producers, not engaging in agriculture as such. The question is how can local administration (LA) best make a contribution as part of a system of local institutions furthering agriculture.

The most common role of LA is to provide advice and demonstration of new technologies to raise production. To be useful and accepted, these must be truly appropriate and productive. If the most innovative agricultural research and experimentation is being done under government auspices, LA is usually in the best position to disseminate this. Especially if a technology is not "embodied" in a tangible form which permits private distributors to make a profit selling it, e.g., raising fish in rice paddies, LA is the most appropriate channel. To the extent that the advantages of an innovation are insufficiently known to make it commercially viable, LA may need to play a role in popularizing it. The best LA role may be to pave the way for private businesses to handle the task rather than maintain responsibility for dissemination, as seen in the case of fertilizer distribution for high-yielding varieties in Pakistan (Falcon and Papanek, 1971:4-5).

In assessing when LA has an advantage for disseminating new technology, one should bear in mind that government staff are not the only, or always the best, means of dissemination. There is a great deal of "horizontal" diffusion of technology among farmers whenever something truly beneficial is introduced. This can be done on an individual basis or through organizations, such as the seed-exchange societies formed among farmers in rural Japan during the early years of that country's agricultural modernization (Aqua, 1983). Private suppliers of technology are often some of the most active purveyors of new techniques or products, and there are non-institutionalized channels of communication such as through local shops or tea-stalls.[7]

When the inputs needed for improved production are scarce and some rationing system is desirable to spread them most fairly or productively, LA is more likely than private distributors to handle this properly, being more directly subject to state authority. Cooperatives or other membership organizations can be enlisted in this but

7/ Discussions with colleagues about diffusion of agricultural technology have produced examples where farmers stole and spread new varieties that they saw as particularly advantageous — high-yielding wheat seeds from Punjab Agricultural University plots in India and a better variety of potato (Renacimiento) from experimenters' fields in Peru (personal communications from Mohinder S. Mudahar and William F. Whyte). So the role of institutions in technology diffusion should not be exaggerated. On this, see Nicholson (1984), but also Goodell (1984).

whether or not they will be less corruptible depends on their traditions and on the degree of local stratification. Any time there are shortages, any local institution is liable to distorting influences.

If use of inputs such as seed or fertilizer is thought to be productive and to benefit not just producers but also the public at large, arguments can be made to subsidize them. LA will probably be the channel of choice for such purposes as well, though subsidized distribution can be handled through private agencies or through MOs and cooperatives, with the same caveats applying as mentioned above. Subsidies create incentives for corrupt practices to which no form of local institution can be assuredly immune. In deciding among channels, their respective histories should be considered to see which is most disposed by precedent to retain reasonable standards of conduct. If there is a substantial subsidy, as with a substantial shortage, one must expect new "precedents" to emerge.

Extension advice as a service rather than a good is less visibly liable to corruption, but its distribution can be similarly unequal.[8/] Extension can be provided through private channels, as seen with commercial crops like cotton and tobacco. But most extension work is done through agents who are part of the local administration (LA) cadre.

The problems of getting good extension advice to farmers through local administration channels are many, quite apart from how it would get distributed among farmers.[9/] (1) Extension workers often receive little useful information from their agency to transmit or there is little information available that could improve the farming system. (2) They are posted in the hinterland and are often isolated and ignored, thereby becoming demoralized. (3) They tend to avoid taking responsibility because they are outside the decision-making process, and initiative is not encouraged or rewarded. (4) They are often burdened with many tasks besides agricultural extension work, and they have many bureaucratic duties to fulfill.[10/] (5) They work in an atmosphere of uncertainty, not knowing how long they will be posted in that area.

8/ The extent of unequal distribution is seldom documented, but Leonard (1977) has calculated, based on detailed field studies, that a "progressive" farmer in Western Kenya was 42 times more likely to get an extension visit during the year than was a "traditional" farmer.

9/ These are common observations about extension services in LDCs, but Leonard (1977) gives documentation on these points.

10/ See data from Chambers (1974) and Reddy (1982), cited in footnote 22 of Report No. 1 on this point. Reducing such bureaucratic demands would be an important contribution to LID for the extension service in most countries.

(6) The conditions of work are often difficult and the facilities for transportation and communication inadequate.

There is almost always considerable scope for improvement in the LA performance of extension work, so judgments about extensions utility should not be made in terms of present levels of performance so much as in terms of what could reasonably be achieved with some reforms and reorientation. For example, Roling and Jiggins (1982) suggest that the effectiveness of extension agents could be improved by not having them play "regulatory" as well as "advisory" roles. If they are monitoring and enforcing soil conservation measures, for example, farmers are less likely to listen to them on improving production practices (Temple, 1972).

One approach which has sought to increase LA effectiveness has been the "training and visit" (T&V) system supported by the World Bank (Benor and Harrison, 1977; Cernea et al., 1983). It seeks to ensure and standardize the performance of extension cadre through fortnightly training sessions. Simple set messages are given to the extension agents to take to a series of "contact farmers," whom they meet regularly and who in turn are to carry the messages to other farmers. This methodology, when it works, is most effective when there is: (a) a productive technology readily diffusible, (b) a degree of supervision over farmers' production, (c) a uniform pattern of farming, preferably monocrop, and (d) relative homogeneity among farmers (Howell, 1982). These conditions are unlikely to apply in very many areas.

One of the limitations of the T&V approach has been a shortcoming in terms of LID. Even when messages get to the contact farmers, they do not get much further.[11/] Contact farmers have usually been chosen by the extension agent or elected only perfunctorily by a set of farmers, who are not a real group with "members" feeling some sense of solidarity and mutual responsibility. Thus the transmission of messages commonly breaks down at this lowest but crucial level for lack of a local organizational underpinning to LA activities. The T&V approach is so focused on messages and meetings that it has seldom tackled the local institutional development requirements

11/ A study of T&V in Thailand found that so much of the program's effort was concentrated on getting messages "out" (or "down") that there was little attention paid to the information which farmers could (and in principle should) contribute to a two-way flow which reached back up to the researchers and planners (Compton, 1982). A study analyzing the working of T&V in a major project in Sri Lanka, concluded that the percentage of farmers in regular contact with the contact farmers was not sufficient to make the program effective (Gunawardana and Chandrasiri, 1981). More optimistic assessments of T&V are offered in Cernea et al. (1983).

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for an effective linkage to the farming community. These include building legitimacy for the channel as well as the activity so that both become "institutionalized."

The orientation of the LA organization and staff is important when trying to judge its potential for work with farmers. As a rule one can say that LA works more frequently and congenially with more advantaged farmers. Indeed, Tendler (1982) has suggested that Departments of Agriculture and rural banks derive bureaucratic power from their ability to provide subsidized inputs to local elites, so they are likely to resist reorientation of their services toward less privileged groups. On the other hand, in some cases such as reported in Botswana by Willett (1981), one finds some extension agents working quite actively on behalf of small farmers and women. In the majority of cases it appears that some amount of "bureaucratic reorientation" will be needed if LA staff are to become productively engaged with typical farmers in need of technical assistance (Korten and Uphoff, 1981).

We will discuss the functions of marketing and processing more below when considering the role of cooperatives and private businesses. We note here that among support activities, marketing and processing appear not particularly suited to government agencies. Maintaining price stability is about the only thing they can accomplish. Seldom do such agencies act as an intermediary between farmers and the commercial or export market in ways that increase farmers' production and benefits. Only the monopoly power of government buying and processing agencies keeps them from looking as uneconomic as they actually are (Bates, 1982). In Jamaica it appears that state marketing corporations, discussed in the Annex (pages 60-65), contributed to a decline in output of certain crops rather than to an intended increase.

There is no question that the technical and policy requirements of agricultural development will make for a substantial LA role in every country. But this needs to be evolved in conjunction with other institutional channels. One of the considerations in weighing LID alternatives is the fact that once the government undertakes a responsibility, it often pre-empts other channels, private or voluntary, from getting into that area. (The Pakistan case cited above was an exception.) A decision to use LA staff and to build up LA capabilities is not an independent choice. It has implications for what other local institutions can and will do. Accordingly, the challenge is to work out a network of alternative channels which make each other more effective in their respective tasks.

2.2 LOCAL GOVERNMENTS

That local governments generally play a minor role in agricultural development was one of the unexpected findings of our study. This conclusion is difficult to quantify, but we found few instances where LG institutions had substantial direct responsibility in the area of agriculture. For example, although the legislation which established panchayats in India in 1957 envisioned an active role in agriculture for these local government bodies, this has not materialized (Nicholson, 1973). The reasons for this are worth considering. From the vantage point of a local government, the technical requirements for agricultural improvement may appear to be beyond LG competance, and LA may encourage such a perception to keep control over decision-making about agriculture. This is apparent in India, where the bureaucracy has kept a tight hold on agricultural functions (Haragopal, 1980; Reddy, 1982). Still, this does not seem a sufficient explanation because the panchayats could have played a larger role if their leadership had been more assertive.[12]

A more theoretically interesting reason appears to lie in the fact that agricultural production is mostly private and its benefits are private rather than public goods.[13] Even though the village panchayats are notoriously dominated by larger and more prosperous farmers, who could use their authority to promote agricultural innovations of special interest to themselves, LGs appear to prefer undertaking activities of a "public goods" nature like roads or water supply that are ostensibly more broadly beneficial and thus less controversial. Richer farmers can more legitimately pursue their agricultural interests through membership organizations like cooperatives, as is

12/ One detailed study of Indian local administration and politics found that areas of higher productivity and agricultural growth had more political pressures for performance, coming mostly from the panchayat system (Bjorkman, 1979:219). Even then, the panchayats tended to be more involved in lobbying and planning efforts than in service provision for agriculture.

13/ "Public goods" were discussed in Section 4.0 of Report No. 3. That local governments may feel constrained to provide "public goods" was proposed by Nicholson (1973).

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regularly done.[14] As local government bodies are established to benefit all the persons within their jurisdiction, those activities which are of use to any and all members of the community will maintain or enhance LG legitimacy. A health clinic or a school is a more appropriate undertaking for a local government, according to this reasoning, than an irrigation channel or a fertilizer program.[15]

A separate explanation based on bureaucratic considerations would point out that local governments come under the jurisdiction (or direction) of some other ministry than the Ministry of Agriculture. A Ministry of Interior, Local Administration or Home Affairs might steer local governments away from agriculture because of concerns about "turf." Conversely, a Ministry of Agriculture might not like to have its staff assist in local government programs. Where such problems of territoriality exist, they would need to be overcome for LID efforts to succeed in strengthening local government capacity for work directly on agricultural development.

If local governments provide infrastructure, as discussed in Report No. 3, or have an active role in forest or rangeland management as suggested in Report No. 2, these are valuable indirect contributions to agricultural development, but the question then becomes, what other local institutions will play primary roles? While we conclude that in general the direct role of local government in agricultural development is limited, we found some cases where LG institutions made substantial contributions to agriculture. Usually these were institutions "descended" from traditional local government roles, such as those mentioned above in Bolivia and Peru and documented by Isbell (1978). A common factor in these instances is that practically the whole community was engaged

14/ A detailed demonstration of such control is found in Blue and Junghare (1975) in their study of agricultural yields associated with farmers' access to fertilizer through cooperatives in India. Some farmers getting no fertilizer from the co-op had very good production while others received large amounts of fertilizer but did not have commensurate output. Closer examination showed the first group to be purchasing fertilizer on the black market, being willing and able to pay a higher price for good quality fertilizer that arrived on time. The latter group were officials of the co-op who were taking as much as they could get to distribute as payoff to members who supported their election and who constituted a third group of farmers, who had better yields than predicted by their official receipt of fertilizer. A fourth group, farmers outside the political network that controlled the co-op, lost out and got no fertilizer.

15/ Ralston et al. (1983:36-38) cite a number of studies from Peru, Kenya, Tanzania, Zambia, Zimbabwe and elsewhere, where community self-help groups as well as local governments engage in activities to build schools, dispensaries, water supply, etc. but not to promote agriculture (e.g. Bratton, 1980). They attribute this pattern to low rural demand for agricultural improvement rather than to the kind of "public choice" explanation suggested here.

in agricultural activity, and landholdings are relatively equal so almost all members of the community have a similar stake in increasing or guaranteeing production. Management of irrigation systems in Pakistan and Indonesia through local community institutions fits both of these conditions (Bhatty, 1979; Coward, 1983). Such conditions -- links of local government to traditional roles, and little economic differentiation of the population -- are not likely to be found very widely, however.

That local government with vigorous and agriculturally-oriented leadership can play a key role in promoting agricultural development is seen in a historical study of such development in Northern Nigeria. Those areas which carried out policies supportive of agriculture through what were then called the Native Authorities (headed by chiefs with elected councillors) achieved comparative success in agricultural development without much infusion of government funds (Tiffen, 1980). The case of the Gombe Emirate is particularly instructive and is reported in the Annex (pages 70-71). Obviously, where local governments are willing and able (with sufficient taxing powers and personnel) to play a larger role in agriculture, this deserves support.

2.3 MEMBERSHIP ORGANIZATIONS

Voluntary associations can perform a wide variety of functions to facilitate agricultural development (Oxby, 1983). Here we are distinguishing such organizations from cooperatives, discussed next, which are a special and important kind of local organization which involves a pooling of resources and risks. What we are terming membership organizations (MOs) operate like limited-liability companies, but not to make a profit. Rather they are formed to serve members who hope to have more profit themselves from getting better, cheaper or more reliable goods and services. These are inputs to production or they enhance the value of outputs.

No pooling of resources is involved in MOs as with cooperatives, though the distinction fades if an organization pools purchasing power to pay lower bulk prices for fertilizer or bargains for a better price when selling the group's commodities. Together MOs and co-ops constitute an "intermediary sector" between what are known as the "public" and the "private" sectors (Esman and Uphoff, 1984:18-22).

Probably the most well-known and widely-acclaimed membership organizations serving agriculture are the Farmers' Associations in Taiwan which have contributed substantially to the advancement of productivity there. The Associations provide

farmer-members with extension advice, production inputs, credit, processing, marketing and other services. Such comprehensive organizations, of course, represent the culmination of a sustained program of developing local institutions (see Annex, pages 77-78). They cannot simply be "built" like an irrigation or road system.[16]

It may be easier to develop multi-functional organizations in more-favored environments like Taiwan. With good water supply, the predictability of tasks and outputs and the level of resources generated facilitates such an evolution. In less-favored environments where soil or rainfall are less ample, such as Botswana, one is more likely to find more specialized, single-function organizations. Indeed, the vitality of self-help efforts in Botswana has encouraged the government there to embark on a Group Development program (Kloppenburg, 1983). Some Farmers Associations and Farmers Committees in Botswana are in principle multi-purpose but usually they concentrate on a few needed functions. Single-purpose groups are legion; they manage small catchment dams for agricultural and livestock production; they sink and operate wells for irrigating gardens; they rent or purchase tractors for plowing; they construct stock dipping tanks to control cattle ticks; to protect planted fields against cattle damage, they build fences more than 100 miles long; they start up poultry or horticultural production (these are mostly women's groups), and so forth.[17]

What these membership organizations have in common is that they all enhance or protect the private production of their members. Some goods or services may be sold to non-members, such as water from a livestock dam or tick-dipping services. This contributes to MO revenue or, in the latter example, to MO effectiveness since ticks spread unless all herders control them. These groups also evolve and change functions as new opportunities are recognized, adding activities or splitting off new organizations to meet these needs.[18]

16/ The Japanese colonial administration which governed Taiwan before World War II had already started farmer associations decades earlier.

17/ The structure and performance of these various kinds of associations as well as of parallel "traditional" institutions are analyzed in Willett (1981) and Brown (1983). The drift fence groups are described in the Annex, page 67 as representative of such local initiative in Botswana. The dam groups have been analyzed in detail in Roe and Fortmann (1982) and are included in the Annex to Report No. 2.

18/ The dynamism of such self-help groups, called mwethya in the Machakos district of Kenya, is documented by Tiffen (1983) with the example of a mutual aid society among women engaged in agriculture. This MO used its agricultural earnings to buy sewing machines for its members, becoming an informal cooperative to make money sewing school uniforms. The profits from this were devoted to establishing a nursery school, so the MO ended up as a service organization (SO) with an agricultural base.

The functions of local organizations in agriculture can go beyond self-help measures to engage in tasks of technological modernization where they are taken into account by scientists and administrators (Goodell, 1984). It is not yet common for MOs to hire their own extension staff, but the example of the Taiwanese Farmers Associations has encouraged planners to see this as a possibility for other organizations. The Malaysian government sought to introduce the Taiwanese model of organization in the 1970s but without much success, because the roles and tasks were being transferred wholesale, without modification or experimentation.

If technical staff are hired and directed by farmers associations, such extension agents can be held accountable to their clientele so that knowledge is put at members' disposal with adaptation of advice to field conditions and energetic follow-up. Another function can be lobbying with representatives of the national government to get more and better services for agriculture or holding local government officials accountable to their constituencies. In the Northern Nigerian case referred to above, through the efforts of the Native Authority (LG) and of rural interest groups, villages have been able to secure a greater share of development services.[19] In Nepal where farmer groups have been organized under the Small Farmer Development Program, these groups have been able to curb the local power structure by taking control of the local government as reported in the Annex (pages 76-77).

Perhaps the greatest strength of MOs is their flexibility, which facilitates their identifying needs and mobilizing efforts to meet them. MOs can retract as readily as they rise, or change their form as the mwethya example from Kenya indicates. Such flexibility also means, however, that such groups are not easily institutionalized. Whether these groups become fully institutionalized is less important than the extent to which they can facilitate resource mobilization and two-way communication in their various incarnations. It is more likely that cooperatives which we discuss next will become institutions, as defined in Report No. 1, because their members' economic stakes and jointly-owned assets give very tangible reasons for supporting their continuation.

19/ "Gombe NA has always vigorously defended expenditure on the villages, protesting strongly in 1950 when its projects for rural development were excised from the plan. In 1967, Rural Development was the only section of the 1962-68 Plan in which expenditure targets had actually been exceeded (less than 50 percent of the remainder of Plan projects had been completed). There is a contrast here with Bornu, a centralized emirate, where over (half of its) Development Plan for 1962-68 was allocated to Public Buildings and Urban Development, both mainly for the capital" (Tiffen, 1980:31).

2.4 COOPERATIVES

There are many kinds of cooperatives associated with agricultural improvement. As indicated already, we are not including here the category of producer cooperatives which represent a unit of production parallel to the household, corporation or state enterprise. The resources which members can pool in cooperatives for economic gain are (1) money, (2) labor, (3) purchasing power, and (4) products. These are associated with the following kinds of cooperatives:

(1) Credit Unions or Savings and Loan Associations. They pay interest on members' savings and provide loans to members. These are not exclusively involved in agriculture but are important for agriculture where banking institutions are not available and moneylenders are extractive.

(2) Labor Cooperatives. These are not common as formal cooperatives, but informal ones are fairly common in less commercialized settings such as in Liberia (Seibel and Massing, 1974) or in the Latin American Andes as discussed already.

(3) Consumer Cooperatives or buying clubs. These can lower prices by group purchasing of commodities or services. When the goods or services are directly used in agricultural production, this kind of cooperatives may be classified separately, as:

(4) Input Supply Cooperatives. The purpose of these co-ops is to get better prices or quality for agricultural inputs. These are important worldwide for agricultural producers.

(5) Marketing Cooperatives. These try to get more favorable prices for members by grading, processing and/or transporting products in common, or by storing and selling when the price is most advantageous. They are found frequently around the world, giving incentives to members to use new technology and increase production because of more favorable returns to labor.

The latter two are the most common kinds of co-ops for agricultural development. Cooperatives can vary considerably in form. The following distinctions can apply to other kinds of local organizations, but are particularly relevant for cooperatives:

(1) Functions. Co-ops can range from single-function, covering just one of the resources noted above, to multiple-function, dealing with several of them. Multi-Purpose Cooperative Societies are fairly common in India and Sri Lanka, handling credit, agricultural inputs and marketing, as well as consumer goods in some cases.

(2) Structure. Co-ops can be simple organizations, operating independently, or they can be federated into larger, more complex organizations linking base-level primary societies into two, three, four or more tiers of organization.

(3) Objectives. Co-ops can be purely economic, with the material advantage of their members as the only goal, or they can have broader socio-political goals as well, viewing the co-op as a means for achieving social change and even wielding political influence.20/

(4) Membership. Co-ops can be exclusive, restricting membership (e.g. permitting only small farmers to join) or they can be inclusive, allowing anybody who contributes their membership share (of money, labor or material goods) to become a member.

(5) Initiative. Co-ops can be started by their members alone, or at government or PVO instigation. Those in the former category have generally been more successful but no strict delineation is possible because a co-op started by its members may become coopted by the government through economic or legal strings; conversely, one set up by government may become quite independently run by its members.

Almost all of these combinations can occur. For example, a marketing cooperative may have been started by its members or at government initiative; it may move on to perform other functions or may stick with that one task; it may have just economic goals or not; its membership may be exclusive or open to anyone.

The most important difference which we observe in cooperatives grows out of these variables:

(6) Accountability. To whom is the cooperative accountable? Are its decisions made mostly in the interests of its members, or are they shaped in response to government objectives and policies? Do officers look mostly "downward" to members or "upward" to officials? Do members see the cooperative as belonging to themselves or to the government?

Even the latter position, however, acknowledges that the economic purpose is present.

There can be organizations called cooperatives where:

- the functions are not ones which members understand and appreciate,
- the structure is complex and lower levels of organization are controlled by personnel at higher levels (rather than vice versa),

20/ If there are no economic objectives, it would not be a cooperative. Dobrin in his study of Kenyan cooperatives notes two contending views, that cooperatives are "essentially economic tools," i.e., business organizations, or "essentially social organizations which serve a need more basic than an economic one" (1970:108-109).

- the objectives are broader or narrower than members want,
- membership is so open that there is no sense of mutual responsibility (the co-op is in effect a public utility), and
- the organization was not the members' idea in the first place,

Such organizations, if they continue to operate, are essentially public sector organizations (LA) rather than cooperatives. When one surveys co-ops in developing countries, one finds a substantial proportion being "cooperatives" in name only. Others operate only partially along cooperative lines, constrained and distorted by standardized models of organization and by government controls.

If cooperatives always operated as they are intended to work, they would be ideal contributors to agricultural development. Unfortunately, actual experience is quite mixed. King says of the cooperatives which he studied in Northern Nigeria:

> The institution created in the villages was insubstantial and dependent on government patronage. If credit or the rewards of leadership were removed, it would collapse immediately. The sophisticated organization described in the rule books would not provide a framework for the rural population to mobilize their own resources and undertake activities immediately useful to them. Rather, the existence of the sophisticated legally registered cooperative, dependent on government credit and authoritarian leadership, inhibited the formation of small simple self-sufficient groups which could be responsive to local needs and might form the basis of genuine village institutional development. (King, 1983:278)

A review of World Bank project experience suggests that co-ops have a high "mortality rate" after 3 to 8 years, when their initial momentum has passed and the complexities of accounting and management are confronted (Cernea, 1981). There are, however, some impressive cooperatives that have survived many years and contributed both to increased production and members' welfare. Examples would be the AMUL dairy cooperative in India (Korten, 1980; Paul, 1982:15-36), the Sukuma cotton growers' cooperative in Tanzania (Lang et al., 1969) and the Portland-Blue Mountain Coffee Cooperative Society in Jamaica (Gow et al., 1979). A recent study of a number of Bolivian cooperatives found much more basis for approval than the author had expected (Tendler, 1983).

It has been suggested that co-ops do better if they limit themselves to a single function (Tendler, 1976), but this may be a matter of phasing. Our analysis (Esman and Uphoff, 1984) found on the basis of quantitative case study analysis that, other things

being equal, multiple functions are associated with greater average success in all of them. This does not mean, however, that co-ops or other local organizations should start with multiple tasks. Rather they do better to start with one or a few activities, moving to take on more only when their members feel a definite need for this and feel capable of managing them.

Cooperatives often experience difficulties in competing with private marketing or supply companies because of their financial structure (Turtianen and Von Pischke, 1982). Whereas private firms have a clear incentive to re-invest earnings to build up capital and become technologically more advanced, co-op members may prefer to distribute profits, because they perceive little advantage from the accumulated book value of assets. Also, cooperatives must maintain satisfactory relations with many different sets of actors: their members, the government, their employees, their customers (where non-members also do business with them). If any of these become dissatisfied, the organization can be undermined.

One problem faced almost universally, though not always succumbed to, is corruption. Few things are more deadly for a co-op than this, since loss of members' confidence and support will kill it quickly. We do not want to exonerate those responsible for corruption, but it is often partly a consequence of the way the co-ops have been set up. Fieldwork on coffee cooperatives in the Bukusu area of Western Kenya concluded that the observably pervasive corruption could be traced to the way they had been set up by colonial authorities (Hamer, 1982). A foreign structure was imposed on a society which was only newly acquainted with cash, let alone formal-legal organizations. There was no attempt to incorporate traditional roles or sanctions. The externally imposed system was incomprehensible to local co-op workers who had limited numerical and writing skills. The requirement of frequent meetings was seen as a waste of time. So a series of informal procedures grew up which allowed substantial abuses of co-op resources.[21]

21/ The lack of controls was not due to the absence of government regulations (there were plenty of those) but community sanctions which would have been more effective were not utilized. Hamer concluded, based on previous fieldwork in rural Ethiopia where indigenously-based organizations do control corruption (see Hamer, 1976), that more decentralized decision-making and sanctioning procedures, by involving members effectively in oversight of cooperatives, could have controlled abuses.

As damaging as corruption by co-op officers and staff may be the domination of cooperatives by government officials.[22/] When co-ops are effectively under the control of officials, for all practical purposes they should be considered as LA and not as local organizations. If administered honestly and efficiently, they may make a contribution to agricultural development without membership participation in their management. The AMUL dairy cooperative in India, referred to above, comes close to such a situation. Its size is such that its base-level societies cannot do more than approve the plans of the managers. This organization is unusual, however, in the extent to which its management has remained reasonably honest and hard-working.

Size presents a dilemma for cooperatives, in that control over officers and staff is easier to maintain in small organizations (Doherty and Jodha, 1979; Bennett, 1983:38-40). But co-ops can produce more economic benefits for members by economies of scale in purchasing inputs or in processing and selling produce which are made possible by larger organizations. Maintaining high standards of conduct within cooperatives generally requires active oversight by members. Unfortunately, such efforts are easiest to elicit when a co-op is not being well-run. When it is operating successfully, there are few incentives for members to invest time in overseeing management, and an abundance of funds may itself increase temptations. This problem is often dealt with in Latin American co-ops by members' appointing "vigilance" committees to review and report on financial affairs.

Cooperatives are usually reasonably careful when handling their own members' money. Financial problems arise most often when some substantial amount of money from the government is involved. This was seen most clearly in the case of the Comilla farmer's cooperatives in East Pakistan (now Bangladesh). These had been one of the most hopeful demonstrations of how small farmers could be enlisted in agricultural improvements (Millikan and Hapgood, 1967; Mosher, 1969; Owens and Shaw, 1972). Members deposited savings on a weekly basis and made loans to themselves as needed, with a high rate of repayment. The government sought to utilize these channels for a large-scale credit program to promote new agricultural technologies (see Annex, pages 74-75). With the large influx of government funds, however, not only record-keeping and management deteriorated, but the incentive to repay declined (Blair, 1978).

22/ This may include corruption by officials, as documented in rural Thailand (Thai Khadi Research Institute, 1980) and Northern Nigeria (King, 1975). King presents detailed diagrams showing how both credit and marketing activities of the cooperatives diverged from the way they were supposed to operate under the control of members.

This brings us to a consideration of what functions co-ops can best perform in support of agricultural development. Cooperative credit unions or savings and loan associations appear attractive as channels for getting capital into agriculture. Loans and repayments are usually handled more satisfactorily when members' funds are involved, as members hesitate to deprive each other of assets. But there are limits on how much co-ops can expand their loan services with only members' deposits to draw on. Outside resources can be channelled into such co-ops to increase the volume of their loans, but any large infusion of funds is likely to lead to the kind of experience just reported from Bangladesh. Whereas people are usually quite concerned to repay private loans, there is an expectation, often created by politicians, that "government" funds do not need to be repaid. Thus, using private banking channels, even if some subsidy must be paid to the banks to handle small-scale loans, seems preferable to using cooperative mechanisms for extending agricultural credit.

If one turns to private or public sector institutions for handling loans to small farmer or landless households, rather than giving credit on an individual basis, some form of group lending may be desirable, both to reduce administrative costs of processing the loan and to increase rates of repayment because the group is collectively liable. This approach underlies the Small Farmer Development Program of FAO in Nepal and the Plan Puebla farmer committees in Mexico (see Annex, pages 76-77 and 65-66). Some effort must go into getting such groups formed, and they may not themselves become institutions. But having such groups can become institutionalized, as they hook up with banks or government agencies which are institutions.

Cooperative institutions are generally somewhat more effective in providing other inputs besides credit. They must be able to operate in a business-like manner, however, or they will not survive, especially if having to compete with private enterprises. If input supplies are scarce, as noted already, co-ops handling them may be tempted to engage in illicit practices. If given a monopoly over inputs, there are similar temptations.[23/] On the other hand, if private dealers have a monopoly, their performance may be improved and their price manipulations checked by having competition from co-ops. Here again we see the need to think in terms of combinations of local institutions rather than of alternative channels.

23/ One of the clearest examples of cooperatives producing counter-developmental results occurred in Ghana in 1965-66. Knowing that the popularity of his government was slipping, Kwame Nkrumah gave the United Ghana Farmers Council, by then a wing of his ruling Convention People's Party, a monopoly over the subsidized distribution of machetes, hoping to boost support for the regime. Machetes, the

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Probably the function where cooperatives can make the clearest contribution is in processing and marketing. This is suggested by the set of cooperatives cited above as some of the best examples of cooperative institutions. Marketing and processing may seem more difficult tasks technically than credit or input supplies, but they are easier to manage as accounting is quite simple and there is not the problem of collecting payments which can be such a source of financial losses in supply and credit co-ops (Tendler, 1983). Marketing co-ops allow producers to get the best possible return from their output, which gives both an incentive for increasing production and more income from which to invest in further improvement.

Another reason for marketing co-ops' success appears to be the commonality of interest between large and small producers, unless the larger farmers buy up the produce of smaller ones for processing and sale. In most situations, large producers gain by having small ones contribute their produce also to the cooperative. Having a larger volume makes processing more efficient, lowering unit cost, and it also improves the market position of the co-op when selling the produce. This is seen, for example, in the Bolivian co-ops and the cotton cooperatives in the Indian state of Gujerat discussed in the Annex pages (61-62 and 73-76).

The advantages of such processing and marketing operations are fairly obvious. Sometimes a government, wishing to make such operations more efficient by expanding their scale, and possibly with a view to gaining control over them, has given cooperatives the sole right to buy or process a crop like coffee or cocoa, which was disastrous in Ghana. Organizations nominally established as cooperatives may be set up to perform these functions, as occurred in Jamaica (see Annex pages 64-65). Co-ops as an institutional form are no less vulnerable than state bureaucracies or private firms to the distorting effects of monopoly, and their efficiency and their benefits to producers have usually suffered. This is to say that as one among several competing channels,

principal implement for cultivation in southern Ghana, were in short supply because imports had been cut in anticipation of opening a new factory to produce them in Ghana. But co-op officials, having a monopoly and operating more as petty government officials than as cooperative functionaries, held back the machetes supplied, selling them instead on the "black market" for many times the official price. This exacerbated the shortage of farm tools, reduced food supplies and raised food prices in the cities (the price of corn went up to more than three times the world market price; West Africa, February 19, 1966, p. 201). Moreover, it undermined still further Nkrumah's base of support. The UGFC is discussed in the Annex, page 68).

they have a lot to offer in agricultural development. But like other channels, they can only contribute to -- not by themselves accomplish -- local institutional development for agriculture.

2.5 SERVICE ORGANIZATIONS

In our literature review, we found local service organizations much more often engaged in activities like education or primary health care (see Report No. 4) than in agricultural development. Practically all of the SOs we came across were making useful contributions. Most were church-related organizations working at the locality level, dealing with very poor communities and justifying their efforts as works of charity.

One example was a Catholic organization working on small-scale irrigation and ox cultivation in Northern Ghana in the 1940s and 1950s. It was quite innovative in its time but was superceded by less effective government programs (Prosser, 1982). The Catholic-sponsored Kottar Social Service Society in Tamil Nadu, India, though involved mainly with primary health care, helped organize almost 10,000 small farmers (most of them having less than one-quarter of an acre) to install field channels for irrigating their land (Field, 1980; see Annex of Report No. 7). In Mexico, a secular organization, FORUSA, established by persons desiring to demonstrate a service orientation of private capital, has usefully assisted small farmers on a fee-for-service but not-for-profit basis (Whyte and Boynton, 1983:202-205). Other examples of service organizations and particularly religious organizations are cited by Ralston et al. (1983:47-49).

It is difficult to reach judgments about SOs when their number in the literature on agricultural development is so small. When there is sufficient motivation on the part of the providers to sustain a program, whether out of religious, ideological or personal values, and when adequate resources can be procured, SOs are almost ideal because of the flexibility they have, being bound neither by bureaucratic rules nor by profit considerations. Institutionalization of SOs, however, depends more on staff and donors than on beneficiaries. The latter are not "members" and have no control over the organization. Accordingly they have no obligations to it and need not support it in a way that would give it broad institutional foundations. To be sure, if staff and donors feel a strong enough stake in the organization's continuation, they can make it into an

"institution" through their own sustained efforts. Even so, at least some minimum acceptance and valuation within the community is needed for such a service organization to become institutionalized in some substantial way.

The role of service organizations may be more that of a catalytic than an operational agent for agriculture. Tendler (1983) found that three of the four cooperatives she studied in Bolivia had been started with Catholic Church leadership. The case of energetic cooperative development in the Dominican Republic documented by Sharp (1977) showed a crucial role from the local church. The strong peasant organizations in Honduras which have helped implement land reform and supported agricultural research activities (e.g., PNIA -- Whyte and Boynton, 1983:176-190) were launched decades earlier with church support. So one may look more for an indirect if not a direct role for many service organizations.

2.6 PRIVATE BUSINESS

The role of the private sector in agricultural development is hardly addressed in the literature in LID terms. What discussion there is deals mostly with comparative claims of efficiency in resource allocation. The institutional aspects of local private enterprises are seldom examined. Making judgments from the literature is made more difficult by the prevalence of stereotypes. The image of the money-grubbing village storekeeper who makes usurious loans and pays miserly prices for commodities clashes with that of the efficient, well-stocked service-oriented store which gives free agricultural extension advice to all who ask for it. There is little empirical basis for assessing how often either view has validity or for knowing what is the frequency of positive and negative performances by private entrepreneurs. Complicating these conflicting images are the competing interpretations of the role of multi-national corporations in developing countries. Some describe MNCs as serving to modernize production (e.g. Freeman, 1981) while others see them as exploiting farmers and thus leading to economic and social stagnation (Feder, 1978).

Our analysis leads to a similar conclusion for private businesses as for co-ops. They will not be adequate, equitable or even efficient if the only channel in rural areas for handling inputs and outputs. But they can make very valuable contributions in almost any situation as part of a system of local institutions mediating between

households and individuals, on one hand, and district, regional or higher institutions, on the other. The question is where are they especially suited or unsuited.

The first consideration is the potential for profit. Are the operations which support agricultural improvement, such as input supply or grain processing and storage, as attractive as other business opportunities for investment? In certain areas quite often there is insufficient commercializable activity to make a private enterprise pay. Where yields are poor and uncertain, with incomes accordingly low and variable, businesses are not likely to get involved in input or output services. Changes in the technological level of agricultural production are then more likely to come from the initiative of government (LA) or possibly from the community through collective self-help channels.

On the other hand, private entrepreneurs are generally more attuned to new opportunities than are government institutions. The stimulus of potential profit can induce persons to innovate and persevere where those "only doing their job" would not venture. So when it comes to getting new services started in unpromising locations, private entrepreneurs may be better than official personnel for supporting agricultural development. Any judgment about the comparative advantage of channels would have to compare just how entrepreneurial are the businessmen and bureaucrats respectively in a specific situation. Having some competition between private and public sector channels may itself be worth planning for.

On specific supporting activities, private channels have many advantages for the provision of credit and other inputs. They can be attracted to start and sustain businesses wherever profitable opportunities exist. If private producers cannot get a margin of benefit from use of the input which is greater than its cost, they will not continue procuring it from a supplier. This seems an elementary calculation of efficiency. The difficulty is that profitability is not always fully known in advance by producers or by suppliers, and the latter must be persuaded that there are potential profits before making the investment that will permit producers in turn to invest in higher production. To turn all decisions about credit and input supply over to private decision-makers can seriously constrain agricultural expansion, which is why most LDC governments have retained at least some role in this area.

The same logic which leads a government to subsidize the use of a new input can justify subsidies for its distribution. What may not appear profitable when used with little experience or on a small scale can indeed produce net benefits once better practices have been learned and economies of scale are realized. Whether or not

private venders will be appropriate channels for such inputs depends on whether agreed price levels can be enforced when demand at the subsidized price begins to exceed supply. Private dealers are harder to regulate than government stores or cooperatives, though the latter also present problems in practice. Once a technology with characteristics of a private good[24/] has proved profitable for all concerned, the case for handing distribution over to the private sector is strong, unless there is a scarcity situation prompting rationing. If there is reason to have competition, possibly distribution can be augmented by cooperative channels.

For the functions of processing and marketing, the case for a private sector role is quite strong because one is dealing with commodities that exist rather than trying to elicit ones that have not yet been produced. To be sure, the price paid to producers, which reflects efficiency as well as competition in processing and marketing, will have a definite incentive effect on production. For this reason, the case for cooperative institutions which rebate any profits to member-producers can be even stronger than for private enterprises if scale and efficiency conditions can be met by co-ops.

State agencies have a rather unsatisfactory record when it comes to buying and handling commodities. The temptations to give short weight and to undergrade produce are notoriously strong for poorly paid government staff.[25/] Private buyers and sellers have the same incentive to pay as little as possible, but they can be bargained with, and usually sellers can find some alternative buyers. Studies of middlemen in the grain trade in India have shown them to be paying prices which cover real costs of operation and do not produce a profit in excess of other investment opportunities (Lele, 1971).

The basic strength of private businesses is the incentive for efficient and innovative use of resources which competition can encourage. The option of regulated private monopolies, often used in the area of public utilities, does not seem as feasible in the agricultural area as in infrastructure. Where responsiveness to changing conditions and risk-taking are important, private operations have an advantage over state-owned ones.

One function where the private sector has a clear advantage over other institutional channels is in the repair of agricultural machinery, and generally in its manufacture. There are few cooperative, let alone state, workshops that can compete

24/ On this characterization, which includes divisibility and excludability of benefits, see Section 4.0 of Report No. 3.

25/ A government may take over and operate a cooperative as if it were a state enterprise. This was the case in Ghana with the United Ghana Farmers Council under Nkrumah's regime 1957 to 1966 (see Beckman, 1976, and Annex, page 68.

with private ones. Ruddle and Rondinelli (1984:80) point out that quite different institutions operate at the community, locality and higher levels. In the villages, one finds small blacksmith shops where artisans produce simple tools and fix equipment, sometimes even tractors and trucks. More complex manufacture and most repairs can be done in enterprises at the locality level, with major production and the most complicated repairs left to companies at regional or national levels.

We began our discussion of private businesses as an institutional channel for supporting agricultural development with the observation which applies to the discussion of local institutions in general: no single kind is likely to be sufficient by itself. Our review of LID experience provides more grounds for our earlier conclusion, that promoting a system of organizations mediating between the individual or household and higher economic, administrative and political levels is more promising than establishing any particular single channel (Uphoff and Esman, 1974).

The complementarities and contrasts in agriculture as each of the kinds of local institutions surveyed has some advantages and disadvantages. For example, if private businesses perform certain agricultural support functions, this costs the government little or nothing compared to what it would pay to accomplish the task through local administration. On the other hand, businesses are set up to advance their own interests, not some general public interest which is the government's responsibility, so they may not be responsive to needs which the government has to serve. For some tasks, the least-costly method may also be least effective.

This consideration of alternatives has assessed the components of a local institutional network which could inform, encourage, assist and reward producers as they engage in the activities that raise food and fiber for themselves, their communities, the nation and possibly for export. We need to look also at the commodities, the conditions, and the producers involved to get a better idea of how differences in their characteristics affect what will be the most appropriate institutions and combinations for a given situation of agricultural development. But first we will consider the general subject of interdependence and dependence of producers which bears on their disposition to cooperate with each other in collective action and with higher level institutions.

3.0 THE INFLUENCE OF INTERDEPENDENCE AND DEPENDENCE

The central theme in consideration of commodities and conditions for agricultural development has been that the extent of dependence, or interdependence, of producers and institutions affects the possibilities for LID.

3.1 HORIZONTAL INTERDEPENDENCE

Producers may be interdependent in a number of ways, thereby creating incentives for cooperation in some kind of local institution -- public, private or membership. The following variables, with examples, can be identified:

(1) topography: hill environments can require some cooperation to control water flow so as to reduce soil erosion and leaching of nutrients;

(2) location: in irrigation systems, there is interdependence between "upstream" and "downstream" farmers; as failure to cooperate leads to the latter's crops suffering and to conflict;

(3) plant protection: controlling pests by coordinating planting schedules, by fencing, or by bird scaring (uncoordinated bird scaring has little effect);

(4) production activities: forming joint plowing teams, or planting paddy seedlings by work groups;26/

(5) marketing: timing harvests and sales to get better prices, by staggering sales to avoid a glut on the market, or by coordinating sales to get more favorable terms (through selling in bulk or hiring cheaper transportation);

(6) processing: joint processing to achieve economies of scale and also quality control for better price returns;

(7) varietal selection: coordinated choice of varieties to avoid deterioration of stock, to control pests, to improve robustness, or to spread risks;

(8) complementarity: pastoralists and agriculturalists may benefit by coordinating livestock and crop activities, providing manure for crops from livestock grazing on residues so long as animals are prevented from damaging crops;

26/ Most examples of joint labor come from irrigated areas, but dryland agriculturalists can also be dependent on mutual cooperation. Getting land prepared for planting and actually planting it right after the first rains can make a big difference in yield, So group action may be quite important in rainfed agriculture, as Vincent (1971) shows in a rural community in Uganda. Such cooperation can be inegalitarian and even exploitative, however, as she documents.

(9) credit: money lending for agricultural inputs or for emergencies;

(10) seeds: some producers specializing in seed production (e.g., for potatoes or rice) and then exchanging seed for consumable or saleable produce;

(11) competing uses of resources: reconciling different demands for water, soil or forest resources, which can create conflict but the need to work out some modus vivendi can give impetus for cooperation;

(12) ecological stability: having to manage natural resources within stable limits to preserve them over time.

Any of these considerations can create horizontal interdependence among producers, though this does not mean they will necessarily organize themselves to handle the various problems effectively. The last two variables in particular create problems as well as needs for cooperation, as discussed in Report No. 2. Program designers should look at the number and kind of factors which would dispose agriculturalists to cooperate horizontally as an indication of the probable ease or difficulties with which greater participation in local institutions for agriculture could be promoted.

3.2 VERTICAL INTERDEPENDENCE AND DEPENDENCE

Given the differences in power which vertical relationships usually entail, one should not assume that there will be interdependence between producers and higher-level institutions; dependence and possible exploitation may be the result. Whether positive or negative vertical relations exist needs to be assessed separately from whether or not producers have reason to relate vertically to local or supra-local institutions. Factors which can contribute to vertical dependence of producers on institutions outside their community or locality are several:

(1) inputs: need for credit, seeds (supply and certification), and other inputs like fertilizer and chemicals;

(2) need for processing: important especially if the product needs quick and quality processing, as discussed below with regard to milk and tea;

(3) need for marketing: important especially if crop is not consumed as food, e.g. tobacco or cotton;

(4) need for transportation and/or storage: important especially if the commodity is perishable or especially vulnerable to pests.[27]

Where rural producers are dependent on higher-level institutions for assistance, this can create antagonism and withdrawal if the relationship is manipulated extractively from above. Just as one looks favorably upon interdependence among farmers at the group, community or locality levels, and disapproves of exploitative dependence such as arises from patron-client or indebtedness relationships, so is the relationship of interdependence between institutions at local and higher levels more desirable than dependence of the former on the latter.

Having terms of exchange which are mutually satisfactory should lead to more continued and productive activity on both sides, being reinforced by the contributions which each makes to the other's success. This requires local institutions which are capable of planning and implementing programs of activity on their own and which are able to "speak back" to a higher-level institution when its proposals are found to be technically unsound or economically disadvantageous.

Local institutions which have a strong base in horizontal interdependence should be able to contribute to a strengthening of vertical interdependence over time. By the same token, vertical assistance from higher-level to local institutions so that the latter can function more effectively should encourage producers to enter into more horizontal cooperation, which strengthens the capability of local institutions. These are general but somewhat abstract principles of LID strategy. They are made more concrete by considering the significance for LID choices of differences in commodity characteristics, in conditions of production, and in the characteristics of producers.

27/ We see in these latter examples the importance of the nature of the crop, discussed in the following section. In the case of potatoes, for example, there are many problems of spoilage and disease during storage, and also the problem of shrinkage. Andean peasants store their potatoes separately to reduce risks of loss due to pests or disease, but also because they would find it difficult to determine reduced shares by weight after potatoes have been stored collectively for some time and have shrunk.

4.0 IMPLICATIONS OF DIFFERENCES IN COMMODITIES

Producing different commodities presents agriculturalists not only with varying technical problems but also with varying local institutional requirements. The simplest example is to contrast growing field crops with raising large herds of cattle. In the first instance, the area locus of activity is fixed whereas with the second, it must vary unless the animals are stall-fed. At the extreme of transhumance, not only animals but whole human communities move hundreds, even thousands of miles a year. The jurisdiction of local governments in the first situation can be territorially demarcated, and other local institutions can be as sedentary as the people they serve. In the second, organizations must be adapted to migratory patterns. Authority relations, for example, being intimately associated with the people who give and receive commands, will be more personal than geographic. Local administration to be effective has to "follow the herds" or transfer responsibility among several LA units during each year.

The permutations of crops and cropping patterns are almost infinite, so our analysis can only indicate the kinds of LID implications to be looked for. The key concepts from organization theory which illuminate these relationships have just been discussed: dependence and interdependence, viewed both horizontally among persons operating at the same level, and vertically between institutions and persons at different levels.

Two of the most successful organizations-become-institutions which are currently raising the productivity and well-being of small farmer households are the AMUL dairy cooperative in India (cited in Section 2.4) and the Kenya Tea Development Authority (KTDA) (Steeves, 1975; Lamb and Mueller, 1982; Paul, 1982:51-62). The first is a cooperative in form and the other is a parastatal (local administration) with a network of farmer-grower committees (MOs) attached. Both exemplify how the nature of the commodity appears to influence the success, and possibly the structure, of the institution.

Although they represent different types of local institutions, their structures of organization are remarkably similar, as the KTDA committees operate in much the same manner as the AMUL primary societies. These base-level units collect the product (raw milk or fresh-picked tea leaves) from farmers twice daily and handle weighing, quality control and payment. They work with members on behalf of the higher-level parent organization to improve the quality and amount of production,

and also get involved in matters like road improvement because collection must be timely and regular.

The two activities, milk and tea production, have more in common than simply being beverages. In both instances, production is continuous, not seasonal as with many other crops. Cows go dry, and tea bushes may be plucked less often during the dry months, but this is quite different from crops that have planting and harvesting seasons and usually a long season when no cultivation is done. Thus the members are usually in daily contact with the organization through which they deliver and sell their product.

The product itself is dependent on processing. True, milk can be consumed, but it cannot be preserved in its fresh state. It needs to be refrigerated and pasteurized, or converted into a dairy product like cheese if it is to last. Tea leaves have no value unless processed and they lose their quality fairly quickly after plucking. Like milk they need to be taken to facilities for processing soon after gathering. This means that producers are dependent on some organization to ensure rapid transportation, as it is inefficient for them to take their produce individually to the factory.[28]

Third, both are commodities for which quality is very important. Spoiled milk becomes worthless, and poor tea is not desired, whereas good milk and fine tea are much sought after, and consumers will even pay premium prices for good quality products. An organization which can ensure quality generates a good margin of profit which can be shared with producers who cooperate.[29] Both AMUL and KTDA have devolved responsibility for controlling quality to the primary groups. If a group's lot is found to be spoiled by careless or deliberate action, all are penalized. If on the other hand, quality is maintained, all benefit because they get a good return for their labor. KTDA in fact has a very attractive bonus payment for quality (see Annex, pages 69-70).

An additional common feature of milk and tea is that each can be produced by relatively low-resource farmers each with only one cow or a few tea bushes, as well as by larger farmers. This relates to the socio-economic characteristics of producers (Section 6.3). Other commodities cannot be produced as satisfactorily on a small scale.

28/ A dairy cooperative in Uruguay found that it could save its members 1-3 hours a day by taking over the hauling and sale of milk (Hirschman, 1984:19, see Annex, page 66).

29/ There can be problems of adulteration with both milk and tea. Farmers may be tempted to add water or other fluids to milk to increase its volume. (Measuring butterfat content of very small amounts is impractical.) Teapickers may similarly be tempted to bulk up their pickings by taking also the larger, older and less tasty leaves instead of just the bud leaves, or even to include sticks which add to the weight.

The AMUL "model" has been hailed for benefiting small and poor producers by paying a higher price for milk than did the local traders. Its processing facilities for making powdered milk, cheese and butter (when there was an excess of supply over demand for fresh milk) have enabled it to deal with the seasonal fluctuations of milk output and to share the benefits of this with members. That AMUL and KTDA could develop strong local organizations which promote efficient production, technological upgrading, and also a broad spread of benefits to small producers is in large part due to the structure and incentives which their planners created (see Annex on KTDA). But the nature of milk and tea as commodities should not be underestimated as factors. Not all dairy and tea operations are as efficient as AMUL and KTDA, but few other commodity operations have matched these multi-tiered institutions which reach down to (or up from) the local level.

Several of the cooperatives which might compare with AMUL or KTDA handle coffee or cocoa, also commodities which require processing and aggregation of produce to get the best price when selling it. There is not as much continuous contact, however, which creates attachment to the organization, and the processing and quality requirements are not as precise. Still these considerations are important. We have commented already on the Portland-Blue Mountain Coffee Cooperative Society in Jamaica, which has the advantage of producing some of the best coffee in the world which can command a premium export price. Marketing makes grower-members dependent on the organization but they are well rewarded financially for their cooperation.

The AMUL model has now been adopted by the National Dairy Development Board in India to promote milk production through the same kind of cooperative structure on a national scale with World Bank funding. Since AMUL has over 200,000 members, it is far beyond the "pilot project" stage. However, it took more than 20 years for the AMUL model of organization to develop and become institutionalized in its environment (Korten, 1980). New problems are likely to be encountered, requiring some organizational modifications, when extrapolating the model into different socio-political environments even for the same commodity.

More important from the viewpoint of commodity analysis, the Government of India and the World Bank, regarding the AMUL organizational model as a generalizable means to assist the poor and increase production, are setting up similar small farmer cooperatives elsewhere in India for producers of oil seeds. This program may eventually prove successful, but it has faced already certain problems that should have been

predicted from a comparison of contrasting commodity characteristics between milk and oil seeds. First, in terms of benefiting the poor, growers of oil seeds are less often among the very poor because crops cannot be grown without access to land, whereas cows can be raised and grazed by the landless on common property if necessary. Second, the buyers of oil seeds are much more powerful (known locally as "oil kings" — telrajah) than were the village middlemen who bought and sold milk. As a perishable product, milk was less easily bought and held in large quantities, making it less profitable. The vested interests which the AMUL-type oilseed producer cooperatives must confront have more incentive and means to resist the organizational efforts of small producers.[30/]

From the farmers' viewpoint, oil seeds do not need to be processed with as much urgency as milk or tea, so they do not create as much producer dependence on an organization. Moreover, compared to milk and tea, oil seed processing can be done by small mills and offers fewer economies of scale, which create benefits that can be remitted to producers who belong to the organization.[31/] In milk and tea production, intense husbandry and attention to detail can pay real dividends, whereas such quality considerations are much less for oil seeds, where profit comes from scale of production and the quantity sold. One should therefore not expect the same kind of local institutional strength (or distribution of benefits) emerging from the oil seed cooperatives in India as was possible with dairy cooperatives.

Neither should one expect the KTDA model to work the same way with hybrid maize, for example, a crop which the Kenyan government would very much like to increase. With maize, there is no day-to-day activity that links farmers to the organization continuously, making it always salient to them. There will be long periods during the year when the organization would be irrelevant to maize producers. This is never the case for KTDA and AMUL members.

With maize (compared to tea or milk) there is no similar need for processing, and no comparable need for marketing since much of the maize produced is for home consumption or local sale. The functions of a supporting institution would tend to be

30/ This resistance has included violence, as reported in India Today, January 15, 1982.

31/ In the case of tea, the organization (KTDA) controls access to the world market for getting favorable export prices. Being able to export at a premium price is not important for oil seeds. AMUL has been able to get into the export business through its marketing strategy. There is some controversy over how beneficial this has been, but it has some advantages for institutionalization.

limited to selling hybrid seed and fertilizer at the beginning of the season, possibly selling insecticides or herbicides during the growing period, and then buying some of the product when harvested, doing nothing more until the rains come again the next year. Moreover, the quality considerations which give AMUL and KTDA more profitability to share with producers would be lacking with maize.

We see that use of more modern technologies and sale for the market make producers more dependent on higher-level institutions for manufactured inputs and favorable prices. This gives producers incentive to have their own institutions for horizontal cooperation and to deal vertically with state or private sector organizations. When producing for the market, there is often need to coordinate planting and harvesting schedules, either to sell in greater bulk or to avoid glutting the market and lowering prices. Cooperation in plant or animal protection measures becomes more important as more capital has been invested in the crops, trees or livestock. Thus, to the extent a commodity is commercialized, there is more basis for local institutions because of the new horizontal and vertical relationships which producers have. (An exception would be the kind of local institutions established to facilitate barter arrangements as in the case of Ayni Ruway in Bolivia (see Annex of Report No. 6).

This is all the more true where production is for export, because of the more stringent requirements for quality control and for timing of harvest and sale. We discussed in Section 2.4 the need for such institutions to operate in an efficient manner which serves the interests of producers. This often makes government institutions less viable than cooperative or private channels. One of our RDC studies found that the marketing organizations set up by the government in Jamaica to support and promote the production of bananas, as well as other export crops, had in fact a disincentive effect which reduced production (Goldsmith, 1982). The fact that bananas are a perishable commodity created requirements for a very responsive institution. Both producers and staff needed to meet high quality standards for export. In an agency purchasing a non-perishable staple like rice or wheat, the bureaucratic approach which the marketing organizations displayed would have been undesirable, but it would not have been so disastrous as with this commodity (see Annex, pages 64-65).

While products that involve a greater amount of capital investment and use more modern technologies make for greater dependence on higher level institutions, it is important to note that these products may also be more "exclusive." Some examples are cattle fattening operations, tree plantations that will not produce for several years,

cotton production which requires a high expenditure on pesticide, or irrigated rice in Latin America where only the wealthy can afford irrigation.

Small farmers who cannot afford such capital investments are usually excluded from local institutions tailored to the needs of these larger producers. In the case of certain Bolivian cooperatives, small cocoa producers could not benefit from the mechanization equipment available through their coop for its rice growing members. Cocoa production was being done in areas not suitable for mechanized rice production. Thus the small farmers were excluded from benefits (Tendler 1983). Here we see the characteristics of the commodity interacting with certain producer characteristics, discussed in Section 6.3.

We found practically no analysis in the literature on various institutional requirements or constraints which arise for certain commodity characteristics. We can thus only sketch with these examples the need to consider the implications of such characteristics for LID planning and implementation. Once the proposition is stated, it is obvious that institutional forms are unlikely to be equally effective in support of all kinds of commodities — field crops or tree crops, large or small animals. The dependence or interdependence (horizontally and vertically) which producers of different commodities confront should receive more attention to determine the value which local institutions will have for producers in facilitating cooperation among themselves and linkages outside their group or community.

5.0 IMPLICATIONS OF DIFFERENCES IN CONDITIONS

Although our review of literature covered all kinds of agricultural development, we were particularly concerned with the problems likely to be encountered in less-favored areas where water presents a definite constraint for crop production. These areas are often referred to as "rainfed," though this designation can be misleading. All crops are rainfed, indirectly if not directly. The term is usually meant to distinguish between irrigated and non-irrigated agriculture. Yet, if rainfall is ample and reliable, it does not present a constraint on production and the area may not differ greatly from an irrigated one. The variable of concern is not just the amount of rain but timing and distribution of rainfall which can be more important, as seen from the fact that the Indian state of Gujerat has more annual rainfall than the agriculturally more productive state of Punjab (Nicholson, 1975).

We are not concerned with "rainfed" agriculture as such but rather with the implications for local institutional development of having less favorable natural conditions for agricultural improvement. These are contrasted with LID tasks where the physical environment is more favorable, as in irrigated areas. What are the differences to be taken into account when seeking to promote crop production under less advantageous conditions?[32]

Areas with limited, excess or unreliable rainfall will generally have a weaker network of local institutions compared to those with irrigation (or ample and reliable precipitation). Central governments find it difficult to staff and supervise their offices in less-favored areas, so LA is less effective. Local governments have a weaker economic resource base to draw on and commonly display similar limitations of capacity as LA. Because the possibilities for profit are less than in richer, irrigated areas, private enterprises are less numerous and less developed.

With the limited resource base, one may find that local organizations (membership organizations, cooperatives and service organizations) are fewer in number or less capable than where the resource base is strong. However, one often finds the traditions of self-help to be more vigorous where the need for them is greater, where the

32/ Agriculture in fact includes more than crops, though the term as usually used ignores livestock and trees in favor of field crops. Livestock development is likely to become more important where rainfall is too meager or unreliable for good crops. Agro-forestry is similarly related to rainfall, terrain or other problems that give trees an advantage over other plants. We will be focusing here on issues relating to field crops.

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influences of "modernization" and "commercialization" have also been less pervasive. In our study of local organizations' effectiveness, we did not find that local organizational performance was higher where natural resource endowments, infrastructure or per capita income were greater (Esman and Uphoff, 1984:106-114).

So it is not certain that local organizational capacity will be lower where physical conditions are less favorable for agriculture. Moreover, the benefits from horizontal cooperation may be substantial. In his study of agricultural performance in the tribal areas of Zimbabwe, Bratton (1983) found nearly half of the almost 500 households randomly selected were members of agricultural associations sponsored by government, private business or church organizations. To a significant degree, he found maize farmers in groups consistently outproducing individual (non-member) maize farmers, but more important the differences were greater in areas where rainfall and soil conditions were less favorable.

> Whereas group farmers produce nearly twice as much as individuals in Chipuriro, they produce almost three times as much in Gutu (the more disadvantaged area). The implication (which needs further testing) is that farmer organizations make the biggest contribution to production in the more marginal areas. (Bratton, 1983:17)

Oxby (1983:54) reports higher yields among rainfed group farmers in Kenya compared to non-group members "who were also assisted by extension workers even though farmers in groups had a lower rate of instructors per farmer. A World Bank project in the rainfed areas of Northern Ghana floundered for some years after failing to set up the farmer groups provided for in the project design to help operate credit, seed and fertilizer programs run from farmer service centers. The project began to get "on track" only after such groups were established. (The URADEP project is reviewed in Uphoff, 1985.)

"Modern" institutions may be less effective in more remote and unfavored areas, which suggests that the strategy for local institutional development should build on any other capacities that exist. Excellent examples of such an approach where disadvantaged populations were practicing agriculture under rainfed conditions are the farmers associations established among the Tiv in Nigeria which built on traditional rotating credit arrangements and the development centers set up among campesinos by DESEC in Bolivia, which capitalized on traditional community solidarity (Moss et al., 1976, both cases are described in the Annex to Report No. 7).

The main environmental feature in such circumstances, compared with irrigated conditions, is that agriculture is more variable and involves more risk. A greater variety of crops will also be grown than with irrigation, partly to offset the factor of risk. Rainfed producers will generally be less interdependent and more dispersed than with irrigated cultivation, and this affects the patterns of local institutional development. Without accepting the thesis that irrigation requires regimentation of farmers and creates power in the hands of a bureaucracy (Wittfogel, 1957), it is clear that irrigation reduces agricultural variability and creates predictability so that agricultural tasks can become more routinized. With more uniform and homogeneous activities, coordination is more beneficial and this establishes a greater role for LA.

Conversely, with more variety, variability and risk in rainfed agriculture, LA is less well suited to be involved in management or even in support of agriculture. Larger responsibilities may be planned for local government, if it can take them. LG should be better able than LA to respond to local variations and to urgent local needs. But more likely it will be private, voluntary or cooperative institutions, more flexible in their operation and more attuned to risk-taking, that can better exploit what opportunities exist in a less hospitable environment.

The dispersal of population in such environments means that most business activities are likely to be less profitable. To be sure, adverse conditions may raise people's demand and willingness to pay higher prices for goods and services (or to accept lower prices for their produce), so some businesses will have incentive to provide goods and services. Working through administrative channels under these conditions is likely to be very expensive. Improvisation, such as having local shopkeepers double as postmasters, is needed for such circumstances.

One might expect to find households under these fluctuating conditions more inclined to use local institutions to reduce their risks. Cooperative farming would be one such means, but it is not common to find real pooling of resources.[33/] Families prefer to try to maximize their own production by their own efforts. Labor and other

33/ We found one study of a joint family farm cooperative and an ex-soldiers' collective at village level in Uttar Pradesh, India (Lerner, 1971). Both were able to pool resources to give members better access to water through tubewells for supplemental irrigation of crops. But in both cases, a significant factor which added an element of cohesiveness was having an agro-business like an oil press or grain mill because there were joint assets apart from the agricultural production. Both local institutions would have been more successful according to Lerner if more protection could have been given against risk, possibly through linkages to state institutions, since risk was inhibiting investment and re-investment in the co-ops.

resources such as animal traction are often exchanged, but the units of production remain discrete. Mutual assistance is sought and given after the fact in case of crop failure. This means that informal local organizations are very important and should be respected and preserved. Introducing more formal guarantees through officially supported local institutions would probably not succeed because where risks and variability are great, their consequences become practically uninsurable. What we see in rainfed areas is usually informal collective self-insurance with no assured level of protection.

In general we find somewhat less interdependence among rainfed producers as compared to irrigated agriculture. Decisions on what to plant and when can be made separately more easily under rainfed conditions. This would seem to account for the greater frequency of cooperatives where there is irrigation, where agricultural activities are more homogeneous and need to be carried out congruently with one another. Moreover, under rainfed conditions, farmers are usually much less dependent on technology that requires inputs from outside the community such as would be supplied through local institutions linked to higher-level private, state or cooperative enterprises. Farmers in rainfed areas are thus likely to have less need for local institutions which handle technological inputs and saleable outputs and thus less vertical dependence on higher-level institutions. We would contrast the following situations:

Dependence among Farmers	Dependence on Local Institutions Linked to Higher-Level Institutions: Low	Dependence on Local Institutions Linked to Higher-Level Institutions: High
Low	(I) Rainfed Millet Production	(II) Rainfed Hybrid Maize Production
High (Interdependence)	(III) Traditional Irrigated Paddy Production	(IV) Irrigated HYV Paddy Production

In the first situation (I), neither horizontal nor vertical linkages are very salient to farmers. Farmers' cooperation is less evidently beneficial, either to produce their own crops or to get inputs or services from outside. The opposite situation (IV) is with irrigated, technically advanced paddy production, which provides incentives for farmers to work together at field level and at higher levels, to get an assured water supply and to have the inputs needed for getting high yields.

Agriculture under most rainfed conditions approximates the first situation. Introducing hybrid maize, which requires purchase of seed each year and which yields significantly better with fertilizer, represents a move toward vertical dependence (toward situation II) without necessarily changing the relations among producers. They may get benefit from access to supporting institutions, but there is still no great need for them to cooperate.

In this regard, the experience of Plan Puebla in Mexico is instructive. There the international center for maize and wheat research (CIMMYT) was trying to introduce new maize varieties, but with little impact. What made a difference was introducing a scheme for group credit. This enabled farmers to get fertilizer and chemicals to improve production from their existing varieties, already adapted to the difficult prevailing ecological conditions. This local organizational approach fostered horizontal connections and cooperation among farmers, which in turn supported better vertical linkages with agricultural support agencies. In effect, this moved farmers toward situation IV in the diagram above, creating conditions more favorable for local institutional development (see Annex, pages 65-66).

Agriculture may appear simpler in rainfed areas because the level of "modern" technology is low. Very basic implements are used. Production follows the cycle of the seasons usually with long slack periods. To be sure, as more knowledge is gained about the farming systems practiced under such conditions, scientists are gaining more respect for the complexity of these production processes, which are not so elementary. They employ a large number of crops and intricate techniques for tasks like moisture retention, weed control and crop protection. Where the natural resource base cannot be taken for granted, special efforts must be made to coordinate efforts at the farm level and at all levels above it as documented by Hill (1982).

One of the few systematic studies of a program operating in a semi-arid environment -- in Kenya -- highlights the interdependence of strategies for increasing agricultural production, developing water resources, and promoting soil and water conservation (Meyers, 1981). Farmers' receptivity to soil conservation promotion, for example, is largely dependent on how well a household succeeds in crop production. Earning some cash income provides resources for investing in conservation efforts, but the latter also become more attractive to a household when it depends on crops as a source of cash income. "Those who seek increased production work harder to insure the continued productivity of their soil and pastures." (Meyers, 1981:87) Off-farm income possibilities are major determinants of a household's ability to absorb the risk involved

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in agricultural innovation, so these must figure prominently in a development program for such a resource-constrained environment.

The operational difficulties of carrying out such a program under adverse natural conditions make it imperative that institutional mechanisms be available which can facilitate the day-to-day coordination of various sectoral components. There needs to be mutual reinforcement among activities and certain economies of operation such as avoiding duplication and saving trips. Meyers strongly argues that the local level is the best place for achieving such integration because

> from this vantage point, it is easier to grasp and act upon the concrete possibilities for coordination and integration in specific planning and implementation terms. (Meyers, 1981:54)

This does not obviate the need for strong support from central institutions. But particularly in regions where the natural resource base is poor, it is difficult to sustain central capabilities (financial, technological and managerial). Such regions are viewed as "backwaters" by the staff of line ministries, so less qualified or poorly performing staff are likely be posted there, sometimes as a disciplinary measure (Meyers, 1981:56). The paradox is that central institutional capabilities are likely to be weakest where they are needed most. This makes all the more significant Bratton's findings (1983) that the agricultural returns to farmer organization may be greater in the less-favored ecological areas (see Annex, pages 73-74).

Strategies for agricultural development in rainfed areas will need to be conceived and carried out differently, with more devolution, than in previous efforts focused on physically more-favored areas, where financial and human resources for a centrally-directed effort were more available. Governments in many less-developed countries wanting to push their agricultural programs into less-favored areas now face a growing "fiscal crisis" which limits their possibilities for expenditure. This makes new approaches which rely relatively more on local institutions, rather than simply on central institutions, all the more appropriate.

6.0 IMPLICATIONS OF DIFFERENCES IN PRODUCERS

Having considered how decisions on the allocation of tasks among local institutions for agriculture could be affected by differences in what is produced, and under what conditions, it is appropriate to look at who is doing the producing, to see how this may affect LID. The common presumption has been that agricultural producers are "farmers" in the Western sense of the term that they are educated, landowning, settled and male. To the extent that the agriculturally active population departs from this "model," one may expect that standard institutional solutions should be varied somewhat. This is worth considering on the basis of existing information.

6.1 LITERACY

It is widely held that literacy is a requirement for the effective functioning of local institutions. To the extent that farming populations are less literate it might be thought that LID is less feasible for agricultural development. It is hardly likely that lack of literacy (or numeracy) is an advantage for local institutional development. Yet a cross-national analysis of 150 local membership organizations and cooperatives found the correlation between their performance and community literacy levels was not at all significant -- only 0.08 (Esman and Uphoff, 1984:119). So literacy does not seem to be a requirement for local organization success.

Other local institutions should not have to be any more dependent on literacy. When nobody in a community is sufficiently literate, the staff of local administration can be recruited from among educated persons outside the community. This might not be as desirable as having staff from the area but it means devolved administration can function where literacy levels are low. Local governments can also recruit from outside to fill certain positions. The legendary success of many illiterate businessmen in rural communities and market towns certainly indicates that literacy is not necessary for small-scale enterprise.

The need for literacy in local institutions is to some extent a consequence of the paperwork required by higher levels of the bureaucracy which puts an unnecessary burden on the uneducated. King (1981) found this with the cooperatives he studied in

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Northern Nigeria.[34] We found very few situations in the literature where illiteracy was a real barrier to performance of development tasks through local institutions if the national government wanted them to operate effectively. So this is one characteristic of producers which does not appear to be as important as commonly thought.

Even where the general literacy level is low, there are invariably some literate members of the community who can perform roles requiring reading, writing or figuring skills. The chief value of literacy appears to be that it gives local representatives more status vis-a-vis higher level officials to get the latter to carry out their development responsibilities correctly.[35] Whether the national government wants local institutions to be successful is crucial. It can let its staff know that it wants them to conduct themselves supportively despite any inconveniences of illiteracy, or it can accept haughty or indifferent behavior toward members of the public.

One reason why local organizations (and possibly other local institutions) may perform well despite low levels of literacy, so long as the national government is supportive, is because the greater the extent of illiteracy in a locality, the more likely it is that the population includes persons of high intelligence and character who can provide leadership and management talents. Where educational opportunities have been widely diffused, upward social mobility and geographic mobility have often moved many of the most talented individuals out of farming and other low-status occupations and into towns.[36]

We should not be unconcerned with the level of human resource development in an area since this is the true foundation for local institutions. Education and opportunities to gain experience in problem-solving, planning, resource management, etc. are certainly to be promoted. But judgments about the feasibility of local institutional development should not be made solely on the basis of literacy levels. Where illiteracy

34/ These cooperatives, having mostly illiterate members, had it complex forms and reports to fill out regularly, when several simplified documents would have sufficed (King, 1981:262). Such infliction of paperwork is not restricted to co-ops and local organizations. Local administrative staff may be similarly burdened as suggested in Section 2.1.

35/ In our analysis of local organization performance, one of the only tasks whose successful performance correlated significantly with literacy levels in the community was "control of bureaucracy" (Esman and Uphoff, 1984:136).

36/ One of the few things we are reasonably certain of is that intelligence, like other human capabilities, is distributed across the whole population without regard to race, residence or other characteristics of parents. Though backward social, economic and educational circumstances can prevent high potential from being fully realized, the likelihood of having extremely capable individuals, some of them geniuses in fact, is significant in poorly educated rural communities.

is pervasive, the strategy of LID should rely on simpler, more informal modes of organization. Also, the bureaucracy may need some reorientation to be more sympathetic and supportive toward rural people (Korten and Uphoff, 1981). But the overall case for developing responsible local institutions is if anything stronger where the population is less educated. Interestingly, interdependence appears greater on social if not economic grounds where literacy is lower. Education seems to have the effect of increasing independence as well as individualism, which has some liabilities for LID.

6.2 GENDER

In years past, most literature seemed to assume that "farmers" were without gender, that one did not have to consider whether they were male or female, or even more mistakenly, it was assumed that farmers were all males and that women were simply "housekeepers." Recognition of the role and contribution of women in agriculture has greatly increased in recent years. But this does not help us in analyzing implications for local institutional development of involving women because the LID literature for agriculture is also fairly limited and has been largely gender-blind.[37]

Women's associations in rural areas are much more common than previously recognized, as March and Taqqu (1982) have documented. However, generally they are more informal and thus less visible than men's associations. They tend also to be less powerful because they have control over fewer resources. Within their limits, women's associations can carry out a great variety of functions. A recent review of the situation in Nigeria says:

> In all the States investigated, there is a powerful tradition of voluntary women's groups. These groups are based on many things, age, religion, culture, or they may be traditional savings societies. In all of the States women showed a tremendous ability to organize themselves and get things done. In many areas women organized themselves into co-operative farming groups and pooled their plots. They created and maintained

37/ We were able to cite some documentation in Reports No. 3 and 4 on women's participation in local institutions for rural infrastructure (primarily domestic water supply) and primary health care, though the literature was not very detailed. There are a growing number of studies on women in agriculture, such as Nelson (1983) and ILO (1984). We include in the Annex (pages 72-73) a report on women's agricultural groups in Senegal.

> savings societies and other community buildings, often taking care of the organization and staffing of the institution as well. Traditionally women have been involved in co-operative trading and occasionally they handle the marketing of their husbands' farm products or are engaged in the procurement of some farm inputs. (Akande, 1984:132)

From their study of existing women's associations, March and Taqqu (1982) conclude that "active" organizations, those with formal structure and explicit purposes, have more potential for becoming productively engaged in contemporary development activities than do "reactive" ones. Women's groups of this latter sort are very common, but they tend to be essentially defensive and informal, often better described as networks than as organizations. They can be distorted and even destroyed by grafting on new purposes which interfere with their limited, but valuable functions for women belonging to them.

The "active" organizations have real potential, though the majority of cases we find in the literature have not been devoted to agricultural improvement. They tend to emphasize health, education or income-earning opportunities, often engaging in agriculture to support these, as in the mwethya example from Kenya, cited in footnote 18 above. Perhaps this is because women's major obligation to carry out agriculture work is regarded as a given over which they have little control, whereas these other activities are more clearly within women's "sphere."

There are women's organizations such as described in Nigeria which are actively engaged in agriculture. The Umoja women's federation in Kenya has a very impressive record in this regard (Staudt, 1980). In some areas of that country, women are heading one-third of the households and they do generally a majority of the agricultural labor. It has been suggested that women's church groups in Kenya be contacted and involved if agreeable in agricultural extension programs (Moock, 1976:835). These groups are already important local institutions that support activities like chicken-raising and could have a larger role in improving agriculture.

Even if women's groups have not started with a focus on agriculture, there seems to be a strong interest among women to improve the productivity of their agricultural work. This was seen with the Mothers' Clubs in South Korea. Originally organized around family planning and domestic activities, they frequently got into horticulture and other agricultural work (Misch and Margolin, 1975; Korten and Young, 1978).

When women's organizations get involved in agriculture, it is most often to support women in their activities of household production by channelling technical information, credit or other inputs to them or helping with marketing, rather than

undertaking production directly. There are some successful cases of women's group production but their record generally is not impressive.[38/]

One of the issues debated but unresolved in the literature is the extent to which women should participate in separate or parallel local institutions. One generally finds that women's role in local government is less active than men's, though this does not always mean they are without influence.[39/] In India, there has been debate over requiring village and district panchayats to reserve some seats for women. Where this has been done to ensure that they have some representation of women in local government, it may have done a little for the status of women but hardly anything for their economic opportunities, since women's representatives have not been able to shape LG agendas to deal with issues that increase women's productivity. Anyway, as noted in Section 2.2, local governments particularly in India have not taken much of a role in agricultural development despite their mandate to do so.

There is some question whether it is advisable to promote separate organizations for women. Especially among poorer strata of the population, solidarity between men and women is crucial in their struggle for survival and improvement. So this would argue against separate structures. But women's membership in distinctive organizations gives them some options, strengthening their position within the family and broadening their horizons. Women without any affiliations outside their families are likely to be more dependent and less ambitious for themselves and their families. So on balance we see value in having some such organizations capitalizing on women's solidarity where this exists. Case studies suggest that such organizations should attempt some

38/ Akande (1984) reports successful group production in Nigeria, as does Yoon (1983) in Senegal. On the other hand, one of our studies found women's groups in Upper Volta having notable failures with group production (Taylor, 1981). The Umoja federation in Kenya referred to already organized collective work groups of women and hired out their labor for fieldwork. This did not represent pooled production, however, and earnings went into the organization's treasury to fund health, educational and other activities (Staudt, 1980). Women's collective farms are reported in Mozambique, where a large proportion of households are female-headed, but these are formed at state direction. Women's production efforts in the ujamaa villages of Tanzania have been mostly disappointing (Hyden, 1981).

39/ Of 500 members of Rural Councils in Senegal, for example, only four were women (Ba et al., 1984:111). Women in Botswana were previously excluded from participation in the kgotla, the traditional rural local government institution. "Today (however, women) may take part, though they typically sit apart from the men. At the kgotla meetings observed during this research, women generally spoke less frequently than men, though since many women are better educated than men, those women who did speak often carried weight" (Brown, 1983:22).

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cooperation and even cooptation of men (see Senegalese garden group case in Annex, pages 72-73, and Comas Women's Academy case in Annex to Report No. 7).

There is a question whether the government service should have special cadres for working with women. There is a common bias in agricultural extension toward working with male farmers, even when women are more efficient managers of farm resources than men (Moock, 1976; Staudt, 1978). Because women's role in agriculture is so pervasive, and because it would be difficult to get sufficient resources and status for separate LA units devoted just to women's work, it does not seem advisable to press for such units as part of local institutional development for agriculture. Rather increasing the number and proportion of women LA staff, especially in extension services, appears to be the better course.

How difficult it will be for women to play a prominent role in the expansion of local private businesses will vary from country to country. Much of the marketing trade in agricultural products is in the hands of women in some countries, particularly in West Africa. In Jamaica, female traders known as "higglers" come to the farm gate and even help in the harvesting of commodities (Lewars, 1982:152-153). Even where historical precedents and cultural values favor women's involvement in private sector expansion, however, there may still be national policies and practices that limit their participation in support of agricultural development. Rules about providing credit from government programs or banks usually discriminate against women (ILO, 1984:56-57). The imposition of "top-down" forms of organization inconsistent with women's existing patterns and values of interaction can discourage women's participation, whereas working with them in ways which are more socially and culturally sensitive can lead to larger and more viable institutions.[40]

Agencies seeking to promote local institutional development for agriculture should consider the extent to which the specific institutions, existing or anticipated, are hospitable to active women's roles. Moreover, which women are participating needs to be considered, as many of the most visible national women's organizations are not

40/ This is shown in the case study of Nigerian women's cooperatives by Ladipo (1983). The more flexible organizational form for promoting their role in agricultural trade proved successful whereas the authoritarian model, more familiar to the bureaucracy, was a failure. This is consistent with the broader comparative analysis by March and Taqqu (1982). See also Bruce (1980) on experience with market women's cooperatives in Nicaragua.

suited for work in agriculture.[41] To the extent there are impediments to full participation by women in agricultural development efforts, some significant share of the local talent which could make those institutions more effective will be absent. This omission can hardly be afforded.

6.3 LAND TENURE AND ECONOMIC STATUS

Agricultural development programs tend to consider only those cultivators who are landowners, regarding those persons who have only labor to contribute as being "inputs" rather than participants in the process of development. Local institutional development for agriculture should not neglect the landless and near-landless, often referred to as the rural poor, since they are important not only for accepting and using new technologies but also for contributions of resources and ideas. It was the landless and near-landless, as we saw in Report No. 3, who were most concerned that local institutions in several countries (panchayats in Nepal and the desa village government in Indonesia) focus on investments increasing productivity rather than on amenities.

One of the major concerns in the literature on local institutions is the effect which a high degree of socio-economic stratification created by differences in land tenure status will have on their functioning (e.g. Blair, 1978). An analysis by Leonard (1982) has helped to assess when these differences are likely to create special difficulties at the local level. National institutions may want to maintain a degree of control over development activities, to ensure all cultivators access to resources and opportunities, when:

(a) the activities are vulnerable to elite manipulation (for example, distribution of subsidized fertilizer: Blue and Junghare, 1975); or

(b) elite interests are divergent from those of the rest of the community (for example, introducing a credit program charging lower rates than village money-lenders).

Activities can be delegated to local institutions under conditions of economic and social inequality with fewer adverse effects when, conversely:

41/ "Organisations of upper-class women tend to see their function as social. Either they are purely for the social pleasure of the women involved, or they are welfare oriented. Rural women's organisations tend to be oriented more toward self-help (economic) programmes." (Tadesse, 1984:79)

(a) the activities are not particularly vulnerable to distortion (for example, tick-dipping of cattle); or

(b) the interests of the landed and landless do not diverge much (for example, control of diseases that affect crops, as crop failure will reduce employment and also drive up the price of food).

Relatively few activities fit these latter criteria fully, but decisions about institutional design should at least take into account the ways the nature of the activity affects participation in decision-making and benefits when dealing with a population where land tenure differences create dynamics for bias.

Where stratification is serious, the choice among local institutional channels may be made differently. What Leonard (1982) calls "alternative organizations," ones with membership restricted to the less-advantaged, may become more appropriate, to complement LA, LG and private business channels. The special "land reform cooperatives" established in Egypt after the major land reforms there are good examples of such organizations. As seen from the village-level study by Harik (1974), they served their purpose at least for a time in giving political influence as well as economic opportunity and social status to beneficiaries who had been among the poorest of the poor. The land reform co-op was necessary for breaking the domination of the landed elite over the local government. (Alternative organizations are discussed in Section 3.3 of Report No. 7.)

Unfortunately, in agriculture, relations between landless and landed are more likely to be zero-sum and competitive than in other areas of rural development activity. In human resource development, benefits for poorer members of the community can be achieved with less likelihood of adverse effects on richer members. Indeed, the latter may gain from better education, health and nutritional status for the former, whereas labor supply, wages and competition for land may be affected by agricultural programs (Uphoff, 1980). Certain public goods like community water supply or common forests for fuelwood offer advantages for elite and non-elite alike, so the effect of stratification on their provision through local institutional channels is mitigated.

However, even private goods like agricultural inputs or marketing services may be provided to the poor in a community through local institutions like cooperatives, even to non-members, under the direction of local elite members, as Tendler (1983) found in Bolivia. The rewards can be in terms of status which is desired by persons who already have some sufficiency of economic resources. One should not assume that elites will always use local institutions to pursue their own interests to the exclusion of others'

advantage. This is an empirical question. Nicholson's data (1984) on the distribution of agricultural inputs, particularly credit, for the Green Revolution in India's Punjab show that even if co-ops there were elite-dominated, they did provide greater access to productive inputs to the poorer sectors.[42/]

One proposition that finds some support in the literature is that elite interests are more likely to predominate at higher levels than at lower levels. Persons of lower status and income are more likely to play important roles at the group than the community level, and more in the community than in the locality.[43/] In terms of having influence in the bureaucracy this is probably also true. The poor are more likely to be seen and responded to by sub-district personnel than by district officials. LA staff at the locality level or below are even more likely to be responsive because they live in closer proximity.[44/] This is a consideration which should support a degree of devolution to local institutions even when stratification confronts decision-makers.

Where one is dealing with localities that have a large number or proportion of landless and near-landless, there should be continuing concern over whether local institutions are serving as adequate channels for their participation in agricultural development. Swedish donors assisting the Chilalo Agricultural Development Unit in

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42/ Apart from activities in which elite and non-elite members of a community have a common interest, Leonard (1982:18) lists three conditions which make elite-run systems more likely to be responsive to the needs of the poor: (i) there is competition for leadership; (ii) the support of the poor is necessary for elites to achieve and maintain leadership; and (iii) at least some elite members are willing to appeal directly to the interests of the poor. Nicholson's analysis (1984) suggests that reduced scarcity of desired goods makes a difference also.

43/ This has been documented by Gaige (1975:141-165) for Nepal in his analysis of the panchayat system there. The percentage of representatives from low caste or tribal groups declines as one moves from the village panchayat level to the district panchayat, and then to the zonal panchayat. The likelihood that a poor person will be elected chairman also diminishes the higher up one goes. The Small Farmer Development Program established by FAO in Nepal and other Asian countries recognized this and therefore adopted a group approach for assisting the rural poor. As noted above, this approach permitted small farmers and landless to gain control over the panchayat (LG) in their area (see Annex, pages 66-67). This bias toward elite control at higher (locality) levels but also the possibility of overcoming it by focusing programs at lower (group and community) levels is seen in the Aceh, Indonesia case in the Annex to Report No. 7.

44/ The beneficial effects of having local officials in close proximity to the poor can be seen from an analysis of the outcomes of land reform implementation in more than two dozen countries (Montgomery, 1972). The probability that rural people would get more income, more tenure security and more political influence in the wake of land reform and distribution of land to the landless was greater to the extent that decision-making was carried out at lower levels of government, involving LA, LG and LOs.

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Ethiopia, operating through LA units of the extension service, were appalled to find that their resources for agricultural credit were going almost entirely to large farmers because the LA staff were making no effort to identify and reach the poor. By working with the staff and redefining eligibility criteria, the pattern of loans was changed markedly within three years' time under a regime which was not particularly progressive.[45/]

Working with poorer members of agricultural communities can have substantial payoffs. In the San Martin Jilotepeque cooperative in Guatemala, sixty percent of the members did not own their own land. Yet it was possible to introduce a program which greatly increased agricultural production, while reducing soil erosion and promoting non-agricultural activities (see Annex, pages 63-64). Working through a variety of local institutional channels, some specialized and some general, it is possible to get more responsiveness and contributions from the rural poor, which means particularly the landless. They are part of the agricultural production process, but as tenants or laborers they have little voice and stake in it unless the pattern of local institutional development gives them opportunities.

6.4 MIGRANTS

Another image of "farmers" is that they are all settled on the land, when in fact, increasingly agricultural populations include a substantial number of migrants. Once one understands that it is farming communities, not just farms or farmers, that raise the level of production through technological and institutional innovation, we see how local institutions need to take population mobility into account, rather than presume a stable, sedentary population.[46/]

45/ Tenants were only 9% of loan recipients in 1968 and got only 6% of total loans, while in 1971 they were 39% of recipients (with 36% of loans). Thirty percent of recipients in 1968 were landowners with over 20 hectares (and they got 39% of loan funds); three years later they were down to 1% (with 2% of loans) (Cohen and Uphoff, 1977:247-250). We found no data on yield differences by size of holding, but in neighboring Kenya it was found that farms under 10 acres had six times more gross output per acre, and almost seven times more net profit per acre, than large farms which averaged 125 acres (ILO, 1972:167). So the spread of credit opportunities should have led to more total production.

46/ Friedman (1982) has put this succinctly in a report on rural development in Haiti: "Of course, peasants do not live in isolation from each other, and more is needed than to work with individual households, though that is necessary too. It is ultimately the peasant community that must be motivated and become the focus for a project."

One needs to distinguish between seasonal migration, where individuals or families move regularly during the year to undertake cultivation, tend herds or earn income where physical or economic conditions are more favorable, and out-migration, where adults leave their communities for several years or longer to undertake employment elsewhere. Money is often remitted to their families, and migrants commonly maintain some stake or presence in the community by visits or contributions.

In countries such as Botswana, Nepal and Yemen, where the Rural Development Committee has worked, it is not uncommon to find out-migration rates of 30 percent among adult males, and in other countries, women may move to cities for short-term or long-term employment. In Central America, whole families move to harvest coffee when that is in season, so movement may include children, though it is adults' participation which is of most concern in LID. Local institutions need to adjust either by moving with the people or by making sure that their activities coincide with people's migration patterns.

In Botswana, migration has long been a way of life to accommodate to the arid or semi-arid environment. Households spend most of the year in the "village" where deep wells give year-round water supply. As soon as the rains start, most households move or send some of their members to "the lands" where arable crops are cultivated while still others take cattle farther away to "cattle posts" where ephemeral sources of pasture and water can be found (Roe and Fortmann, 1982). In the Botswana situation, if local councils or other institutions are based only in the village, where there are year-round residents, they will be made up of older, more prosperous males who can stay behind when younger, less well-off persons, particularly women, have to leave to exploit available resources. Vesting more authority and economic resources in village-based institutions would introduce an undesirable bias into decision-making. Especially if such local institutions are to be dealing with agriculture and natural resource management, the persons actually doing the managing would be poorly represented. Local institutions thus need to find ways to incorporate more migratory persons into their structure where rural populations move about.

In Botswana, out-migration to South Africa often drains communities of their most vigorous, ambitious and best-educated potential leaders. The leadership pool, therefore, at least for men, will often not be the best that the community has to offer. Women, as noted already, do not have equal standing in the "public" sphere. Ways should be found to involve "migrants" while away from the locality, by getting financial contributions and suggestions, and to engage them more actively as "returnees." Their

experience, their education and exposure to new ideas can greatly assist an organization in its development undertakings. It must be kept in mind that they may become so distanced from the village that they no longer represent the community (Fortmann, 1982). One would like returnees to follow the example of the ex-Gurkha servicemen in Nepal who went as recruits into the British and Indian armies. After returning with pensions they have often became pillars of strength in local institutions (Caplan, 1970).

Perhaps the most dramatic migration effects have been felt in North Yemen, where about 40 percent of males have at one time or another found lucrative employment in the Gulf states. This has led to decline in agricultural production as women have been left with more work than they can handle, and as maintenance of the hillside terraces has not been kept up. Repatriated earnings of migrants have provided a generous capital base for the Local Development Associations in rural areas (Cohen et al., 1981). Unfortunately, the LDAs have not systematically channeled such resources into agricultural improvement efforts.[47]

This observation in Yemen is not atypical. A review of literature covering Nigeria, Kenya, Ethiopia, Peru, Bolivia, India and the Caribbean finds that migrants seldom sponsor agricultural extension or other collective investment in agriculture, preferring to support buildings and more visible things (Ralston et al., 1983:38-39). This finding parallels our observation with regard to local government that "collective action" for agriculture seems to be infrequent at the community or higher levels, though it is common at the group level on an informal basis. It is an important question for LID whether ways will be found to engage the talents and resources of migrants in agricultural development since the phenomenon of migration is likely to increase in the future. The constructive influence of returned migrants in Nepal is of some encouragement, though their agricultural contribution has been more one of setting examples by their own innovative activity than of strengthening LID for agriculture.

47/ One problem the LDAs face is that women's public roles are culturally restricted, and only men are supposed to participate in public meetings. One suggestion by Swanson (1983) is that LDA annual meetings be held during the holiday month when many men working in the Gulf return to their communities for family observances. This would engage more male household heads in LDA decision-making and could also mobilize voluntary contributions. Otherwise households where the male head is away send a junior male to represent them (Swanson and Hebert, 1982). In some communities understandings have been reached so that when important LDA decisions are to be made, the final vote is put off. The issue can then be discussed privately in the households, with women making their views known. At a subsequent meeting, the male spokesman can then speak and vote for the whole household.

6.5 INTEGRATION OF THE AGRICULTURAL COMMUNITY

The implicit model of most agricultural development theories has been one of individuation, from communally-oriented and cooperative "peasants" to self-standing and competitive "farmers," as argued by Weitz (1971). This derives from increasingly discredited "modernization" theory which presumes a unilinear progression from ascribed to achieved status, from particularistic to universalistic norms, etc. In fact, an analysis of the functions of agriculture suggests that what changes are the forms and not in the facts of cooperation and interdependence. Even in the most "traditional" modes of agriculture, production is usually by individuals or households, not groups or institutions. There is exchange of inputs and some sharing of outputs in time of need, but the balance between private and collective efforts tends to favor the former.

As the level of technological sophistication increases, there is more requirement for access to inputs and to marketing and processing facilities, so while individual operations expand and become more differentiated there is a concomitant increase in horizontal and vertical interdependence. While the balance between private and collective efforts in agriculture may shift somewhat, it does not tilt from one end of the continuum to the other as "modernization" theory has suggested. Local institutional development becomes if anything more significant as the scale and complexity of agriculture increase, as suggested by considering the hierarchy of levels indicated in Figure 1.

While the focus of production is the individual or household in the large majority of cases, aggregate levels of production are a consequence of what whole communities are able to accomplish through their networks of institutional support for individual and household producers. In this concluding section on producers, we have raised questions about how to engage in local institutions several major categories of rural residents -- migrants, women, illiterates, landless or land-poor -- who together often make up the majority of rural communities these days.

Local institutions that do not bring them into the planning and implementation of agricultural development -- being satisfied to have only the more educated, settled, prosperous males -- will be limiting the scope of agricultural change in the future and the spread of benefits therefrom. Planners and policy-makers should be thinking of how to integrate all sections of the agricultural community in productive enterprise. Contrary to the image of "yeoman farmers" which dominates development thinking at higher levels, what has been regarded as the "mainstream" of agricultural producers is

not necessarily the majority any more. This is why we have emphasized in this concluding section some of the LID implications of these "non-mainstream" groups.

. Institutional networks need to be conceived as providing access to resources and services that:

(a) upgrade the production of millions of households and

(b) make that production yield more value to its producers and consumers.

This access is particularly needed for the majority of agricultural producers who have lacked it in the past. The better endowed agriculturalists have less need for new efforts at local institutional development because they have usually been able already to forge at least some vertical and horizontal linkages of their own --with government agency personnel at higher levels, with private suppliers, with trade associations representing the interests of larger producers, etc.

As seen at various points in our analysis of experience, what is needed is seldom the strengthening of any single local institutional channel to promote agricultural growth. Rather it is the importance of complementarities which is impressive. No matter how many criticisms may be made, warranted or not, of government agencies operating at the local level, their good performance is needed for co-ops and for private businesses to succeed. These latter two channels perform better when there is some competition between them, giving producers alternatives to choose between based on quality of service and cost-savings. Service organizations, because of their different motivation and resource base, can fill "gaps" that other institutions find difficult or unrewarding to deal with. Membership organizations are even more often important as "gap-fillers," providing agricultural services of various sorts on a self-help, collective action basis. As Oxby (1983:56) suggests, however, such groups will be more stable and effective when tied in with other institutions which give them legitimacy at the local level. The significance of the whole range of local institutions has been recognized by USAID (1984) as a matter of policy. It is now up to development professionals to find ways of providing for and supporting LID initiatives in agricultural and related projects.

ANNEX

To share with readers some of the most instructive LID experiences, positive an negative, that we found in our review of the literature, we are presenting som capsule descriptions of such experience. Readers are referred to the reference sources for fuller information.

LATIN AMERICA

BOLIVIA: Agricultural Cooperatives

A recent evaluation of four peasant cooperative associations supported by th Inter-American Foundation provides a number of insights which contradict th conventional wisdom about cooperatives (Tendler, 1983). The co-ops, which hav been in operation for almost 10 years and continue to receive donor assistance have various familiar administrative and management inadequacies. Thei membership, for example, is small and appears to have levelled off after reachin only 25 percent of the families potentially served. The prices charged to cove the co-ops' merchandise and services are sometimes too low to cover costs, an collection of loans is casual. The co-ops exhibit many of the same "pathologies frequently found in Latin American as well as in other parts of the world.

Yet upon closer examination, Tendler found some very positive aspects of thei performance. The average donor investment per member family ($1,000) might b judged more than "reasonable." But when the benefits to non-members ar considered the cost per beneficiary goes down markedly, and the ratio of benefit to costs is substantial. Aside from the co-ops' serving as a voice for all farme on issues that concerned them with the government, two of the organization undertook public infrastructure projects -- potable water and road construction - which benefited most of the community. The cooperatives also worked to contro contagious crop and livestock diseases, an effort which required (and got) th support of non-members as well as members, benefiting them all.

One instance of what appeared at first to be "loose management" turned out t exhibit a good (if intuitive) understanding of the difference between average an marginal costs. Non-members were allowed to ship their produce in th cooperative truck, for a small charge, if there was space available. This looke like non-members were not contributing their "share." But the co-op was increasin its income to cover more of its operating costs of the truck, which wa advantageous economically even if the non-members did not pay an equal proportio of total costs.

Management inadequacies were not randomly distributed, but were greater or less depending on the nature of the task. Agroprocessing was consistently the best performed activity, and cooperative stores and credit the worst. Agro-processing worked well because the commodities in question "belonged" to the members and their return from their produce depended on good processing (and storage and marketing). Also, the members regarded the processing facility very much as "theirs" because they had contributed the labor and materials to build it. This created social pressure from among farmers for efficient and honest operation. Furthermore, improving the management of agroprocessing called for basically technical decisions that did not involve politically or socially difficult problems.

The store and credit operations, on the other hand, did not generally perform well because prices were set too low, and there was no systematic effort to get loans repaid on time. The strong social symbolism associated with "cooperatives" apparently made it difficult to charge prices or to follow procedures which might resemble those of "exploitative" middlemen. In contrast, when one of the co-ops rented out a bulldozer to members who needed its services for clearing land, there seemed to be no difficulty in charging a rate that covered all costs. There were no private competitors whose presence would "obligate" the co-op to keep charges lower than private operators.

The leadership of these co-ops came from the more prosperous members of the community who rarely relinquished office. However, since they were also farmers, the leaders shared the same economic interests, e.g. the desire for better crop prices and lower transport costs. Activities such as marketing, processing and stores benefited many non-members, thereby putting benefits beyond the self-interested control of the entrenched leaders.

LESSONS: This study offers many lessons, so only some of its implications will be noted. First, evaluating cooperatives, like other local institutional development efforts, calls for closer and more multi-faceted scrutiny than standard accounting procedures normally provide. The fact that the co-ops had several activities underway simultaneously allowed one activity to subsidize another and to give the institutions some stability and attractiveness missing in single-function organization. (Note that this conclusion differs from that of Tendler's 1976 study of farmer organizations in Ecuador and Honduras.)

Co-ops may be more useful institutions at an early stage of LID but may diminish in utility as some of their functions can be effectively or more efficiently taken over by state or private institutions. This is not something proven by the case studies but rather suggested by the fact that co-ops in these cases fill functional niches that are often filled by the government or by businesses in other settings. The fact that more advantaged persons joined and led cooperatives did not mean that these organizations' benefits accrued only to such persons. If the activities of co-ops produce positive-sum (rather than zero-sum) benefits, members and leaders should be willing to have the benefits of co-ops go also to non-members.

BEST AVAILABLE

GUATEMALA: San Martin Jilotepeque Cooperative

Although this project began in 1971, the agency which helped initiate activities World Neighbors, already had a well established reputation in the region since the 1960s. Planned as an "integrated" project, the project started with an agency stal member and six part-time extension workers concentrating on a small geographic area and attempting to learn from the residents through interviews and dat collection involving almost 600 families. Activities fairly quickly narrowed to focu on agricultural development.

A review of the data found that corn yields were among the lowest i Guatemala due in part to soil erosion problems. With funding from Oxfam an World Neighbors, a weekly training program on agricultural practices to comba erosion and raise production was organized for two groups of farmers. Each cours followed an outline suited to their abilities and learning methods. Members of th training staff visited the farmers in their communities to help put classroom idea into practice. After nine months, 27 of the 40 original "students" agreed to worl as non-paid rural promoters and adopt the "technological package" which, becaus of its cost, required that $15 be loaned for one season to each promoter.

Subsequent efforts involved the organization of a credit cooperative and a smal input supply store. The cooperative, called Kato-ki (self-help) had 732 member and over $38,000 in share capital by 1978. Loans are made for agricultural inputs livestock, land purchases (60 percent of the members are landless), commerce o small industry, housing and consumption. The cooperative also established banking service for members' savings. The input supply store was established t meet the emerging demand for agricultural inputs. Prices and quality remai attractive enough to draw customers even though four nearby competitors hav gone into business in recent years, and members of the co-op are free to choos any store the like. Sales in 1977 totaled over $23,000 (over $300 per member).

New members must attend classes where attention is given to the uses an management of credit. When a loan is reviewed by the credit committee an reduced or denied, the reasons are fully explained to the member. Importan decisions are made by the cooperative's general assembly with more routine matter handled by elected leaders who, after two year, must relinquish their position.

The project has demonstrated some impressive results. The average net incom of a farmer using the improved technological package for five years on one hectar of corn and one of beans has increased over 160 percent. Wit cooperative-sponsored training and credit services, average yields have increase 110 percent for corn and 60 percent for beans. Membership in the cooperative ha increased between 10 and 20 percent each year. By 1978, 63 members had bee able to leave the "landless" category by acquiring land. The default rate on loan has been only 8.5 percent. Many members report they no longer have to engage i seasonal migration or seek work on nearby haciendas. (Gow et al., 1979:153-170).

LESSONS: By becoming well acquainted with residents, maintaining continuity of field staff, and showing flexibility, the project was able to focus on the priorities of the residents, and not those of the planners who initially advocated an "integrated" approach. This is a good example of "learning process." When organizing the training program, the outside agency closely consulted with existing religious institutions to identify potential local leaders. Since activities began in a small, staff-intensive manner, important individual and group learning could emerge before undertakings were expanded.

The fact that all new members of the co-op complete the same training program means that the entire membership has relatively equal information about organizational procedures and methods of operation. Limited terms of office contribute to a sharing of responsibility over time. Withdrawal of expatriate staff and external funding when there was evidence of appropriate local capacities to continue the institutionalization process helped preclude a dependence relationship from forming.

JAMAICA: Agricultural Marketing Boards

When the government decided to increase the production of food crops and particularly to promote export crops like citrus, bananas and coffee, it established an Agricultural Marketing Corporation (AMC) to give marketing services and guaranteed prices for commodities. To boost export crops, various commodity associations were set up, officially as membership organizations, but practically as state enterprises. Private buyers and handlers were thought to be too exploitative and thus to be a deterrent to farmers' expanding production.

The prices offered by the AMC were usually too low for farmers to get what they considered sufficient return for their effort. Moreover, the buying system was chaotic, with drivers not always coming when scheduled to pick up produce, or demanding bribes before they would buy perishable foods. Farmers soon learned to by-pass the AMC for foodstuffs and to return to dealing with private buyers. They did not have this option for export crops like coffee and bananas, however.

Banana exports, for example, require a very thorough organization to collect sufficient quantities of assured quality produce which can maintain the satisfaction of foreign consumers. A banana growers' association was set up by the government and all sales for export were required to go through it. Farmers being compelled to "join" took no interest in the association. They often did not even know they were "members" because their dues were automatically deduced from the proceeds of their sales.

The alienation of farmers from "their" association was increased by the staff's high-handed treatment of them and their produce. Rejection of hands discolored by tropical snails was not explained, for example, and this caused much resentment

BEST AVAILABLE

because members saw the fruit as edible, not knowing that foreign consumers woul shun it. Farmers had no control over the price paid (it was kept low for the sak of government profit) so eventually much interest in banana production was lost (Goldsmith, 1980 and 1982; Lewars, 1982)

LESSONS: Unfortunately, the government agency and the commodity association (pale versions of membership organization) although set up to promote productio ended up reducing it. Both farmers and government were the losers from thi When organizations like the commodity associations and the AMC (whose buyin centers constituted "local administration") develop no awareness, commitment o support within the public, and particularly among those persons whom they ar supposed to serve, they cannot become "institutions" in any real sense.

MEXICO: Plan Puebla Farmer Committees

This project was started in 1967 by the international wheat and maize researc center (CIMMYT) in Mexico to improve the production and incomes of rainfe farmers in the State of Puebla. The National Agricultural University at Chapin supported the effort. By 1973 it covered 32 municipalities (counties) and involve some 43,000 small farmers (CIMMYT, 1974).

Initially, the project emphasized the adoption of new high-yielding maiz varieties, but it soon became apparent that under the prevailing agronomi condations of Puebla, the traditional varieties did nearly as well, given that farme needed to maximize combined maize and bean production on their small fields a not just maize. Production could be increased, however, by adding fertilizer a trace minerals that were deficient in the soil (Whyte and Boynton, 1983:37-41).

For farmers to buy such inputs they needed credit. Upon arrival of the seco generation of field staff, an extensive system of credit groups was organized. Th was based on the notion that groups would be better able to apply pressure members to honor the repayment obligations than an administrative arrangeme which extended credit to individuals.

In a site visit to the project area in 1981, Swanberg found the system h functioned quite well over several years. The use of "community organizers" forming the farmers groups was apparently quite successful. To increase the capacity to negotiate for better prices, among other things, farmers negotiated w the government for construction of a warehouse. Perhaps even more important w the increased level of knowledge about plant fertilization (Swanberg, 1982).

LESSONS: Building a program on small solidary groups of 10 to 15 farmers prov very successful, similar to the spread of irrigation water management groups in S Lanka as documented in Uphoff (1984) and more generally shown by Oxby (1983).

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Farmers welcomed the "group discipline" which upheld the integrity of a program that had real benefits for them. Another important element to the Puebla experience involved the sensitivity of project staff to farmers' limitations, constraints and needs (Swanberg, 1982). Specifically, time was invested in observing the performance and rationale of the existing agricultural system, instead of stubbornly insisting that farmers adopt the new technology, which it turned out was not as superior as the technicians assumed. Upgrading the existing technology, through local institutional development, opened the door to subsequent introduction of more appropriate new technologies.

URUGUAY: Sociedad de Fomento Rural

This cooperative, organized around the provincial capital of Durazno, has not had time to become "institutionalized." But it has gotten off to a very promising start, because a profitable combination of "technology" and "organization" has been put together with help from the Inter-American Foundation. The dairy plant run by the cooperative is seeking to encourage small and medium-size milk producers to raise output by guaranteeing stable demand. With pasteurization and packaging of milk in attractive containers, consumers are willing to pay more for the milk they get. In addition the plant produces butter and is in the process of expanding production of cheese with the expectation of export sales.

The dairy producers previously marketed their own milk individually, which required making one or two trips daily by horsecart to distribute milk along an extended route that sometimes resulted in spoilage problems. The cooperative employs a truck to collect the milk at the farmers' homes, thereby saving them from one to five hours of transportation labor a day. This in turn has freed up time for farmers who want to increase crop yields or improve pastures and herds. The advantages of group transportation, processing and marketing give members a tangible stake in making the co-op a success (Hirschman, 1984:18-21).

LESSONS: Though the dairy cooperative with its modern plant and transportation has clearly increased prospects for increasing the economic welfare of producer-members, the status and prestige they have gained may also be a strong inducement for supporting the co-op. "Now they are associates of a much admired, technologically-progressive undertaking, whereas previously their daily milk-peddling treks caused them to be viewed as quite lowly members of rural society." (Hirschman, 1984:21).

The differences in commodities should be noted, however. For some producers, such as wool growers, yearly deliveries or sales can be an exciting variation on their daily routine, giving desired opportunities for social contact. For dairy producers, on the other hand, since marketing is a daily activity it may be boring and little valued. When developing local institutions one needs to take into account the nature of the goods produced and the less tangible social aspects of agricultural life.

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AFRICA

BOTSWANA: Drift Fence Groups

"Drift" fences are wire fences built to separate grazing land and crop lan
They are usually undertaken as a crop damage projection measure, though they c
also ease herd management problems or serve as the basis for grazing manageme
schemes. A few "bush" fences had been built in the 1920 and 1930s, but the fi
wire drift fence in Botswana was completed at Pelotshetla in Southern District
1975. After this there was a phenomenal growth in drift fencing. By August 198
there were 109 fences either completed or underway with a total length of 10
km. (Willett, 1981, 11:9). In Kweneng District by 1980, 14 fences were complete a
a further 28 were under construction (Chris Brown, personal communication).

The configuration of each fence is broadly determined by ecologic
considerations (the location of crop and grazing lands), though the exact line tak
into account such things as access to water points and the need for futu
expansion of crop land. Most fences are locally initiated (indeed all 10 in the ar
studied by the Institutions Research Project of the Ministry of Local Governme
and Lands were locally initiated). Often the idea for a fence comes from th
example of a neighboring community which has built a fence. In some are
adjacent fences are linked up to form one long line. In the Iswapong Hills are
one fence made up of 10-15 km. segments each built by a single community n
stretches almost 200 km.

Government assistance to the fence groups is part of its overall support progra
for farmers' groups. The group is expected to provide voluntary labor to cut pol
clear the fence line and build the fence. It must also contribute cash equivale
to 10 percent of the capital costs. In return, the government provides fenci
material (wire and gates), equipment (for tightening the wire and digging hole
and extension advice. Maintenance of the fence, once completed, is t
responsibility of the group. (Brown, 1983, and personal communication)

LESSONS: Where a kind of local organization provides manifest benefits, it c
spread rapidly if easily manageable by members. The support given by t
government has been limited but very effective in spreading these groups a
fences. It is a good example of what has been called "assisted self-reliance
(Esman and Uphoff, 1984:258-264). The maintenance of fences has been reasonal
good, partly because any need for repair is quite evident and failure to ma
repairs will result in obvious damage (this was one condition mentioned in Rep
No. 3 for local institutions handling maintenance effectively). Also the "ownersh
of the fence is clearly with the group, not the government, an important conditi
(Coward, 1983).

GHANA: United Ghana Farmers Council

The cocoa industry in Ghana, presently in a shambles, was once the economic mainstay of a prospering economy. Cocoa farmers developed their production beginning in the 1890s essentially on their own, with little help from the government (indeed the colonial government at times discouraged the nascent industry). These agricultural "entrepreneurs" made this small country the world's leading producer by the 1950s (Hill, 1963).

The UGFC grew out of cocoa producers' cooperatives which were started in the 1920s in response to the low price paid by private (European) buyers. At that time, several groups of small producers (most illiterate) tried to sell directly to the London market but were swindled by their agents. Thereafter co-ops stuck to purchasing cocoa beans from members and selling them to European companies to try to get the best price.

When during 1937 it became apparent that the companies were in collusion to hold down the price, growers boycotted them, holding back the entire crop, almost 300,000 tons, for six months until the colonial administration intervened to raise the price. After World War II, growers became one of the main organized "pillars" of the independence movement, as the UGFC was formed and allied with the Convention People's Party of Kwame Nkrumah.

One of the first problems confronting Nkrumah after his party took over the government in 1951 was to combat an epidemic of the serious black pod cocoa disease. The UGFC cooperated with government staff (LA) in explaining to farmers the need to cut and burn infected trees on a mass scale. The campaign could hardly have gone as quickly and successfully without the UGFC's assistance. Partly as a "reward" to the UGFC for its role in helping to win independence, but mostly to get control over the crop so as to divert revenue to the government, Nkrumah gave the UGFC a monopoly on cocoa purchasing.

The result was to destroy it as a cooperative form of organization. Clerks, previously accountable to farmers, now cheated on weight and grading, gave "chits" instead of cash, and demanded bribes to convert the chits later into money. Both farmers' incentive to invest in planting new trees and the regime's popularity suffered as a result. (The UGFC's disastrous monopoly over distribution of machetes is discussed in Section 2.6, footnote 22.) When Nkrumah was overthrown in 1966, one of the military government's most popular acts was ending the UGFC monopoly (Beckman, 1976).

LESSONS: Farmer's "indigenous" capability of organization can be substantial as seen from their starting cooperatives with little outside assistance and from their massive "hold-up" of cocoa in 1937. Co-operatives if given monopoly and state backing may act quite irresponsibly, once accountability to members is severed. The political and economic consequences of this can be quite unfortunate, as seen also in the case of the Jamaica AMC cited above.

KENYA: Kenya Tea Development Authority

KTDA has come to be recognized as a "successful" national institution, bringin small holder tea production from zero before 1960 to one-third of Kenya's export within 15 years. There are many lessons to be learned from it as an exercise i "institutional development" at the national level (Lamb and Mueller, 1982). Here w will focus on some of the LID aspects of KTDA, having discussed a number of it features in Section 4.0.

From the outset, it was recognized that close linkage with growers was crucia for maintaining quality control, and the structure of farmers' committees was mad one of the four operational arms of the Authority (the others were extensio buying and quality control, and factory production).

The basic forums for farmer participation are the Divisional Tea Committe which are made up of elected farmer representatives who oversee production an buying in their area. (In many "locations," the level beneath the "division", farme committees have also been formed but these are not uniform in these activity The Divisional Committees elect representatives to the District Tea Committee which are probably the most consistently effective level of organization, partl because they make quite "sensitive" decisions about allocating tea quotas.

The District Committees send representatives to the Provincial Tea Board About one-third of the national KTDA Board is made up of farmer representative Farmers are also represented in increasing numbers on the boards that oversee th operation of tea factories through farmers' purchase of equity shares in th factories. (Presently they hold about 10 percent of factory shares, in what h become a mechanism for mobilizing savings for capital formation in the agricultur sector.)

From the outset the KTDA leadership showed great seriousness about farme participation. It recognized the need to have institutions that could deal wit peasant households as very complex units, since smallholder tea growing was to f into the existing and ongoing farming systems, not replace them (Lamb a Mueller, 1982:2-3). KTDA was willing to invest some of its financial resources t encourage participation, for example, through organizing farmer visits to Nairo and paying "sitting allowances" to farmer representatives for time spent on KTD business.

At the outset, most of the initiative came from "above." Indeed, Steev (1975:10) characterized the organization initially as "autocratic." But over tim grower initiative has increased, with KTDA approval. The technical sophisticati of farmers has increased also. One "breakthrough" for expanding tea growing wi quality control was to introduce vegetative propagation in place of earlier nurse techniques. Farmers learned this rather quickly and before long were able to do better than many KTDA staff. In 1980, about half the demand for new tea bush was met from growers' own stock. This has placed some strains on the policy limiting individual holdings to one acre maximum.

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Interestingly, the KTDA staff have continued to champion the acreage ceiling on egalitarian grounds despite political pressure from somewhat larger growers.(Steeves, 19840. (There is also the quality consideration that smaller holdings are generally more intensively cared for and more carefully plucked.)

The incentive system worked out is ingenious. Once a month, growers are paid a fixed rate (per kilogram) for the greenleaf delivered to buying points for the factory they sell to. At the end of each season, when the processed tea has been sold at the London auction, where most KTDA tea fetches a premium price, the growers get a "bonus," which usually amounts to about 150 percent of the "base" income. The better the quality of the tea leaf delivered to the factory, as well as the better the processing there, the more the factory's tea sells for and the higher the bonus to growers.

LESSONS: There are many lessons from the KTDA experience, some suggested already in Section 4.0. One important element of KTDA institutional strategy has been its considerable decentralization, to the factories and to the provincial, district and divisional levels. The fact that the tea price is rather precisely pegged to some independent measure of "quality" gives all within the system--growers, buyers, transporters, factory workers and managers--good measures of success and makes decentralized management more feasible. Everyone gets clear feedback on performance coupled with material incentives.

For many years, it was said that tea was too demanding a crop for "peasants" to grow it, and all investment and technical assistance was reserved for the tea plantations in Kenya. The performance of KTDA has shown that a system of organization with farmer participation from the field to the factory, and beyond that to the national level, can achieve superior quality and efficiency compared to the more administratively managed plantation operations.

NIGERIA: Gombe Native Authority

The policy of "indirect rule" by the British colonial regime left considerable authority in the hands of traditional leaders in Northern Nigeria, who headed what were called the Native Authorities governing each sub-district area. (Native Authorities were renamed Local Authorities in 1968.) A case study of the Gombe Native Authority by Tiffen (1980:25) concludes that the comparative success of this area in agricultural development has been very much due to the particular performance of its local authority.

All NAs had taxing authority for making local investments, but the Gombe NA in particular avoided malpractices in tax collection, which would have been a disincentive to individual farmers to improve their production, and invested the money collected in education, health, veterinary and agricultural services, which

supported increased production. The traditional NA leaders (emirs) in Gombe we generally progressive in encouraging agricultural modernization and setting a go example in their own fields. The traditional district and village heads, in tur "propagandized innovations such as the use of fertilizer, worked their own far actively, and keenly cooperated in the distribution of cotton seed, the organizati of cotton markets, etc." (Tiffen, 1980:29).

After 1945, the government started "democratizing" the system of loc government by moving to elected officials. In Gombe, where the Native Author heads were progressive, they were elected to the new Councils. The governmen however, was reluctant to give much independent taxing and spending authority local councils, thinking village people were too illiterate to allow them any contr of funds. In Gombe this mattered less because there were many competiti interest groups which put pressure on higher authorities to invest in agricultur improvements which the local government could not undertake.

In communities with strong local leadership, despite the lack of formal taxi powers, "Village Heads who were good organizers could get rough roads constructe or classrooms built by voluntary labor, and they might be able to influence t central NA to allocate the necessary funds for staffing and maintenance" (Tiffe 1980:32).

"The Village Head is the main channel for Government advice and orders to h people. The Agricultural Officer expects him to enforce the cotton close seaso (to curb diseases), to provide cotton seed dumps, to organize seed distribution an to disseminate information. The Veterinary Officer expects him to maintain catt tracks and to inform cattle owners about innoculation facilities. The Forest Officer expects him to protect Forest Reserves. He has to recruit labor for loc public works. The Education Officer expects him to keep this village school fu despite prejudice against western education. The District Officer expects him n only to collect taxes, but to maintain law and order, and all for a salary which 1967 ranged from L42 to L345 per annum."

The government and donor-assisted development projects in the area that hav not succeeded have been those that by-passed the Local Authorities, whereas thos which had worked with and through the local government have had considerabl success. (One water scheme pushed through by high officials without local revie and support was a waste of L245,000, Teffen reports.)

LESSONS: "As Gombe has benefitted with so little expenditure of centrall directed funds, we can take it as an example of the success of the policy o strengthening the rural institutional base of the Nigerian economy. The speci political and administrative factors which favored its development are to be foun locally, in the power structure that favors majority rural interests; in the effectiv leadership given by locally rooted families at District and Village levels; and in th comparative absence of extortion, which has meant that local farmers do not fea to work for, and display, wealth." (Tiffen, 1980:35)

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SENEGAL: Women's Garden Groups

The genesis of women's garden groups is complex. Traditionally Sengalese women have often cooperated in agricultural tasks, especially for rice production. In the mid-1970s, the government initiated an agricultural development project during a period of drought when there were serious food shortages. Though a similar garden promotion scheme had failed a decade earlier for lack of demand, recent growth in tourism had created an increase in demand for tomatoes, potatoes, etc. and villagers' need for income had greatly increased. Hence the prospects of successful action were more favorable.

Since land could not be purchased outright, the groups began by securing use-rights from village authorities. Land was cleared and fenced by relying on the traditional division of labor; men cleared and prepared the land and also provided the labor for well digging. Because the wells frequently became saline, limited but essential technical assistance was given to the groups by UNICEF and units of local administration. Of particular value was the provision of cement and hand tools, to line the wells. As no pressure was applied by outside agencies on the groups to take on a particular organizational design, each of the more than 50 groups has adapted its form to meet local needs and norms. A discussion of two groups will indicate their diversity:

The women's garden group in Boucotte Ouoloff has 160 members, each of whom paid a membership fee of 1000 francs to join. Two presidents serve concurrently, the younger being in charge of "external affairs" (since she is bilingual) and the senior woman handling "internal affairs" (within the village). With assistance from village men, three hectares were cleared, fenced and a 12-meter well dug. Each member has individual rows to oversee on the plot. However, following the sale of their produce, members must individually contribute 2500 francs to the common treasury to build up its capital fund. Benefits from the savings fund have included construction of a health/maternity center and construction of a road to the garden so it would be easier for the UNICEF-donated truck to transport commodities to city markets and hotels. Five hectares of trees have also been planted by the group to help alleviate fuelwood scarcity.

In the drier area of Dianky, another gardening group has 260 members, 48 of whom are men. Leadership remains exclusively with the women, however. This group works two hectares on a more collective basis than Boucotte Ouoloff. According to the group's president, the organization has "matured" rather quickly due to a previous experience with women's banking and a tradition of cooperative agricultural labor for growing rice and peanuts. Discipline within the group is strict. If a cultivator does not tend her rows, an empty basket is placed next to it. If it cannot be filled from the person's row in the group plot, produce from her/his own individual plot must be contributed. With outside assistance, three improved wells have been built. The group has agreed to take on several experimental projects using new varieties of seeds, provided that they plan and decide what the projects would be. As with Boucotte Ouoloff, provision of a UNICEF truck has facilitated shipment of produce to Dakar, thereby increasing the quantity sold and the profits which each member received. (Yoon, 1983)

LESSONS: The dynamism in women's garden groups comes from their building on indigenous patterns of cooperation and because outside agencies were able to support the organizations without trying to determine how the tasks would be organized and what kinds of sanctions were appropriate. External aid for water source improvements complements the labor and skills already available. Provision of the truck allowed for new marketing linkages which brought groups together as would not have occurred otherwise. An example of innovation in organizational structure when groups are left to determine this themselves is the selection of a president for external affairs, i.e., someone who is wise in the ways of Dakar and can speak French.

ZIMBABWE: Farmers Associations

A systematic study was done by Bratten (1983) to determine the extent, functions and effectiveness of farmers associations in the communal (African-operated) areas of Zimbabwe. Interviews with a random sample of 494 households in four districts revealed that 44 percent of cultivators belonged to some form of voluntary agricultural association. The groups themselves covered a wide range of activities and had connections to a variety of public, private, parastatal and non-governmental agencies -- the Ministry of Agriculture, the Windmill Fertilizer Company, the Agricultural Finance Company, the Cooperative Marketing Union, the Adult Literacy Organization of Zimbabwe, the Savings Development Movement, and the Catholic Church.

A classification of associations according to their sponsorship is understandable from the perspective of the capital city, Bratton says, "but for several reasons it is seriously misleading when viewed from the village. (a) Farmers and not field staff are the prime movers in creating and sustaining the farmers organizations. Farmers justifiably resist being defined as appendages of large, distant agencies. Example: a farmer in Wedza sternly corrected me when I asked if his was an "extension worker group" -- "does he (the extension worker) come here to join our group when there are fields to be planted or weeded?" (b) Farmers in groups feel free to enter transactions with several different agencies and are rarely bound by loyalty to only one. Example: a group leader in Mtilikwe explained that "we can't just speak with one government worker to get all the things we need." (c) Most important, farmer groups with nominally different 'labels' perform essentially similar functions." (Bratton, 1983:3)

In terms of the activities undertaken, 60 percent of the groups identified in the study engaged in exchange of information so as to diffuse technical "know-how" in agriculture. "In part, groups form to overcome the shortage of extension agents in the field and in part to consolidate and dispense existing indigenous knowledge." Just over half the groups (54 percent) engage in mutual work exchange with work parties for planting, weeding and harvesting, sometimes sharing scarce capital

resources like farm implements or draft oxen. Almost half of the organizations (47 percent) make bulk purchases of inputs, particularly fertilizer, and about one third (36 percent) do joint marketing to attain transport economies and better prices. About one-quarter of the groups were multi-purpose, usually with supply and marketing functions having been taken on by production (labor exchange) groups.

"The survey results confirm that, within each agroecological setting, maize farmers in groups consistently outproduce individual maize farmers. The effects of group organization on maize output appear to become more marked as rainfall and soil conditions become less propitious. Whereas group members produce nearly twice as much as individuals in Chipuiriro, they produce almost three times as much in Gutu. The implication, which needs further testing, is that farmer organizations make their biggest contribution to production in the more marginal areas." (Bratton, 1983:17)

LESSONS: We had already formulated our framework for agricultural LID analysis before receiving this empirical study, which supports our analysis quite directly. Actual production is likely to remain as individual or household responsibility, even with some collective action during the production process. The main "group" or other "institutional" functions are to provide inputs and to dispose of outputs on advantageous terms. Even when there is exchange of labor or implements, each participant gets (only) the produce from his or her own field, so there is not cooperative production with a sharing of risks.

The extent of farmer organizations in support of agriculture is itself quite impressive. The mix of governmental, private and NGO initiatives to promote farmer agricultural associations has been fruitful. Yet these connections have not been overwhelming. As a rule, the farmer groups have been able to maintain their own identity and capacity. Groups' contribution to greater productivity is demonstrable from comparative data on yields.

ASIA

BANGLADESH: Comilla Small Farmer Cooperatives

The farmer cooperative sponsored by the Academy for Rural Development at Comilla started out with considerable success in mobilizing funds for agricultural improvement and getting production increases. The groups met regularly and each member made a deposit into his savings account, becoming eligible for loans administered by the group. Farmer respresentative from each group went regularly to the thana (sub-district) training center run by the Academy to gain new agricultural knowledge which was brought back to the group. The Comilla "model" became one of the most hopeful examples of how small farmers could be enlisted in agricultural improvement (Millikan and Hapgood, 1967; Mosher, 1969; Raper, 1970; Owens and Shaw 1972).

When the government became enthused about the Comilla cooperative, it wanted to expand them to the whole of East Pakistan (now Bangladesh). The leadership of the Academy knew that the success depended in large part on the thoroughness of the training and supervision that brought out the best in the groups' membership and leadership. But they had no control over the larger program (Blair, 1978).

The main undoing of the program was the infusion of huge amounts of credit from the government to be passed on to co-op members. The discipline which had characterized repayment of loans when the funds were mostly the members' own savings dissipated, and arrears began piling up. From almost 1,000 co-op societies with 25,000 members in 1967-68, having paid in 1.6 million thaka as shares and having 5 million thaka in loans--with only 2.2% overdues, the "movement" was expanded to over 5,000 societies 5 years later, with 125,000 members, over 10 million thaka in shares, almost 60 million thaka in loans, and 25% overdue (Blair, 1982:438). Before long the program was as insolvent as any government-run credit scheme. (Blair, 1978, and 1982).

LESSONS: Overrapid expansion of even a good program can kill it because the training, communication, discipline, supervision, and other elements get diluted or destroyed in the process. The philosophy of "self-help" which the organizations began with was washed out by the flood of resources which the government poured into the program. In an attempt to get a larger impact, the government lost much of what effectiveness the institutional model possessed. Of some significance, in the Comilla area around the Academy, where the program in the early stages had the most discipline and innovation, one can see that the level of agriculture practiced is still higher than in surrounding areas (David B. Lewis, personal communication).

INDIA: Gujerat Cotton Cooperative

Many people now know about the AMUL dairy cooperatives which started in the Indian State of Gujerat, but they were preceded by much less-known though similarly successful cooperatives of cotton producers. At the turn of the century, new technology, new markets and better transport made cotton a more profitable crop in Gujerat. However the benefits of increased production tended to go to the merchants who bought the crop.

A cooperative sales society established in 1919 grew in the next decade into a cooperative ginning and pressing society, financed and managed by growers. Efforts by private gin owners to suppress it failed. Between half and two-thirds of the cotton crop was eventually marketed through cooperative channels. Growers were paid 80 percent of market value upon delivery (minus the value of the loan they had taken out in advance of the season) with the balance paid at the end of the season when the crop had been sold. The societies were able to get a better price because of their economies of scale and their quality control.

This structure of cooperatives has supported considerable technological advance in cotton production as a steady flow of new varieties with features of disease resistance, higher yield and fiber quality have been introduced in the last two decades (Nicholson, 1975).

LESSONS: Cooperatives can expand in scale and can become both technologically and commercially sophisticated in competition with private buyers. A similar example is seen with the Sukuma cotton cooperative in Tanzania which grew into a regional federation with its own cotton ginneries and which contributed to a doubling of production (Lang et al., 1969).

The greater returns to farmer-members which a cooperative form of organization for processing and marketing can provide can be a real stimulus to adoption of new technology and to raising output, as also seen in the case of the Bolivian cooperative studied by Tendler (1983) and reported above.

NEPAL: Small Farmer Development Programme Groups

The SFDP was set up in 1975 by the Agricultural Development Bank of Nepal with support from the FAO. This was an unusual donor-assisted project in that only $30,000 was provided at the outset and the design of the program emerged from intensive field visits which involved consultations with small farmers and landless laborers about their problems (FAO, 1978-79).

The program trained and sent "group organizers" into communities to set up groups of 10-15 small farmers, including landless laborers, to whom credit would be made available on a group basis, without collateral, to improve production. The initial focus was on rice, small animals, poultry, water buffalo raising, vegetables, etc. Women's groups started up with activities on nutrition, family planning, and cottage industry production. The groups often supported building or upgrading schools, establishing first aid centers and literacy programs. The savings program included a fund for emergency loans so that members could stay out of the thralls of moneylenders.

One important consequence has been to increase small farmers' political influence in their communities. In Tupchie, where the program was started, the rich family which previously dominated the panchayat was ousted from control, and about 45 small farmers were elected to panchayats in the area through the group solidarity introduced by these membership organizations. (Shrestha, 1980; Ghai and Rahman, 1979 and 1981).

LESSONS: Starting with small, cohesive groups is important for a structure o local institutional capacity. Some of these groups have become multi-ethnic an multi-caste, contributing to more universalistic social relations. Leadersh responsibilities within the groups have been passed around, revealing a considerabl breadth of talent among this largely illiterate population.

Small farm households may best begin their institutional development b concentrating on agricultural and other directly productive activities. But onc organizational capacity is developed, they have other needs such as literacy hygiene and family planning which can be promoted through these sam organizational channnels if members have confidence in them.

The role of "catalysts," discussed more in Report No. 7, was crucial here, as th group organizers got new social processes started that the members could an would then continue and elaborate. The gaining of political influence has been a important aspect of the institutional development process, as the panchayat loca government now supports the expansion of the program, such as into social forestr (as described in Annex of Report No. 2, pages 40-41).

TAIWAN: Farmers Associations

The Taiwan Farmers Associations, and their parallel Irrigation Associations, ar credited with making a significant contribution to agricultural development i Taiwan, which has attained some of the highest yields anywhere through a syste of very intensive production practices (Mosher, 1969: 37-40). The FAs provid extension advice and physical inputs (seeds, fertilizer, chemicals, etc.) as well a credit. They also handle purchasing, processing and marketing for the membership, which includes most farmers in the country though membership is a least nominally voluntary. The boundaries of the Irrigation Association ar hydrologically determined and differ from those of the FAs; the size of IAs ca range from a few hundred hectares to tens of thousands of hectares.

Taiwan was ruled by Japanese authorities from 1895 until 1945, with the objec of producing food for the colonizing country. During this period, investments wer made in irrigation, fertilizer factories and agricultural research to improve ric varieties. After World War II, when the Chinese Nationalist government moved t Taiwan, great attention was given to rural areas, including an extensive lan reform and investment in health, education and law and order.

While farmers in Taiwan have had various forms of local agricultural institutions since 1913, the present form of farmers association including credit cooperatives has been in operation since 1953. The FA established in each township (locality) is financially self-supporting by having several sources of income. First, the government stipulates that all farmers pay their land taxes (in rice) through the FAs, which receive a portion of the tax as commission to cover expenses. Second, all fertilizer sales are channelled through the FA, which makes some profit on these, though the price paid by farmers is fixed and subsidized by the central government. Because the supply of fertilizer has been kept plentiful and the government keeps a vigilant watch against them (through Nationalist Party cadres), corrupt practices are relatively uncommon. Third, the Fas each have a credit department which functions like a bank. Profits on savings and loans are kept by the Association, and they provide funds for extension services, scholarships, etc.

In certain respects, the FAs operate, and are even perceived by some farmers, as arms of government. Indeed the government's general laws for Farmers Associations come to 480 pages. On the other hand, selection of the full-time salaried staff of FAs is made by their elected boards of directors, subject to some minimal specification of qualifications by government. Decisions on who will get allocations to grow highly profitable market crops such as asparagus and mushrooms are left to the FAs. This is an attractive reward which FAs control. Moreover, each Association also has autonomy when it comes to spending the profits of its various input and output operations. (See Stavis, 1983, on both Fas and IAs)

LESSONS: Even though the FAs have operated under much supervision and control from the center, they have created a degree of farmer involvement in managing agricultural improvement which has made Taiwanese farmers among the most productive in the world. In particular, many local staff (equivalent of LA) are employed, supervised and controlled by the FAs rather than by the central government ministry, creating an accountability of officials to farmers that is rare in agricultural development.

A number of financial mechanisms are helpful, such as using FAs to collect land taxes and giving the FA a commission for its service. This permits the government to accept payment in kind, freeing farmers from the need to convert rice to cash as harvest time when prices are low. It also gives the local institutions a stable financial base, while helping the central government with its finances. The FAs handle rural banking quite efficiently and finance useful services and benefits for the whole community from these operations which would otherwise benefit only a few private moneylenders.

Because of their evident success in Taiwan, Farmers Associations have appeared attractive as an organizational model to other developing countries. Indeed, the FA "model" was imported to Malaysia in the latter 1960s, with great disappointment. One cannot transfer an organizational design from one sociopolitical-economic environment to another any more than a biological specimen can be expected to survive where temperature, soil and other conditions are quite different. Some of the organizational principles such as accountability, referred to above, however, can be extrapolated mutatis mutandis to new environments.

THAILAND: Mae Klong Integrated Rural Development Groups

The Mae Klong Integrated Rural Development Project was initiated in Januar 1974 with the collaboration of three Thai universities, each of which intended t address broad development objectives in the region. Project activities began i villages in the sub-district of Yokkrabat, some 15-20 kilometers inland from th sea. Approximately half the villagers relied on production of palm sugar as th primary source of income. The other half were rice farmers with a lower averag ncome and standard of living.

During the first year, project activities included attempts to improve a earthenflood dike to provide more irrigation, as well as adult educatio dress-making classes and village health worker training. None of these effor in the second year as they were not well accepted. However, th researchers persevered with their efforts to increase rice yields whic because of high levels of soil salinity and rodent problems. Suggestio for the turning the rice fields into palm production did not appear promising sin require a large investment and a long "gestation" period until the fir to this point the efforts were implemented through the form village leaders.

The late 1975 a newly arrived university staff member, in the course of visiti rice-growing households, found that many people supplemented their incomes aft harvesting season by constructing mud dams to trap fish. Based on th information the researchers began to work toward developing socially cohesiv groups of households organized around the prospects for larger-scale fi production.

The organizing activities involved: (a) facilitating small, informal even conversations among farmers to discuss their knowledge of different varieties fish and the feasibility of raising fingerlings (this social methodology resembles th of the Banki water supply project reported in the Annex of Report No. 3); (sending a number of farmers selected by the groups to observe fish raising at t National Institute of Fresh Water Fishery; (c) starting an experimental fish pond land owned by one of the informal leaders; and (d) overcoming resistance by t local rice mill owners who were initially able to prevent the group from obtain loans from the agricultural bank.

By 1976, over 100 households had significantly increased their income throu involvement with fish culture. The villagers also began raising fingerlings f replenishment of the ponds. Although the groups remain loosely structured, ea household's fish harvest is timed to allow for work groups to do the harvest collectively and to prevent oversupply of the market. These loosely structur groups have developed roles, practices and procedures to promote a collective valued purpose and are thus on the road to "institutionalizing" their organizatio (Thai Khadi Research Institute, 1980; Rabibhadana, 1983)

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LESSONS: The outsiders had to learn to observe and listen before their expertise could become useful to the rural people and before institutional development based on valued new opportunities could begin. The evolution of a production-centered program out of an "integrated" project here is similar to that reported from Guatemala (pages 63-64 above). The fact that the new technological opportunity was very productive was certainly an important factor favoring the groups' "institutionalization."

When the organizers worked through the established village leadership, they got conventional advice which did not lead to a fruitful agricultural-cum-institutional development approach. By going door-to-door to meet all households, the organizers were able to identify new leadership within the community, coming from the poorer strata, which had ideas and talent previously overlooked or excluded. These persons' experience and the confidence they could generate from others gave the effort a new impetus.

The program was able to proceed without much formalization of the organizations, which would have given vested interests more opportunity to oppose or thwart the program. Such informal groups are vulnerable but also flexible. If the commitment of members is strong enough even outside obstruction may not succeed.

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AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: Political Factors in the Agricultural Policy Process **Date:** Thursday, June 5
Guest Speaker: Michael Lofchie **Time:** 12:15-2:00 pm

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OBJECTIVE(S): At the end of this session participants will be able to:

- o Better understand the political factors and conditions in the African context that impede the process of policy reform in the agricultural sector.

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ABSTRACT:

This talk will explore some of the political factors that are said to impede the process of market-based policy reform in the agricultural sector. Two political factors will be given special emphasis. These are: (1) the weakness of African states . . . a discussion of the critical differences between weak and strong states; and, (2) the concept of "urban bias." There will be a discussion of why it is especially the case in the current African context the rural constituencies (pressure groups) are so frequently unable to translate their political needs into effective demands in contradistinction to urban constituencies. Other broad political factors to be taken into account will be the ethnic factor in African politics and its operation at the ministerial level, and the prevailing political culture in Africa as regards market-based practices.

The above factor will then be related to the prevailing policy patterns as these reflect an avoidance of market influences. These will include: (1) suppression of producer prices; (2) overvaluation of currency exchange rates; (3) maintenance of inefficient and poorly managed parastatal corporations; and, (4) the committment to a strategy of industrialization by import substitution.

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READINGS: Required/Optional

- o Commins, F. Lofchie and Payne, "Africa's Agricultural Crisis: The Roots Of Famine", Lynne Rienner, Boulder, CO, 1986. ___/ X
- o M. Lofchie & S. Commins,"Food Deficits and Agricultural Policies in Sub-Saharan Africa," San Francisco: Hunger Project, Sept. 1984. ___/ X

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Food Deficits and Agricultural Policies in Sub-Saharan Africa

MICHAEL F. LOFCHIE
STEPHEN K. COMMINS

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THE HUNGER PROJECT PAPERS

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THE HUNGER PROJECT PAPERS
Beverly Tangri, Editor

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SUMMARY

Africa is in a state of emergency Serious agricultural problems together with widespread drought, global recession and domestic political and economic failures have combined to create famine conditions of unprecedented scope in sub-Saharan Africa

Sub-Saharan Africa is the only region in the world where food production per capita has declined during the past two decades. Approximately 150 million people are malnourished. Hunger and hunger-related disease are now a serious threat in 27 countries, and there is every indication that without radical changes food shortages will become more severe during the next decade.

The causes and remedies of food deficits in Africa have been the subject of wide-ranging debate among experts and policy makers in the past several years. Two widely discussed theories—the theory of underdevelopment and the theory of comparative advantage—purport to explain the decline of food production in Africa Both theories, however, have serious limitations, as do the policies that are advanced based on those theories.

The most common response to Africa's food deficits has been to import food in the form of food aid Although a valid and necessary response to food emergencies, food aid has many drawbacks· it encourages dependency on imported foodstuffs, disrupts local agricultural systems and may act as a long-term disincentive to agricultural development.

The complex problems in Africa must be considered, not in terms of short-term solutions but in a long-term context Broad guidelines for future agricultural development in Africa include: active participation of rural producers, land-tenure policies that enhance small-scale agriculture, freer access to commodity markets and environmentally sensitive agricultural policies.

Policies and programs should be designed in a way that people at all levels of society, particularly women, actively participate in solving the problems of agricultural development in Africa Further, people in Africa and in developed countries must forge a partnership to change the structures that perpetuate hunger, poverty and powerlessness.

Efforts are being made in African countries to develop national food strategies to reverse the decline in agricultural production. Current research offers promises of breakthroughs in food production and in agricultural techniques. The possibility of eliminating Africa's food shortages exists However, the challenge is great and major changes are necessary both to relieve the current situation and to avoid another famine in the future

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ABOUT THE AUTHORS

Michael F. Lofchie is Director of the African Studies Center and Professor of Political Science at the University of California, Los Angeles. He did his undergraduate work at Harvard University and completed his Ph.D at the University of California, Berkeley, in 1964

Professor Lofchie's long-standing interest in Africa has focused on rural development and overall development policy. The specific areas in which he has specialized include national food policy, pricing policies in agriculture and the impact of the International Monetary Fund on African economies. He currently consults with several U S. government agencies on Africa.

Lofchie has traveled extensively in Kenya, Somalia and Tanzania. His country-based research has centered on the problems of implementing socialism in rural Tanzania. An article on that subject, entitled "Agrarian Crisis and Economic Liberalisation in Tanzania," appeared in the *Journal of Modern African Studies* in September 1978

Lofchie is also concerned with continent-wide problems of agricultural development and, more specifically, with the question of food deficits An early essay on this topic appeared as "Political and Economic Origins of African Hunger," (*Journal of Modern African Studies*, Winter, 1974, pp 551-567) More recently, he has co-edited a volume on African agriculture with Robert Bates, *Agricultural Development in Africa. Issues of Public Policy* (Praeger Special Studies, 1980) His most recent article, "Africa's Agrarian Malaise," will appear next year in *Africa, Twenty-Five Years of Independence: An Assessment*, co-edited by Gwendolen M Carter and Patrick O'Meara. It will be published by Indiana University Press

Stephen K. Commins is Coordinator of the Development Institute of the African Studies Center and a lecturer in history at the University of California, Los Angeles. He received his undergraduate degree from UCLA, his M. Div. from Virginia Theological Seminary, and is currently in the Ph D. program at the School of Architecture and Urban Planning, UCLA. His dissertation research is centered on rural development projects and smallholder agriculture in Liberia.

His field research in Africa includes visits to Kenya, Liberia and Upper Volta (now Burkina Faso), where he has studied environmental factors in agricultural development, relations between peasants and development agencies and the changing situation of African peasant economies.

Commins worked from 1974-1981 as the Director of the St Augustine Social Outreach Action Project, a community outreach hunger education program in Santa Monica, California. He has worked extensively with private voluntary organizations involved in development programs He presently consults with the United Nations Non-Governmental Liaison Service He serves on the Boards of Directors of Bread for the World, World Hunger Year and RESULTS.

Among his publications are *Let the Earth Bless the Lord: A Christian Perspective on Land Use* (Seabury Press, 1981), "Food Aid Against the Gift," (*Food Monitor*, March 1983), "Too Many People? No," (*Food Monitor*, May 1983), and "Africa's Food Crisis: Which Way Out?" (*Pro Mundi Vita*, August 1984) His current research on Liberia will appear as a chapter in a book he is co-editing with Michael Lofchie, to be published in 1985

FOOD DEFICITS AND AGRICULTURAL POLICIES IN TROPICAL AFRICA

MICHAEL F. LOFCHIE AND
STEPHEN K. COMMINS*

Hunger is the most immediate, visible, and compelling symptom of a continent-wide agricultural breakdown in tropical Africa. The crisis of food deficits has now become so perennial and so widespread that it can no longer be understood as the outcome of particular political or climatic occurrences such as wars, ethnic strife, or drought. Sub-Saharan Africa is the only region in the world where food production per capita has declined during the past two decades. As a result, the average calorie intake per capita has now fallen below minimal nutritional standards in a majority of African countries. By current estimates, approximately 150 million out of Africa's 450 million people suffer from some form of malnutrition originating in an inadequate supply of foodstuffs. This abysmal picture is further highlighted by the fact that the Food and Agriculture Organization of the United Nations recently indicated that no fewer than 28 African countries were faced with food shortages so critical that further famine might occur imminently.[1] This stark reality challenges fundamentally our earlier assumptions about the possibility of economic development.

There is every indication that food shortages will become more rather than less severe during the next decade. By 1980, Africa had already become heavily dependent upon food imports, at a time when grain prices were rising and African governments faced acute shortages of foreign exchange. Grain imports tripled during the 20 years between 1960 and 1978 [sic], but due to price increases, especially during the 1970s, their cost multiplied nearly 12-fold. If current trends continue, Africa's demand for food imports will triple again by 1990, when sub-Saharan countries will be forced to import approximately 17 million tons of grain annually, simply to maintain 1975 levels of consumption. Even this staggering volume of imports would do nothing to reduce the tragic gap between average consumption per capita and the amount of food required to provide minimal nutritional standards. A further 13 million tons of imports would be required to alleviate this deficit.[2] Even the most optimistic estimates, which foresee some recovery in the productivity of the food-producing sector of African agriculture, envision the need for a doubling of food imports during the decade of the 1980s.

Food deficits on such a massive scale are a sobering entry point for Africa's third decade of independence. The problem is much deeper than the failure of an agricultural continent to feed itself. It is present in the environmental degradation that afflicts not only the semiarid areas of western and eastern Africa, but also the high rainfall regions of Zaire, Zambia, and the West African coast. Desertification, the conversion of once arable soil to desert-like infertility, can be observed in every African country across the equatorial belt from Senegal to Somalia. Soil loss on so appalling a scale reflects both the pressure of increasing population to land ratios, and the imprudent use of capital-intensive temperate-zone technologies on fragile tropical soils. Generations of accumulated wisdom and historically evolved agricultural systems are now rendered largely irrelevant by greatly increased production requirements, and by the pressures of outside markets and political forces.

Africa has been the scene of a bewildering kaleidoscope of experimental strategies for agricultural development. It has become a con-

*Michael F. Lofchie is Professor of Political Science at the University of California, Los Angeles, and acknowledges the support received from his Department and the African Studies Center. Stephen K. Commins is Coordinator of the Food and Agriculture Project of the African Studies Center, and acknowledges the support of the St. Augustine By-the-Sea Episcopal Church for sabbatical leave during 1981. Both authors wish to thank the Episcopal Diocese of Los Angeles for a grant from the Presiding Bishop's Fund for World Relief.

[1] *Times* (Los Angeles), March 9, 1981.

[2] United States Department of Agriculture, *Food Problems and Prospects in Sub-Saharan Africa: The Decade of the 1980's* (Washington, D.C., 1981), pp. 1-8.

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tinental proving ground for policies ranging from socialist collectivism to free-market individualism, with countless approaches somewhere on the continuum between the two. It would require an encyclopedic inventory of research even to compile the literature on world hunger, and this would not begin to touch on such sensitive theoretical concerns as the determinants of successes or failures of rural development efforts.[3]

The causes and remedies of food deficits in Africa have been the subject of a wide-ranging debate.[4] This article examines certain of the principal schools of thought which participate in this debate, and assesses the remedial policies which each suggests. Our objective is to help clarify some of the contending analytic viewpoints, to call attention to the bewildering complexity of the problem, and to suggest a framework within which future rural development policies may be considered. It is useful for our purposes to begin with a discussion of two major contending approaches These might best be identified as the theory of underdevelopment and the theory of comparative advantage We will then consider the factor of environmental deterioration, and the impact of international food-aid policies, particularly those of the United States.

The Theory of Underdevelopment

The best known and, by a wide margin, most widely discussed analysis of poverty and agricultural failure in Africa is found in the complex of theories concerned with underdevelopment. It would not repay us here to summarize at length the differing analyses of such prolific theoreticians as Paul Baran, André Gunder Frank, Samir Amin, Argihiri Emmanuel, Walter Rodney, and Immanuel Wallerstein.[5] It may suffice to extract from this protean array of literature a common core of presuppositions which bears most directly on the problem of food deficits, and on the failure of the food-producing sector of African agriculture to provide adequately for the continent's population

The point of departure from the theory of underdevelopment is the view that the root causes of Africa's economic problems, like those of other developing areas, lie in the nature of the continent's relationship with the global economic system. Underdevelopment theorists normally begin with the presupposition that the world can be divided into the core and the periphery. The core consists of those few countries, principally in North America and Western Europe, which, during the past five centuries, have been able to develop advanced capitalist economic systems. The periphery consists of those countries in Africa, Latin America, Asia, and elsewhere, commonly referred to as the "developing areas," whose economies are, in fact, desperately underdeveloped The theory of underdevelopment asserts that the core countries have been able to achieve advanced forms of capitalism at least in part because of their capacity to exploit—that is, extract an economic surplus from—the periphery The peripheral countries, conversely, are poor because their wealth has been drained off to sustain the process of economic growth in the core. In a nutshell, the economic surplus which might have been used to generate development in the peripheral areas is used instead to finance further enrichment of already affluent nations.

Peripheral countries find it virtually impossible to transform their status in the world system For they are highly dependent on the core for capital, technology, and for markets for their products. Moreover, the policies of these countries are formulated by elites, sometimes referred to as "comprador," whose decisions advance the interests of western capital. Although theorists of underdevelopment sometimes acknowledge a degree of mutual independence between core and periphery, they view this as highly asymmetrical because the core countries have far greater discretion over the terms of their participation in the global economic system. The peripheral countries, precisely because they are so poor, are politically as well as economically weak, and must generally accept the terms of trade they are confronted with as a set of "givens" over which they have little or no control.

The theory of underdevelopment attempts to explain the reasons for the failure of the agricultural sector of developing areas to generate an adequate supply of locally needed food items. It is believed that since the economies of the developing areas are fundamentally shaped by their dependence upon the global economic system, there is a pronounced tendency to favor export agriculture over the production of food crops for domestic consumption. Dependency gives rise to a pronounced dichotomy between the export sector and the food-producing sector; the striking contrast between the two has given rise to the concept of "agrarian dualism." For export production is often carried on in large, plantation-sized farms which are highly favored in terms of agricultural inputs, whereas food crops for local consumption are grown on

[3]See, for example Nicole Ball, *World Hunger: A Guide to the Economic and Political Dimensions* (Santa Barbara and Oxford, 1981)

[4]E g , Kenneth Anthony et al , *Agricultural Change in Tropical Africa* (Ithaca 1979), and "The Roots of Famine " in *Review of African Political Economy* (London) 15–16, 1979, pp 1–74; Raymond Hopkins and Donald Puchala (eds), *The Global Political Economy of Food* (Madison, 1978), Radha Sinha, *Food and Poverty: The Political Economy of Confrontation* (London, 1976); Lester R Brown, with Erik P. Eckholm, *By Bread Alone* (New York, 1974), and Susan George *How the Other Half Dies, The Real Reasons for World Hunger* (Montclair, 1977)

[5]Cf Paul Baran, *Political Economy of Growth* (New York, 1957), Samir Amin, *Unequal Development* (New York, 1976), Immanuel Wallerstein, *The Modern World System: Capitalist Agriculture and the Origins of the European World Economy in the Sixteenth Century* (New York, 1974), Walter Rodney, *How Europe Underdeveloped Africa* (Dar es Salaam, 1972); Argihiri Emmanuel, *Unequal Exchange* (New York, 1972), and Andre Gunder Frank, *Dependent Accumulation and Underdevelopment* (London, 1978)

5 peasant farms which are badly deprived of needed agricultural supports

The export-oriented plantations have benefited from a host of supportive inputs not typically available to peasant farmers. They have access to agricultural-extension services which can help to introduce and sustain scientific methods of production, including high-yield seeds, pesticides, and advanced irrigation technologies. They also benefit from the availability of highly developed infrastructures to deal with the transportation, packaging, and storage of their products. Export agriculture is additionally buoyed by a host of private firms and government agencies which provide "soft" services such as credit, insurance, market analyses and, most importantly, which handle the actual sales transactions to foreign purchasers or commodity exchanges.

The peasant sector, where much of the country's supply of foodstuffs is produced, contrasts fundamentally with the export plantations. Units of production are small in scale, and thus are not in a position to take advantage of modern agricultural technologies. As a result the most common instrument is the hand-held hoe; less frequently, some form of animal-drawn cultivation. Almost never, except in the rarest cases of successful peasant cooperatives, is there any complex machinery Peasant agriculture is also starved of other vital inputs Agricultural-extension services are conspicuous by their inadequacy, with the result that there is little or no provision of scientific inputs for the production of locally consumed food crops. Modern varieties of seeds, fertilizers, and pesticides are, similarly, far less commonly available than in the plantation or export areas. Feeder roads tend to be woefully inadequate, as well as other important elements of infrastructure, such as facilities for the storage or preservation of food grains There are few systematic efforts to organize the supply of food items from the countryside to urban centers, or between different rural areas, with the result that an appalling proportion of the food which is produced goes wasted for want of access to markets. In sum, the shortage of foodstuffs in Africa can be traced directly to the systematic structural neglect of the food-producing sector

This theory of the roots of Africa's food crisis has proved to be highly compelling because of its sweeping synthesis of historical, political, and economic factors. But its very all-inclusive generality is also the source of considerable doubt about its ultimate utility. For although the theory does illuminate important structural pathologies in African agriculture, it can be deeply criticized on a variety of grounds Some of the more general judgments are fairly well-known.[6] These include: a tendency to challenge the crudely moralistic oversimplification involved in a bimodal division of the world between exploitative core and exploited periphery, a growing realization that the very term "periphery" is so broad that it impedes an understanding of the considerable economic and political differences between countries in the developing world, and, among some thinkers, a strong conviction that the notion of "comprador" is inadequate as a conceptualization of class domination in Africa

It has recently been argued that the theory of underdevelopment also fails to understand the nature of the African peasantry, and the overriding cultural factors which limit their food production[7] Other critics have called attention to the need for a more sophisticated classification than dependent versus non-dependent countries, and for a far more probing treatment of the class factors which inhibit or facilitate food production on the African continent In the last analysis, a theory which uses identical terms to explain skyrocketing food imports both in Nigeria and Tanzania is seriously lacking in persuasiveness. 6

Our principal concern is with the limitations of the theory of underdevelopment as it pertains to a strategy of rural development. Here, its shortcomings are particularly acute A conspicuous feature of the theory's strong condemnation of the global trading system is a call for withdrawal from external markets—a process sometimes referred to as economic closure—and those who lay heavy stress on the exploitative aspects of world trade for underdeveloped countries are especially likely to suggest this as a remedy The difficulty with this approach is that it leaves a host of critically important practical questions unanswered, especially those that have to do with the acquisition of foreign exchange. While it is absolutely true, as dependency theorists point out, that the terms of world trade have shifted steadily against agricultural countries, it is woefully inadequate to suggest that the solution is to withdraw from world markets, because those who choose to do so must necessarily forego, or reduce substantially, their stocks of innumerable essential commodities The theory of underdevelop-

[6] Nicola Swainson, *The Development of Corporate Capitalism in Kenya, 1918–1977* (London and Berkeley, 1980), Richard L. Sklar, "The Nature of Class Domination in Africa," in *The Journal of Modern African Studies* (Cambridge), 17, 4, December 1979, pp 531–52, and "Postimperialism A Class Analysis of Multinational Corporate Expansion," in *Comparative Politics* (New York), October 1976, pp 75–92

[7] Goran Hyden, *Beyond Ujamaa in Tanzania Underdevelopment and an Uncaptured Peasantry* (London and Berkeley, 1980).

ment is regrettably silent on how countries which pursue a policy of closure can equip themselves with the scientific and technological wherewithal of the modern world.

A second shortcoming in the rural strategy of the theory of underdevelopment is its unqualified reliance upon collectivized agriculture Agrarian socialism tends to be viewed as an integral accompaniment of the policy of closure. The argument advanced for this position by a number of theorists is that unless the capitalist relations of production in the countryside are dissolved, it would be impossible to reorient agricultural production away from world trade towards the cultivation of foodstuffs for local consumption Capitalist farmers would continue to be attracted to the higher levels of profit available in western markets, and their influence over the local state would enable them to influence agricultural policy in such a way as to facilitate production for export.

Our reservation concerning socialist agriculture is essentially pragmatic, and has to do with the fact that it has generally proved incapable of sustaining high levels of agricultural production.[8] For this reason, country after country in Eastern Europe and elsewhere has abandoned collectivized farming in favor of private farming, mixed forms of production, or locally controlled cooperatives Whatever its attractive theoretical merits, agrarian collectivism in Africa has been consistently unable to transform production levels in the countryside Indeed, those countries which have sought to implement rural socialism, most conspicuously Tanzania, find themselves today in the midst of calamitous agricultural crises, and they must import enormous volumes of foodstuffs in order to avert starvation in the countryside The great irony of socialist agriculture in Africa is that it has tended to exacerbate the very dependency it was intended to remove, it has necessitated heightened levels of financial and material dependence on western donors.

In the last analysis, the greatest value of the theory of underdevelopment may lie in the fact that it sounds a persuasive warning about the pitfalls of uncritical dependence upon world trade. It demonstrates graphically the results of a world economy in which relatively affluent nations can afford to outbid local consumers for the use of local agricultural land However, the theory does not demonstrate the viability of a strategy of "withdrawal" and, indeed, it does not even rebut theories of rural development which call for poorer countries to remain involved in world markets as a partial solution to their food crises.

[8]Rene Dumont, *Socialism and Development* (New York, 1973), especially chs 2 and 4

Comparative Advantage

The major alternative to dependency theory is found in the principle of comparative advantage, the view that countries can maximize their economic potential by specializing in the production of commodities at which they are most efficient in terms of such inputs as capital and labor. This concept was originally suggested in the writings of David Ricardo nearly 200 years ago. For Ricardo, the notion of comparative advantage was a powerful argument for free trade since an unrestricted flow of products between countries would enable them to use their productive resources most efficiently·

> It is quite important to the happiness of mankind that our own enjoyment should be increased by the better distribution of labor, by each country producing those commodities for which by its situation, its climate and its natural or artificial advantages, it is adapted, and by their exchanging them for the commodities of other countries, as that they should be augmented by a rise in the rate of profit.[9]

This kind of specialization, according to Ricardo, would not only lead to more wealth for all nations, but to the greatest possible improvement in living conditions for their people. He believed strongly that comparative advantage must work to the benefit of all concerned, and that the poorer governments would only worsen their economic position by withdrawing from world markets—indeed, there is a strong implication in Ricardo's work that the least developed nations would be particularly well-advised to specialize narrowly in their range of products, since this would enable them to trade in world markets on the most advantageous possible terms.[10]

Writers who followed Ricardo have expanded and altered some of his theoretical ideas, but the basics of the argument have remained the same.[11] Perhaps the most significant addition has been the expansion in the number of factors of production which need to be taken into account to determine a country's comparative advantage. Ricardo gave almost exclusive emphasis to labor as the measuring rod of efficiency in any sphere of production More contemporary authors have argued the need for land and capital to be taken into account, as well, before a country's comparative advantage can be accurately established Significantly, however, two of the major premises of Ricardo's thought have remained intact. Modern theorists of comparative advantage tend not to question either his assumption of

[9]Pierro Sratfa (ed.), *Works and Correspondence of David Ricardo*, Vol 1 (Cambridge, 1962), 'On the Principles of Political Economy and Taxation," p 132.

[10]Ibid, p 135

[11]We are indebted to Rhys Payne, "Economic Development and the Principle of Comparative Advantage," University of California Los Angeles, 1980, for a sweeping survey of the relevant theories

9 the mobility of labor between spheres of production, or his conviction that poor and rich countries alike would improve their economic well-being by participating freely in world markets.

Agricultural economists who accept the doctrine of comparative advantage tend to see no fundamental problem in economies which are characterized by agrarian dualism. They see the heavy structural emphasis on export crops as the natural and beneficial consequence of the operation of free-market forces. William O. Jones, for example, has stated that

> The great African production of coffee, cocoa, tea, peanuts, palm oil, and cotton occurred because these crops could be sold; that is, because consumers in Europe, North America, and elsewhere manifested an economic demand for these commodities, and because a marketing system was developed to communicate the character and magnitude of this demand to African farmers. As a consequence, African producers were able to enjoy more nonfarm goods such as textiles and utensils, than they had before [12]

According to this perspective, it would be a grave mistake to shift away from export crops to food production as a means of solving the problems of food deficits. If such inputs as capital, land, and labor are more effectively utilized when allotted to the production of export crops, it would, from the standpoint of comparative advantage, be economically imprudent to shift these resources to food production. For the income generated by the sale of export crops, such as coffee, cocoa, or tea, would make it possible to purchase far greater amounts of wheat and corn than could have been produced domestically with the same inputs.

Perhaps the most important contemporary proponent of the theory of comparative advantage for developing countries is Hollis Chenery, an economist with the World Bank. His influence has been based partly on his willingness to challenge certain of the more extravagant claims sometimes advanced by other economists. In particular, Chenery questions the classical assumption that specialization of production for foreign trade promotes economic growth He demonstrates a distinction between analyses of comparative advantage (trade theory) and of economic development (growth theory). In his most recent work, Chenery associates himself with a number of important economists, including Joseph Schumpeter, who believe that "comparative advantage is a static concept that ignores a variety of dynamic elements." The elements Chenery refers to, including especially the stimulus that exports provide for the growth of the industrial sector, would be of critical importance for a country seeking overall expansion of its economic system [13]

For the political leaders of developing countries who require practical guidance in making decisions about how best to allocate their own scarce resources, growth theory would appear to have decisive advantages. It is, for example, far more concerned than is the theory of comparative advantage with changing relationships "over time among producers, consumers and investors in related sectors of the economy" Indeed, if there is one single point of differentiation between growth theory and trade theory, it is the greater concern in growth theory for the expansion of multiple sectors of the economy, not simply the export sector. Chenery is particularly emphatic on this point.

> [Development requires] much more emphasis on the sequence of expansion of production and factor use by sector than on the conditions of general equilibrium Growth theory either ignores comparative advantage and the possibilities of trade completely, or considers mainly the dynamic aspects, such as the stimulus that an increase in exports provides to the development of related sectors . . . With this different point of view, growth theorists often suggest investment criteria that are quite contradictory to those derived from considerations of comparative advantage [14]

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For Chenery, it is axiomatic that a developing country's best long-term economic interests lie in balanced, multi-sectoral development. Present market forces, which comparative advantage would rely upon to promote this purpose, are inadequate, since they do not reflect future patterns of consumption and demand.

Given the force of this critique it is rather surprising that Chenery nevertheless continues to advocate a positive role for the concept of comparative advantage in the development process His argument on this point is carefully modulated If comparative advantage can be modified by taking into account some of the important differing assumptions of growth theory, it can serve as an influential principle of planning Four such assumptions would need to be incorporated into the theory, namely.

[12] William O Jones, *Marketing Staple Food Crops in Tropical Africa* (Ithaca, 1972), p 233

[13] Hollis Chenery, *Structural Change and Development Policy* (Oxford, 1979)

[14] Ibid , p. 275

(a) factor prices do not necessarily reflect opportunity costs with any accuracy; (b) the quantity and quality of factors of production may change substantially over time, in part as a result of the production process itself, (c) economies of scale relative to the size of existing markets are important in a number of sectors of production, and (d) complementarity among commodities is dominant in both producer and consumer demand.[15]

By accepting these assumptions, rather than the more pristine doctrine of pure comparative advantage, a developing country can carefully plan its economic policies so as to achieve a judicious balance between emphasis on foreign trade and other strategies which are more likely to promote multi-sectoral development.

Chenery's contribution is of immense value to development scholars. For it establishes the principle that participation in the global trading economy may not by itself enable a developing country to allocate its resources in such a way that the growth of complementary sectors of its economy is promoted. We would identify this principle, for the sake of brevity, as "market failure," and Chenery's theoretical concern about this is well substantiated by the unfortunate experiences of a number of African economies. For countries which have pursued an aggressive strategy of emphasis upon export agriculture have often experienced market failure in its bitterest form. Their earnings from agricultural exports have fallen far short of national needs, and they have been consistently unable to enter the world market to acquire food grains on anything even remotely resembling an adequate scale.

The reasons for this market failure are worth identifying. Contrary to early expectations which saw tropical exports as scarce, high-demand goods, available from only a limited number of suppliers, whereas food grains produced in the temperate zones would be available in abundance, the exact opposite has turned out to be the case. The production of tropical export crops is now an enormously competitive field with new suppliers constantly entering the market,[16] sometimes in response to only modest upward fluctuations in price. Indeed, the market is so competitive that the entry of a single new producer, or the harvest of a bumper crop in one country, can depress prices below their previous level. Coffee provides an excellent example of this situation. African suppliers such as Kenya, Tanzania, Ethiopia, Uganda,

[15]Ibid

[16]Barbara Dinham and Colin Hines, *Agribusiness in Africa* (London, 1982)

and the Ivory Coast compete intensely for market shares against not only each other, but also a host of producers in Latin America, notably Brazil and Colombia. The dominant tendency during the past decade has been for conditions in the world coffee market to depress prices, and to hold them relatively constant at low levels.

This tendency is strongly reinforced by the nature of the market confronted by tropical producers. For the real market does not consist of large numbers of consumer nations bidding competitively against one another for tropical commodities, but rather for a handful of powerful multinational trading corporations. Companies such as General Foods, Nestles, Lipton, and Brooke Bond often occupy an oligopolistic or, not infrequently, a monopolistic position in the market.[17] If tropical commodities appear expensive on the shelves of western supermarkets, the reasons have less to do with the rate of return to producer countries than with the ability of these processing and trading firms to engage in the time-honored tradition of purchasing cheap and selling dear. Part of what enables them to do so, in addition to their commanding position in the marketplace, is the high degree of elasticity of demand for the products they provide, because this can be used to gain bargaining leverage against the producer nations.

The market strength of the large trading companies—or, more precisely, the weakness of the tropical producers—is further reinforced by such factors as the elasticity of consumer demand and the ready availability of synthetic or substitute products. Since tropical agricultural products are not day-to-day necessities, individual purchasers can quickly alter their consumption patterns in response to price fluctuations. This tends to have a continuously depressing effect on the market. The easy availability of alternatives—synthetic chocolate for cocoa, a coffee-chicory mixture for whole coffee, herb and spice teas for authentic tea, or soft drinks for any of these—has a similar effect. The cumulative impact of these factors has been to make it almost impossible for producers in the developing world to gain price leverage in the international marketplace. As a result, tropical agriculture seems perilously unlikely in the future to do any better than it has in the past in generating the levels of foreign exchange necessary to finance a sustained program of food imports.

Further doubt is cast on the wisdom of any strategy based on the continuation of export agriculture, and the import of food crops, by the nature of the world market for basic

[17]Ibid

grains Temperate-zone food exporters, in clear contrast to tropical crop exporters, benefit from a highly buoyant market for their products. Countries which can export wheat, corn, rice, and other grains are dealing in day-to-day necessities, and they can be confident that prospective customers do not have substitutes or alternatives readily at hand. Moreover, the world market for these crops is virtually monopolized by the United States, Canada, Australia, and Argentina, the great wheat exporters who can choose from a host of anxious consumer nations in both the developed and developing worlds. They can also depend upon a steady and expanding market for their goods. Not only are massive importers such as China and Russia constantly entering this market to negotiate long-term, high-volume purchase agreements, but there is a rapidly increasing demand for food grains among middle-income developing countries and in Eastern Europe

The poorer developing nations enter the market for food grain only with the greatest difficulty. They lack adequate reserves of foreign exchange, and in any case these are often committed in large measure to other vital purposes, such as petroleum imports, the financing of foreign debts, and the purchase of raw materials for factories. Because the grain needs of African countries often fluctuate widely from one year to the next, it is impossible to predict import levels over an extended period of time. And since African economies are typically small in scale, their grain purchases do not begin to compare with those of the Soviet Union and China. As a result, they are compelled to enter what amounts to an international grain "spot market." This can be disastrous, as it was during the early 1970s when the famine-struck countries of the Sahel had to enter the international grain market at a moment of critical scarcity, just as soaring purchases by the Soviet Union had driven prices to record levels.

It would therefore appear that an undiluted comparative advantage approach to development is a risky strategy at best Danger of "market failure" places many developing countries in a highly vulnerable position, especially given their weakness in the international marketplace Inability to provide basic foodstuffs for the local population is all too common a result of government decisions which rely heavily on export commodity strategies Nevertheless, the basic principle of comparative advantage has validity in that Africa does possess highly varied resources and production factors which, at least potentially, would enable a number of countries to compete very effectively on world markets. A strategy of comparative advantage could have considerable utility only if incorporated into a broader approach to agricultural development, one that reflected sensitivity to other important political, economic, and environmental considerations.

Environmental Constraints[18]

In considering the broad framework for strategies of agricultural development in Africa, it is essential to consider the continent's particular environmental constraints Although these have been well explored in a number of books,[19] the relationship between environmental deterioration and agricultural stagnation is still too often ignored in the formulation of appropriate strategies The task of doing so is formidable, for Africa is a continent of micro-environments, with great ecological changes often occurring over very short distances Such variations make environmentally conscious agricultural planning extraordinarily difficult and complex. Yet the necessity for such a strategy is tragically illustrated by the fact that the planned introduction of certain exogenous crops, and of new agricultural techniques, has already led to ecological disasters which, in themselves, make efforts at future development even more daunting.

Underlying the basic difficulties of agricultural production in tropical Africa is the general fragility of most of the soils. African soils vary greatly in depth and initial nutrient content, reflecting differing influences of parent material, vegetation, and climate. But as a general rule, the soil cover of sub-Saharan Africa is not readily suitable for ongoing agriculture. The problem, in a nutshell, lies in the fact that sandy soils deficient in important elements preponderate over clay and limestone soils and there are proportionately fewer young, rich alluvial soils than on any other continent.[20] The principal exceptions are in northern Africa, where the Nile flood plain and the lowland regions of the western Mediterranean countries can sustain intensive agriculture over extended periods Sub-Saharan Africa is not so fortunate. Its soils tend to be highly weathered, relatively poor in humus, and very susceptible to such damaging processes as erosion and leaching.

To understand the nature of the environmental constraints on African agricultural development, it is useful to begin by recalling that the continent was once highly forested, with a rich cover of trees protecting and nur-

[18] We are indebted to the helpful comments of Dean Freudenberger, Jerry Moles, and Antony Orme in the preparation of this section.

[19] Antoon de Vos, *Africa the Devastated Continent?* (The Hague, 1975), Paul Richards (ed), *African Environment Perspectives and Prospects* (London, 1975), and Michel Frederic Thomas and G W. Whittington (eds.), *Environment and Land Use in Africa* (London, 1969)

[20] De Vos, op cit , p 20

turing the soils beneath Under this historical condition, insofar as it can be presently reconstructed, its tropical soils were rich and fertile. For the humus content of the soil—which is of vital importance in providing nutrients for plant life, and in retaining moisture near the surface—was constantly replenished by leaf litter from the canopy of trees. Wherever the forest cover has been removed, whether through natural causes such as fires, or as a result of human habitation, the effect has been to set in motion a disastrous cycle of rapid ecological deterioration: without a covering blanket of trees, the soil no longer benefits from the continuous replenishment of its humus content And, since tropical soils have a high level of micro-organic activity, the residual humus in the topsoil tends to be rapidly depleted by the process of microbial decay African tropical soils are so unstable in this respect that they can lose their arability almost completely in a matter of years.

Deforestation has other negative consequences as well Without a layer of humus near the surface, rainfall penetrates rapidly downwards into the subsoil, leaching the surface of many available nutrients, thereby drastically diminishing its utility for agricultural purposes. In areas where the previous cover consisted of savannah grassland, a comparable cycle of decay can be discerned. The richness of these regions was often reflected, in the past, in the dark, highly organic texture of the surface soils. However, if the natural vegetation of savannah grasses is removed for agricultural or grazing purposes, the soils are also exposed in a rapid process of nutrient removal by a combination of microbial activity and downward leaching due to heavy precipitation.

The tendency for rainfall to penetrate rapidly downwards often leads to an even more serious ecological malaise, because the subsurface water dissolves the laterite found in many African soils. When the water evaporates, as between heavy rains, these metal deposits precipitate out, leading to the formation of a stone-like pan beneath the surface of the soil. Once underway, this condition is extremely difficult, if not impossible, to reverse. Deep ploughing, sometimes suggested as the only possible corrective, has not proved to be a solution; this action merely brings fragments of the encrusted iron pan to the surface where they must be laboriously removed by hand. Moreover, without a top blotter of leaf litter or savannah grasses, the first heavy rains merely repeat the cycle Downward penetration of water once again sends sub-surface metallic deposits into solution, and evaporation then recapitulates the formation of the sub-surface pan.

Contemporary Ivory Coast furnishes a sad example of the ecological and agricultural ramifications of the unplanned removal of the forest cover.[21] The timber resources of the nation's rainforest, once one of the lushest in West Africa, are being rapidly dissipated to help boost the country's exports. As recently as 25 years ago, the Ivory Coast's forests covered approximately 12 million hectares. This has now shrunk to about one-third of that area, and the pace of felling timber is such that little, if any, woodland may remain by the end of the century Without the protection of the forest canopy, the soils in many southern areas have been exposed to severe processes of nutrient removal, laterization, and erosion, rendering them virtually useless for agricultural purposes These vast regions have also lost most of their capacity to retain moisture, depleting the underground reserves and leading to severe water shortages Even more ominously, these changes have drastically disrupted rainfall patterns in the Ivory Coast's northern neighbors, Mali and Upper Volta [now Burkina Faso]. The contemporary intensification of drought conditions in these societies is, in part, traceable to the ecological disruptions in the Ivory Coast.

[21]Howard Schissel, "Forest Cover Blown," in *The Guardian* (London), April 29, 1981

In the past, traditional patterns of cropping were developed which were adaptive to the difficulties of tropical environment.[22] For example, the forested areas were, in effect, closed communities where plants and animals constantly replenished the nutrients in the soil through their death and decay. Successful farming required that the canopy of forest and bush be continued in some fashion to allow for a return of nutrients to the earth. In dried, more savannah-like areas, "shifting cultivation" evolved as the major agricultural technique. old fields whose fertility was depleted were simply abandoned for varying periods of time (up to 20 years) and new fields were opened up Shifting cultivation generally differed from "crop rotation," whereby extended land-use was sustained by changing what was planted on a given piece of land from one year to the next, although inevitably both systems tended to overlap in large regions of Africa.

It would be unrealistic to portray traditional agricultural systems as models of pristine harmony, but there is considerable reason to believe that they did work reasonably well when compared with much that has occurred since the colonial era Since population densities were low, there was little need for intensive cultivation and, therefore, little hardship

[22]William Allan, *The African Husbandman* (Edinburgh, 1965), and A T. Grove and E M G Klein, *Rural Africa* (Cambridge, 1979)

involved in practicing agricultural methods which required farm areas to be left fallow for long periods. Perhaps more importantly, low population pressure meant that very few communities suffered from land scarcity, virtually all members of society could be assured of access to some arable land

Since land was relatively abundant, traditional methods of agriculture were not accompanied by the extreme socio-economic inequalities that have become commonplace today. Class formation, where it did occur, was of limited proportions, and there were few glaring divisions between landless and landed populations This probably meant that when calamities of deprivation did occur, they tended to be the result of natural disasters, such as drought or flood, rather than maldistribution in the economic system Under these conditions, deprivation would have been more equally shared among all members of society To the extent that the extensive starvation which accompanies contemporary food shortages is a result of social structures characterized by wide gaps between wealth and poverty, this particular aspect of food deficits was, in all likelihood, far less common then than now.[23]

European rule contributed to the decay of Africa's agricultural resources in at least two distinct ways. One was through the imposition of export requirements which involved the introduction of crops and methods of cultivation that were not well-suited to the African soil base. Cotton, groundnuts, and tobacco have proved particularly destructive Their introduction necessitated clearing large areas of the original cover of forest and brush, thereby depriving the soil of its principal source of organic replenishment. These three crops are also especially damaging in that they tend to absorb unusually large quantities of nutrients from the topsoil, thereby contributing to a particularly rapid decline in arability Moreover, unlike the original cover of forest, grasses, and scrub, these crops are harvested annually, a practice that leaves the ground bare between growing seasons. Stripped of its cover, the topsoil is especially susceptible to erosion and laterization The cumulative result has been to launch an apparently irreversible cycle of deterioration, and to convert large areas of Africa from a humanly suitable milieu to desert or semidesert in less than a century's time

The second effect of European rule was more indirect and had to do with rapid population growth. The introduction of bioscientific medicine eventually led to lower death rates and increasing numbers of people. By the early decades of this century, there were simply more people in the rural areas of much of Africa than could be supported by traditional methods of shifting cultivation which required that large amounts of land be left unutilized at any given time. Land areas which had been allowed to regenerate during periods of extended fallow, now had to be cultivated annually with all-too-apparent results in terms of declining soil fertility Levels of production that could formerly be sustained without the need for exogenous supports, now required greater and greater amounts of fertilizers and other purchased inputs. This has had the effect of tying Africa's rural food producers ever more closely to the urban cash economy, a dependence which can seriously exacerbate the problem of food scarcity in the countryside.

The growth of population has also meant greatly increased pressure on Africa's remaining forest reserves. Vast areas have been cleared to make way for agricultural production, a process which has sometimes occurred even where soil fertility and other determinants of production are so unfavorable that only the most marginal sort of agriculture can be sustained. Forested areas are also denuded as a result of the insatiable demand for charcoal, still the continent's most common cooking fuel and, increasingly, an important source of export earnings for certain countries. The cumulative result of all these pressures is that the forest canopy which was once a major part of the African geographical environment, an invaluable ecological resource, may well have been irretrievably lost

The portentous implication of environmental deterioration in Africa is that it rules out a return to earlier systems of agricultural production as a solution to the ongoing crisis of food shortages Not only would these systems be completely incapable of sustaining today's levels of population, but they were, in any case, dependent upon ecological sources of soil replenishment which are no longer part of the natural environment An agricultural restoration, if it is to occur, will necessarily depend upon artificial methods of providing humus and nutrients to the soil But the lessons which can be drawn from environmental deterioration are, nevertheless, too important to be overlooked For even the most agroscientific approaches to agricultural recovery are unlikely to remedy the crisis of food shortages in the absence of an ecologically conscious response to economic activities which continue to damage the environmental milieu Under present conditions, it is not at all difficult to envision a future in which agroscientific programs to rebuild production are

[23]Jean Suret-Canale, *French Colonialism in West Africa* (New York edn 1971), Richard W. Franke and Barbara H Chasin, *Seeds of Famine Ecological Destruction and the Development Dilemma in the West African Sahel* (Montclair, 1980), Robin Parsons and Neil Palmer (eds), *Roots of Rural Poverty in Central and Southern Africa* (Berkeley, 1977), and Colin Bundy, *The Rise and Fall of the South African Peasantry* (London, 1979).

dwarfed by the magnitude of the agricultural consequences of environmental damage Already heavily dependent upon food imports from abroad, Africa conveys an unmistakable impression of a continent moving even further in that direction

Food Aid

The most common response to the problem of food deficits in Africa has been to import what is most urgently needed from abroad, frequently in the form of food aid. As an immediate remedy for critical emergencies, this "solution" cannot be faulted. Even the most vocal critics of corruption, waste, and inefficiency in food-aid programs acknowledge that they save lives. If starvation is the result of short-term causes, such as drought, war, or blight, food aid can provide a breathing space until more basic remedies can be introduced, or until natural recovery occurs—as a result, this type of assistance has been virtually immune to fundamental criticism. Of course, some reforms have been suggested in order to improve the delivery of food to the truly needy through the elimination of programmatic abuses.[24] This approach can be of great value, especially when the budgets for such relief work are under political attack in donor countries But it should not be allowed to obscure the more basic question; namely, do food-aid programs contribute to the persistence, or even worsening, of the very problems they are intended to alleviate?

The issue is enormously complex. For food assistance can clearly be of some concrete benefit in less-developed countries.[25] It can be targeted specifically towards the most deprived and disenfranchised groups within a society, and can thus provide a modest safety net for the poorest of the poor, a social stratum that has proved maddeningly elusive to a host of other governmental and international development agencies. Food-aid programs which provide essential nutrition for such vulnerable groups as refugees, women, and children have an especially compelling moral claim to continued support Moreover, they can provide tangible resources for other, more all-inclusive development projects. Food aid may be employed, for example, to encourage price stabilization and grain storage, development tasks that are of great importance in rural areas which are affected by cyclical instability in the availability of food supplies. Food aid has sometimes been linked effectively to the improvement of rural infrastructures through "food for work" projects which employ food recipients as laborers for the construction of roads, irrigation systems, and reclaimed land And, in a context where foreign assistance is declining in real terms, food aid can free scarce governmental resources for other social services.

Nonetheless, serious questions about the ultimate impact of food aid remain. As the Presidential Commission on World Hunger noted in its final report:

> At best, there is an inherent contradiction between food which increases the dependency of recipients upon donors, and measures to increase purchasing power and basic food production within developing countries themselves. . . In some cases, food aid undermines the efforts of recipient nations to develop a more self-reliant base of their own. Food aid has also enabled some recipient governments to postpone essential agricultural reforms, to give low priority to agricultural investment, and to maintain a pricing system which gives farmers inadequate incentives to increase local production required for greater self-reliance in basic foodstuffs.[26]

Comments such as these have helped dispel the mystique of food aid, and have paved the way for searching criticisms about its nature and impact, as well as the policy motivations of the donors. The "Food for Peace" program of the United States, PL 480, has been the subject of intense scrutiny since it is by far the largest single food-aid scheme in the developing world and, as such, has provided a model for many others. Numerous critics have pointed out, for example, that this program had its origins in domestic pressures within America, especially the need to solve the problem of growing domestic food surpluses by creating foreign markets for grains. Others have singled out the tendency for food aid to be awarded on the basis of political and military criteria, rather than the needs of the people themselves.[27]

Food aid has also lent itself to serious abuse within the recipient countries [28] It has provided a source of enrichment for corrupt elites who somehow manage to spirit away an appalling amount of the food intended for the hungry, and who cheat relief organizations by charging exorbitant sums for transportation and storage. Politicians have also taken advantage of assistance programs by demanding bribes to allow relief organizations to operate, by using food relief as a source of patronage,

[24]Report of the Presidential Commission on World Hunger, *Overcoming World Hunger: The Challenge Ahead* (Washington, D C , 1980). Mark Schomer, "Can Food Aid and Development Aid Promote Self-Reliance?" Bread for the World Background Paper No. 28, 1978, Brown, op cit., and Hopkins and Puchala (eds), op cit

[25]Christopher Stevens, *Food Aid and the Developing World: Four African Case Studies* (London, 1979), and S J Maxwell and H W Singer, "Food Aid to Developing Countries A Survey," in *World Development* (Oxford, 1979), pp. 225–47

[26]Presidential Commission on World Hunger, op cit , p. 140

[27]Frances Moore Lappe, Joseph Collins and David Kinley, *Aid as Obstacle* (San Francisco, 1980), Denis Goulet and Michael Hudson, *Myth of Aid* (New York, 1971), Jack Nelson, *Hunger for Justice* (Maryknoll, 1980), and George, op cit

[28]Betsy Hartmann and James Boyce, *Needless Hunger. Voices from a Bangladesh Village* (San Francisco, 1979), Barry Newman, "Graft and Inefficiency in Bangladesh Subvert Food-for-Work Program," in *Wall Street Journal* (New York), April 20, 1981, and Geoffrey Lean, "Scandal of UN's Food Aid in Africa," in *The Observer* (London), June 17, 1979

and by threatening to withhold food relief from potentially disaffected groups Moreover, food-for-work projects are clearly of much greater benefit to well-to-do landowners—whose holdings increase substantially in value from infrastructural improvements—than to landless and destitute families Indeed, food-relief programs have been subject to such a wide variety of forms of corruption that they have helped to widen the gap between rich and poor in virtually every country in which they operate

The most serious criticisms of food assistance, however, focus on its tendency to act as a long-term disincentive for local agricultural production [29] Most of what is imported is distributed through the national marketing network, and so often competes directly with locally produced foodstuffs. As a result, in country after country, the availability of concessionally priced food from abroad has fundamentally undermined the price structure of locally produced food items, and has contributed to the further decline of agricultural economies already buffeted by drought, input shortages, and political disruptions The aid administrators have been chronically unable to remedy this problem Motivated by the need to make food available as quickly as possible to needy persons, often under extremely difficult conditions, they have not had the opportunity or the authority to introduce methods of distribution that would conserve the economic basis of local agriculture Even such targeted programs as food-for-work and maternal-child care are now generally acknowledged to have a measurable disincentive effect on local agricultural production.

As a result, some peasant farmers have actually been driven off the land by this kind of external assistance. Marginal agriculturalists who might otherwise have been able to survive economically have, on occasion, been unable to compete in the marketplace with heavily subsidized wheat or rice. Driven from their plots by cheap foreign grains, as well as by the conditions which induced the initial shortages, such farmers have frequently been compelled to join the ranks of those who depend for their survival upon food assistance. In this way, food aid can set up a permanent cycle of deterioration. It can increase the number of dependent persons by diminishing the market for locally produced goods, it can result in the establishment of a price structure which makes it difficult, if not impossible, for peasant producers to recover economically; and it can compete directly against the donor capital that is needed to improve transportation and storage. These tendencies may help explain why so many food-assistance programs which were initially intended only to provide short-term emergency relief have become almost indelible features of the rural economic landscape

An equally serious long-term issue is the destruction of initiative at the local level. Peasants who are economically exploited by corrupt food-aid administrators, or who are victimized when assistance programs are manipulated for political purposes, are hardly likely to emerge as eager participants when called upon to involve themselves in development projects for economic reconstruction. Food aid has also been observed to generate a mentality of dependence. A report on an agroforestry project in Upper Volta [Burkina Faso] graphically depicts this problem.

> So extensively has this food aid mentality permeated the way of life, that rather than act as an incentive to community improvement, food aid has the opposite effect It is an assurance that despite bad labor practices that lead to eroded and exhausted soil and marginal harvests, there will be food to eat, there will be food aid Food aid is an argument *against* the idea that land reclamation and sound agricultural practices are necessary [30]

It is nearly impossible to discredit the arguments of those who feel that food aid is an unfortunate part of an international system of dependence that casts Africa in the role of a continent of begging bowls.

In the final analysis, food aid is not a solution for human misery and malnutrition in Africa. It is essentially a dead-end approach, an entry into a morass of complexities from which there is no apparent exit. Rather than being easily administered—enjoying local political support and targeted towards specific recipient populations—food-aid programs have become bureaucratic and political nightmares for both planners and project administrators. The ease with which such assistance can be dissipated or spoiled makes for stresses and strains in the body politic that are enduring and difficult to locate—when someone cares to try. And far from alleviating the misery of hunger the net result may be to contribute to its continuation As a short-term necessity in situations of dire emergency, food aid may well be the only answer; as a strategy for agricultural development it is no solution at all.

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[29] Lean, loc cit, Alan Riding, "US Food Aid Seen Hurting Guatemala," in *New York Times*, November 6, 1977, and Tony Jackson, "Statement Before the Committee on Development and Cooperation of the European Parliament," Brussels, April 1, 1980

[30] October 1980 description of the Church-funded AgroForestry Project in Ouahigouya, Upper Volta [now Burkina Faso], which has been operational since 1979

23 The ultimate irony of food-assistance programs, however, may well lie in the fact that there are often adequate local foodstuffs available in other districts of the recipient country. These are typically prevented from reaching needy areas by a lack of administrative capacity, and by inadequacies in infrastructure and marketing mechanisms If the resources and human energies allotted to food aid programs could be channeled towards improving the country's own systems of economic management, transportation, storage, and distribution, this would undoubtedly do more to alleviate hunger on a long-term basis than any quantity of external food assistance.

Conclusion

It is clear that no single theoretical perspective adequately explains the decline of food production in Africa, and that there is no single policy which is likely to resolve it. The morass of historical, environmental, and economic factors is so complex as to render the efficacy of any solution problematic. Underdevelopment theory, for example, is helpful in analyzing the impact of colonialism and the international economic system on Africa, but it falls far short of suggesting workable solutions The alternatives it presents presuppose massive and radical changes not only in Africa, but in the West as well. Since theorists of underdevelopment tend to believe that the impoverishment of the less-developed world will continue so long as capitalism determines the international market behavior of western nations, they tend to remain aloof from discussions of specific projects and policy remedies. For all of its complex historical analysis, then, the theory of underdevelopment in its raw form reduces to an almost absurdly simple policy prescription: end global capitalism.

Much the same can be said of the doctrine of comparative advantage. Since those who hold this position tend to explain any shortages—including food deficits—in terms of governmental interference with the operation of free-market forces, the solution they prescribe tends towards an equally simple, and equally unworkable, remedy: eliminate state-imposed barriers to the operation of the market Theorists of both underdevelopment and comparative advantage share a disquieting trait in common: they tend to treat evidence of the failure of their strategy as proof of the need for ever greater applications. Thus, in the former, the remedy for failure of socialism becomes—apply more socialism Just as, in the latter, the solution for the failure of free-market approaches becomes—free the market further

Both of these approaches tend to be equally insensitive to Africa's immense environmental problems. Workable strategies of agricultural development should take into account the highly delicate and already badly disrupted state of the ecological basis of African agriculture. This would entail working out an extremely difficult balance between the retention of those traditional agricultural systems which can be defended on environmental grounds, and the introduction of modern agricultural practices which would be more responsive to the growing food requirements of rapidly increasing populations. On a continent where about one-half of the land can be classified as arid or semiarid, the introduction of annual crops can be disastrous. Yet socialist and free-market oriented agricultural planners alike all too often see the remedy for Africa's food deficits in terms of the creation of large-scale, capital-intensive farms.

Additionally, western aid programs have often run counter to the needs of African peasants, and have thus inhibited rather than encouraged greater local food production. Government-to-government assistance runs a very great risk of supporting corrupt and venal regimes and, to this degree, can be held partly accountable for the growing mood of cynicism and disillusionment with African leaders. This mood has been well expressed by the Ghanaian novelist Ayi Kwei Armah: 24

> How long will Africa be cursed with its leaders? There were men dying from the loss of hope,, and others were finding gaudy ways to enjoy power they did not have. We were ready here for big and beautiful things, but what we had was our own black men hugging new paunches scrambling to ask the white man to welcome them onto our backs. These men who were to lead us out of our despair, they came like men already grown fat and cynical with the eating of centuries of power they had never struggled for, old before they had ever been born into power, and ready only for the grave [11]

Yet so long as external assistance is given on a government-to-government basis, it is almost impossible to conceive of an aid project which would bypass an entrenched regime to deal with the agricultural needs of food producers at the local level.

[11] Ayi Kwei Armah, *The Beautiful Ones Are Not Yet Born* (New York edn 1969), p 79.

25 This article has examined four approaches to Africa's food deficits. Combining their positive features we would suggest a series of critically important reforms which can best be understood as broad guidelines for future agricultural development in Africa. These might include:

(1) Genuine empowerment of the peasantry in order to enable rural producers to affect the political process, the character of the marketplace, and the administration and implementation of foreign aid. This would be essential in preventing their exploitation by political elites, and in reversing national policies which subordinate peasant needs to the interests of the urban privileged. It could be facilitated by links with trade unions and rural-based cooperatives. One of the most important problems confronting peasant movements in Africa is to overcome rural-urban conflicts over food policies. The realization of power by the peasantry would assist in the creation of effective channels of communication with government agencies, and with organizations representing the interests of urban-based social classes.

(2) Land-tenure policies which prevent "the sharks eating the fishes" and which, thereby, preserve the positive features of small-scale peasant agriculture. The shortcomings of both socialist and free-market strategies are instructive on this point. The efforts of governments to create collective agriculture have not only led to the coercion and brutalization of the peasantry, but to a sharp downward spiral in agricultural production. Large-scale agricultural projects promoted by capitalist interests have also done more harm than good by creating massive numbers of landless and unemployed persons. Smallholder schemes sustained, in part, by governmental limitations on land acquisition and support for agricultural improvements, show great promise in avoiding both these pitfalls.

(3) Freer access to commodity markets through bypassing the large firms which presently dominate the international marketplace in Africa's major export products. Without this major external change, internal reforms that lead to greater security of land tenure and increased peasant participation will lose much of their long-term effectiveness. The theory of comparative advantage has much positive merit for developing countries in Africa, but even a carefully planned emphasis on export crops will continue to be disastrous unless there are real prospects of improved price levels for these products. The paramount objective of this reform would be to avoid the extremes of autarky and dependence in international markets, and to generate new and more equitable modalities for trade, transfer of technology, and investment.

(4) Agricultural policies that are more fully influenced by sensitivity to environmental constraints. Far too much of the planning for African agriculture has separated environmental from developmental issues. The result has been agricultural policies which devastate the land and drastically diminish its value as an economic resource for future generations. The measurements of economic output should be revised to incorporate such criteria as long-term sustainability. This might be expected to lead to a fundamental reappraisal of the value of such crops as groundnuts, cotton, and tobacco, as well as agricultural projects which include a much greater emphasis on reforestation.

Reordering paradigms and practices will be a formidable task. Yet the compelling reality of Africa's increasing food deficits requires nothing less than fundamental changes in these areas. To the extent that previous policies have failed to alleviate the severe shortages, a continuation of existing practices seems an exercise in futility. Models of agricultural reform which do not take these guidelines into account offer only the prospect of an ever-deepening crisis. 26

SUB-SAHARAN AFRICA
INCLUDES CAPE VERDE, COMOROS, MAURITIUS, SÃO TOME AND PRINCIPE, SEYCHELLES

COUNTRIES EXPERIENCING ABNORMAL FOOD SHORTAGES
ACCORDING TO A JULY 1984 REPORT FROM FAO. INCLUDES CAPE VERDE, SAÕ TOME AND PRINCIPE

FOOD DEFICITS IN SUB-SAHARAN AFRICA: THE SITUATION IN 1984

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The serious agricultural problems described in the preceding article have combined with widespread drought, global recession and domestic, political and economic failures to create famine conditions of unprecedented proportions in sub-Saharan Africa. Human misery and suffering from hunger and hunger-related disease are now prevalent in sub-Saharan Africa. According to the UN Food and Agriculture Organization, 27 countries are now experiencing severe food shortages.[1]

The Overseas Development Council, in a recent issue of *Policy Focus*, reports that "more than twenty million Africans are at risk of death from starvation."[2] This crisis will require a continuing response from the international community. However, food shortages and food policies in Africa must be considered in a long-term context. Without radical changes in the immediate future, Africa's agricultural production will not improve significantly, even in years of "normal" rainfall.

Prescription for Change

Some of the key policy issues that need to be addressed in order to prevent future famines in Africa and to ensure just and sustainable agricultural development in the years ahead include:

1. Establishing programs that have widespread participation both in planning and in distribution of benefits;
2. Ensuring that programs incorporate the knowledge of local farmers;
3. Eliminating dependence upon outside aid by establishing self-supporting enterprises;

*The author wishes to thank John Distefano, African Studies Center, UCLA; Lorette Picciano-Hanson, Bread for the World; Sam Harris, RESULTS; and Debra Rein, The Hunger Project, for assistance with this paper.

[1]Food and Agriculture Organization of the United Nations and UN/FAO World Food Programme, "Food and Agriculture Situation in African Countries Affected by Calamities in 1983/84," *Situation Report No. 5* (Rome, May 31, 1984). Also, Nicholas Raymond, "Africa Crisis Goes On," *FAO at Work*, Food and Agriculture Organization of the United Nations, Washington, D.C., July-August 1984.

[2]Gary Walker and Frank Ballance for the Overseas Development Council, "Africa's Development Crisis: Looking Beyond the Famine," *Policy Focus*, Issue Number 3, p. 1.

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4. Including women in key roles within agricultural training, credit and leadership programs;
5 Cutting "aid" programs that are based on narrowly defined "security" and "strategic" interests,
6. Exploring the establishment of food reserves in Africa that do not create a permanent famine mentality.

This paper will illustrate some of these points and identify the continuing problems that prevent most African countries from achieving food security. It will note also short- and long-term policy responses that could lessen the threat of famine and malnutrition in the future.

(It should be noted that general information on African agricultural problems cannot, in a short paper, reveal the extraordinary diversity that exists within agricultural economies in Africa. Beyond the immediate drought situation, this diversity means that progress, decline and stagnation will all occur at the same time within a given country, as well as between countries. This diversity needs to be kept in mind when considering sub-Saharan Africa overall.)

Drought—1984

The spread of the drought is unprecedented.[3] South Africa and Zimbabwe, both of which are normally grain exporting countries, have experienced serious deficits this year South Africa exported four million tons of grain in 1982 In 1984 it expects to import over one million tons.[4] Because of the structure of the apartheid system this food will not be available in the "homelands," which means that malnutrition and hunger among rural blacks will rise above their already high levels.[5]

West African coastal states, which were spared some of the worst ravages of the Sahelian famine, have not been so fortunate this time. The Ivory Coast, while able to provide food for domestic needs, has lost most of its primary energy source—hydroelectric power.[6] Ghana has been hit by forest fires that have worsened drought conditions. In addition, it lacks the foreign exchange necessary to purchase the parts and fuel to deliver food assistance.[7]

In East Africa the drought has afflicted areas of Kenya that normally receive adequate rainfall Around Mt Kenya itself, an area of high food and export-crop production, the spring rains were poor; some have described the drought there as the worst in fifty years.[8] In neighboring Tanzania, where the economy is much weaker than Kenya's, the government lacks the resources to meet needs in the interior. One correspondent wrote recently of a village in the interior of Tanzania. "Between here and two hundred miles south, there is not one village with a maize harvest. There is no food, no reserves, no seeds, and no neighboring villages to rely on for help. The amount of food needed to prevent starvation is simply staggering."[9]

One of the most seriously affected countries is Mozambique, where it is estimated that a hundred thousand people died in 1983 and many thousands more have perished in 1984. Widespread drought has devastated parts of the country Other regions of Mozambique, which were still able to produce food, were recently hit by a cyclone which damaged the crops [10]

Additionally, guerrilla groups supported by South Africa have made the delivery of relief supplies dangerous in part of the interior. Thousands of Mozambicans have fled into Zimbabwe, which has its own drought problems and shortages Nonetheless, the Zimbabweans have attempted to help their neighbors. Camps that offer food for Mozambican refugees exist in both Zimbabwe and Mozambique, but deliveries in Mozambique are not always assured. Food aid has been slow in moving from the West and is virtually nonexistent from Eastern bloc countries [11]

A situation that is even more grim exists in Ethiopia, where drought has combined with widespread regional conflicts to hamper food production as well as food relief. Ethiopia's government faces armed regional and ethnic movements in Eritrea, Tigre, Ogaden and other areas, along with serious drought In areas where there is armed resistance to government authority, disputes have erupted between the national government and relief agencies over distribution of relief. Doubting the government's control of many drought areas, some organizations have wanted to send aid through opposition groups. The Ethiopian government, however, has condemned this approach as undercutting its authority In addition, charges have been made that food aid has been diverted to feed troops, and some critics have claimed that the U.S. has been slow in providing aid to a Marxist government that is openly allied with the Soviet Union.[12] The arguments continue So does the famine

[3]Jack Shepherd, "Drought of the Century," *Atlantic Monthly* April 1984, pp 36–40, *Situation Report No. 5*

[4]"Southern Africa's Drought Nature's Curse, Man's Folly," *The Economist*, February 11, 1984, p 70.

[5]The Second Carnegie Inquiry into Poverty and Development in Southern Africa, April 13-19, 1984, University of Cape Town, South Africa (Carnegie Corporation, New York, to be published)

[6]Alex Rondos, "How Serious Is Africa's Food Crisis?" *CSIS Africa Notes*, Georgetown University Washington, D C , January 26, 1984

[7]Ibid

[8]Alan Cowell, "Drought Spreads to Kenya, Stirring Fear of a Food Crisis, " *The New York Times*, July 16, 1984, p A1

[9]Letter from a Roman Catholic priest in Tanzania to the Society of African Missions, Spring 1984

[10]*Situation Report No 5*, Annex I, p 3

[11]*The Economist*, February 11, 1984, p 70

[12]CBS Network Evening News, August 2, 1984 See also "Politics Hinders Food Aid to Starving People in Ethiopia," *The Christian Science Monitor*, July 20, 1984, pp 1, 30

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Additional Factors

While drought is the primary visible cause of the present famine situation, Africa's economic stagnation, weakness in the external international economy and agricultural malaise are all part of its vulnerability to starvation. Several famine studies have shown, in fact, that food shortages alone do not explain starvation.[13]

The preceding article notes that a long-standing debate has existed concerning the validity of different approaches to economic development in Africa. A similar debate is now taking place between those who see present problems as primarily internal to the continent and those who see them as primarily external. This debate is not a refined academic exercise, it reflects in part the vested interests of different countries and the power relationships between and within developed and developing nations.[14]

Policy: Internal Issues

In most African countries, urban residents wield more political clout than farmers. The most serious internal policy question concerning economic development relates to the low prices offered producers for domestic food production in order to ensure inexpensive food for urban dwellers. Critics claim that these low prices are a disincentive to food production, and thus a factor in undermining the continent's agriculture.[15]

A further internal problem is the continuation of regional conflicts between different national groups, which increases the number of refugees, damages economies and hampers food production.

External Issues

Regardless of the internal policies adopted by African governments, they are constrained by a host of factors beyond their control. The global recession has cut demand for the commodities produced by African countries and thus lowered national revenues. High interest rates in the United States have increased service charges on the debt owed by African countries, and the strength of the U.S. dollar has resulted in oil imports becoming more expensive over the past few years. Generally, African economies remain tied to one or two export items for most of their foreign exchange earnings. For example, African coffee-producing nations may produce bumper crops, partially through offering good prices to farmers; yet their earnings may drop when global prices decline due to large harvests in Latin America. Other commodity producers are similarly vulnerable.[16]

Environmental Issues

Sustainable agricultural systems that would enhance both immediate food production and long-term ecological stability are an immediate priority. Little has been done in the past few years to reverse the trends of deforestation and desertification that take land out of production. Policy makers do not have access to research that incorporates the knowledge that African farmers have about their own environment, in part because coordination and funding are lacking. Investment in new forms of sustainable production is relatively small. Without significant changes in production techniques, increased population and continued soil loss will further undermine food security efforts.

Development programs need to be redesigned to include elements that are missing currently, such as local experience with soils and climate, and knowledge of labor demands for various crops and the impact that these crops have on soil resources. African farmers' organizations, if empowered, could provide much of this knowledge. Continuation of top-down programs of development, no matter how informed by past experiences, will repeat the socially and ecologically disastrous results of many past efforts.

Current U.S. Aid

The U.S., like all other developed and developing countries, does not have a quick or easy solution for the problems of development in Africa. Old ideas of the U.S. "feeding the world" or transferring temperate-zone agricultural technology to the African continent are gradually being replaced.

The U.S. response to the current emergency has been limited. Emergency food aid of $170 million has been appropriated for fiscal year 1984.[17] Private voluntary organizations and some members of Congress have provided much of the stimulus to get the bills for appropriations introduced and passed.[18]

The U.S. aid package lacks adequate funds for transport costs. Thus, not all of the food aid is guaranteed delivery.[19] Little has been done to supplement future budgets with increased support for necessary recon-

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[13] Amartya Sen, *Poverty and Famines* (New York, 1981).

[14] M. Peter McPherson, "Hope for Africa," *The Christian Science Monitor*, May 30, 1984, p. 12. See also John W. Sewell, "African Dilemma and American Response," *The Christian Science Monitor*, May 16, 1984, p. 14.

[15] Interfaith Action for Economic Justice, "Africa's Development Crisis," *Policy Notes*, 84-12, March 23, 1984.

[16] "African Dilemma and American Response."

[17] Agency for International Development, "P.L. 480 Title II, FY 1984 Budget, Approved African Emergency Programs," AID/FVA/FFP/POD, August 15, 1984, Doc. No. 0029N, pp. 15-17.

[18] Some of the groups and individuals are: Bread for the World, Catholic Relief Services, Center for Development Policy, Interfaith Action for Economic Justice, Senators Rudy Boschwitz and John Danforth, Representatives Thomas Daschle, Julian Dixon, Byron Dorgan, William Gray, Matthew McHugh and Ted Weiss.

[19] Arthur Simon, "Famine Relief," *The Christian Science Monitor*, June 19, 1984, p. 14.

struction and new plantings following the disastrous harvests of recent years.[20]

United States aid to Africa for the past year amounted to $1 1 billion. Of this, $257 million was given as PL 480 assistance, $496 million was in the form of military or strategic aid and $350 million was for development assistance.[21] The proportion of foreign assistance going to military and strategic aid has increased in each of the past four years, compared with support for development programs.[22] Funding for such programs as the International Fund for Agricultural Development, which provides assistance to small farmers, has not kept up with either the need or previous U.S promises [23] The level of funding for UNICEF, one of the most cost-effective and valuable international programs, has been threatened with major cuts by the Administration for the past several years.[24]

The Challenge Before Us

The African famine challenges the present direction and priorities of aid programs. Changes in aid priorities are needed, as is an evaluation of the impact of the aid and the results of aid programs. The points made at the beginning of this article provide a starting place for change. Proclamations made by governments concerning a commitment to work against hunger are common, but actions for eliminating hunger and poverty remain difficult to implement. Challenging and questioning existing institutions and policies is a task of great importance which must be undertaken in partnership with the people of Africa in order to remove the obstacles that prevent communities from feeding themselves. Those concerned about hunger need to be willing to question assumptions about why hunger exists and about what agricultural policies should be adopted for the future.

More specifically, people in developed countries can work toward ending hunger by supporting nongovernmental organizations that promote just, sustainable and participatory development. They can work to alter government policies that perpetuate hunger, and they can uphold government policies that help to alleviate hunger.

Conclusion

This year marks the tenth anniversary of the World Food Conference which was held, in part, as a response to famines in the Sahel, Ethiopia and Bangladesh.[25] It is an anniversary that is marked by irony. Global per capita food production is up from ten years ago. New forms of alleviating malnutrition and preventing unnecessary death, such as oral rehydration therapy, are now available

Increasingly, efforts are being made in African countries to create national food strategies that will reverse the decline in agriculture in many of their economies. There are many promises of breakthroughs in food production and new agricultural techniques [26]

The African famine, however, is a reminder of how fragile all these gains have been. The consequences of the failures of African governments and the international community are being borne by the victims of hunger, disease and starvation. Africa's agricultural malaise and severe food shortages are a challenge to present structures of aid, trade and agricultural development policies

The possibility of eliminating food shortages exists, but major changes will be required. Without such changes, the structures of poverty will make another famine unavoidable

[20] "Status Report on Africa Emergency and Bread for the World Action," Bread for the World, July 1984.

[21] U S Department of State, Africa Bureau, Economic Policy Service Document, February 9, 1984

[22] United States, House of Representatives, Committee on Foreign Affairs, Subcommittee on International Security and Scientific Affairs, Hearings *Foreign Assistance Legislation for Fiscal Year 1985, Part 2*, 98th Cong , 2nd sess , 23 February 1984, p. 113. Interfaith Action for Economic Justice, "Human Needs and World Security Bill," *Policy Notes*, 84-4, February 3, 1984

[23] George Dorsey, "Some UN Agencies Are Indispensable," *The Christian Science Monitor*, February 24, 1984, p 16

[24] Mary Ruth Herbers, "New Hope for the World's Children," *Bread for the World Background Paper No 73*, April 1984, p. 2.

[25] Interfaith Action for Economic Justice "World Food Conference A Tenth Anniversary Appraisal," *Hunger*, May 1984

[26] World Food Council, "Summary of Conclusions and Recommendations " in The Report of the World Food Council at the Tenth Session, June 11-15, 1984, Addis Ababa, Ethiopia (to be published).

ABOUT THE HUNGER PROJECT

Established in 1977, The Hunger Project's purpose is to generate a global context of individual will and commitment for ending hunger on our planet by the end of the century As of August 1984, more than 3,000,000 individuals living in 138 countries had publicly declared their commitment to the end of hunger by enrolling themselves in The Hunger Project.

The Hunger Project is currently active in twenty countries: Australia, Austria, Belize, the British Isles, Canada, Denmark, India, Ireland, Israel, Jamaica, Japan, Mexico, the Netherlands, New Zealand, Nigeria, South Africa, Sweden, Switzerland, the United States and West Germany.

The Hunger Project informs and educates people throughout the world about the persistence of hunger and starvation in a way that supports them in participating effectively in its solution.

One of The Hunger Project's educational programs is the Ending Hunger Briefing Created by a team of experts in the field of development, the Briefing presents a comprehensive overview of the facts of world hunger. More than 400 highly trained volunteers in six countries have been certified to lead this four-hour educational presentation. Since its inception in January 1982, the Briefing has been presented to more than 160,000 individuals in North America and Western Europe.

The Hunger Project also publishes a range of educational materials about the persistence of hunger and the work to eradicate it that has already been done.

The Hunger Project newspaper, *A Shift in the Wind*, is the world's largest-circulation publication on the subject of hunger. Each issue is distributed to more than 1.5 million households throughout the world, as well as to more than 20,000 key individuals in the media and in the diplomatic, business, political and academic communities

World Development Forum, a twice-monthly newsletter of facts, trends and opinion in international development, is distributed to more than 10,000 policy and opinion leaders in many countries of the world.

The newest Hunger Project publication—*The Hunger Project Papers*—was inaugurated in May 1984. These occasional papers present technical/professional analyses of subjects related to ending hunger and are circulated to more than 10,000 people.

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The Hunger Project is also active through its volunteer network in the following countries

Australia
Austria
Belize
Denmark
France
Ireland
Israel
Jamaica
Japan
Mexico
Netherlands
New Zealand
Nigeria
Switzerland

THE HUNGER PROJECT PAPERS

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AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: Measuring Impacts of Government Marketing Interventions
Date: Thursday, June 5
Lead Instructor: Fletcher
Session #: 3b
Co-Trainer(s):
Time: 2:00-3:30 pm

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OBJECTIVE(S): At the end of this session participants will be able to:

- o Estimate the domestic terms of trade, measures of protection and comparative advantage.
- o Evaluate the usefulness of these measures for policy decision-making.

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ABSTRACT:

- o Domestic Terms of Trade:
  - * Identify policies that influence the terms of trade
  - * Implications for agricultural growth and income
- o Measures of Protection - Nominal and Effective Rates of Protection:
  - * Data needs for calculation
  - * Role of border and accounting prices
  - * Interpretation and utilization
- o Measures of Comparative Advantage:
  - * Net social benefit
  - * Domestic resource costs

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READINGS: Required/Optional

- o Fletcher, Lehman, "Evaluating Effects of Government Policies on Producers, Marketing Agencies and Consumers," 1986. X /___

Evaluating Effects of Government Policies on Producers, Marketing Agencies, and Consumers

L. Fletcher
6 June, 1986

	Revenues		Costs	Producer Profits	Marketing Margins	Consumer Expenditures
		Tradeable Inputs	Domestic Factor Inputs			
Market Prices	A	B	C	D	M	P
Social Prices	E	F	G	H	N	Q
Policy Impacts	I	J	K	L	O	R

The first step is to obtain detailed input requirements for all of the products to be analyzed. It is convenient to organize these input data using an input-output tableau and expressing input use requirements and yields on a per hectare basis. Input requirements for the same product can be obtained for different sizes of producers, different techniques of production, and different locations. The most important point is to estimate physical quantities and not costs.

The next step in assessing the effect of current government policies will be to compare revenues and costs with existing market prices to those based on social prices and derive implications for incentive or disincentive effects and inefficiency in resource allocation. The framework for this efficiency analysis is given in the table above. The table consists of six columns and three rows. The first four columns pertain to producers, the fifth to marketing agencies, and the sixth to consumers.

The producer submatrix involves two important accounting relationships. The first is the definition of profitability of production of a given product as measured by the difference between revenues and costs, based on per-hectare technical input-output coefficients (and for a base year). Private profitability is calculated by subtracting the costs of domestic factors and tradeable inputs at actual market prices from the market value of output (farm-gate). The results reveal what production incentives are available to producers under existing market conditions and policy actions.

The second basic accounting relationship in the production submatrix is that the differences in column entries measure the overall effects of government intervention policies. The key to this relationship is the use of social prices in calculating revenues and costs in the second row of the matrix. These social prices are based on border prices for tradeable products and inputs and opportunity costs for domestic factors and nontradeables.

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The column differences are an indication of the overall effects of government policies. Any difference between A and E is caused by some combination of trade restrictions, price controls, taxes, subsidies, or exchange rate controls. If A is less than E, producers are forced to accept lower than farm-gate border prices; the government is taxing producers implicitly in the amount equal to E-A. If B is less than F, producers are receiving input subsidies equal to F-B. If G is less than C, which might result, for example, from wages exceeding the social opportunity cost of labor, incentives for domestic production are diminished. The net impact of all the policies on production incentives/disincentives is given by H-D=L.

Social profitability defined in this way is closely related to comparative advantage. If production is socially profitable, it is efficient for a country to use domestic factors to generate (or save) foreign exchange. If production is efficient, E-F-G will be positive and production will have a comparative advantage (net economic benefit).

To compare products, types of producer and locations, ratios are commonly used. The three possibilities for analysis are:

1. Nominal protection coefficients = NPC = A/E
2. Effective protection coefficients = EPC = (A-B) / (E-F)
3. Domestic resource cost coefficients = DRC = G/ (E-F)

Nominal protection coefficients (NPCs) measure distortions based on border proces and domestic prices for the product concerned. They are defined as:

$$NPC = \frac{P_d}{P_b \, E_x}$$

where P_d = domestic market price

P_b = border price

E_x = exchange rate

Effective protection coefficients (EPCs) take into account the impacts of trade policies on purchased inputs used in a product. They measure trade-related distortions in the pricing of value-added in domestic production. To the extent that purchased inputs are a significant proportion of value-added, EPCs are a more satisfactory indicator of distortions than NPCs. An EPC greater than one indicates that the product is receiving a net positive incentive from the combination of policies affecting the prices of the product and purchased inputs used in its production.

The main issue is that the net result of interventions is often to hold producer prices below those that would exist if domestic prices were in line with world prices. As a consequence, the domestic production of all tradeables (exports and inports) is penalized. Currency overvaluation causes prices of imported agricultural products which compete with local productions to be cheaper in domestic currency than they would be with no overvaluation.

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Overvaluation also reduces the domestic profitability of production of agricultural exports. This situation generally arises when import substitution policies involve protection of domestic manufacturing through high tariffs and quantitative restrictions. It also results from a government's emphasis on providing inexpensive food to urban consumers. If domestic production of importables is not protected from cheapened imports and production of exportables compensated for the tax of overvaluation, internal terms of trade evolve against the agricultural sector. The distortion in the structure of prices may be worsened if prices for some food products are set at low levels to reduce the fiscal costs of providing subsidized food to consumers. Income is transferred out of agriculture to other sectors and production incentives are diminished as a result.

The domestic resource cost ratio (DRC) is the ratio of domestic factor costs in social prices (G) to value-added in social prices. The latter is given as revenue less the cost of tradeable inputs (E-F). This ratio measures the opportunity costs of using domestic factors in production, which is an indicator of comparative advantage. As a ratio, the DRC can be compared across products, or across locations and techniques for the same product.

If the DRC is less than one, the particular activity is socially profitable. It would produce enough value-added to renumerate domestic land, labor and capital resources, if all products, inputs, and resources are socially priced. It indicates that the country has a comparative advantage in the activity in the absence of government policy interventions which distort market prices away from social prices.

If private profitability (D in the matrix) is negative for products with DRCs less than one, government policies are discriminating against goods for which the country is an efficient producer.

The fifth column in the matrix measures the costs of transporting, storing, handling, and merchandising the products. Actual marketing costs (expressed per unit of product) is given by M. These costs are compared to N, in which margins are adjusted both by social pricing of resources used but also to achieve an acceptable level of efficiency in the provision of the marketing services. Governments often intervene and affect the prices of inputs used to provide marketing services (e.g., trucks, gasoline, containers). In addition, governments often monopolize the provision of marketing services through parastatal or cooperative organizations, which may not provide marketing services as efficiently as would be possible. If O = N-M is negative, then the pattern of government policies and direct intervention in the marketing system constitutes a tax paid by producers, consumers, or government budget transfers.

The sixth column establishes the impacts of policies on consumers. If actual market prices are lower than social prices, R = Q-P will be positive and consumers will be subsidized by the government interventions. If R is negative, consumers will be paying an implicit tax

as a result of the intervention policies.

In the calculations in the table, social prices for tradeable outputs and inputs are often converted to local currency at existing exchange rates. To the extent that the local currency is overvalued, this procedure biases the results. For example, DRC estimates are overstated and the efficiency of domestic production understated. Adjusted DRCs can be calculated to take the overvaluation into account and remove the overvaluation bias.

Social prices of tradeable outputs and inputs are based on c.i.f. import or f.o.b. export prices which accepts trading opportunities as appropriate standards for domestic production efficiency. The social valuations of factors are their opportunity costs, which means that as long as domestic factors are scarce their costs need to be included. The DRC is an indication of the effectiveness of the activity in using domestic resources (G) to generate (or save) foreign exchange (E-F). If the ratio is less than one, social profits are positive; the activity is competitive in internation terms, an efficient user of scarce resources, and a positive contributor to national income. Not including the costs of a factor such as land would bias the DRC downward.

AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: Working Groups | **Date:** Thursday, June 5
Lead Instructors: Hanrahan, Core Staff | **Session #:** 4
Co-Trainer(s): | **Time:** 4:00-5:30 pm

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OBJECTIVE(S): At the end of this session participants will be able to:

- o Apply concepts and learnings from today's sessions to group and individual action plans for presentation on Friday.
- o Suggest questions of special interest/relevance for tomorrow's sessions.
- o Present a summary of action plans and supporting rationale for peer and staff review.

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ABSTRACT:

- o None.

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READINGS: Required/Optional

- o None.

FRIDAY

AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: "Report to the Mission Director" **Date:** Friday, June 6
Lead Instructor: Fletcher **Session #:** 1
Co-Trainer(s): Core Staff, Church, Herriott **Time:** 8:30-10:30 am

==========

OBJECTIVE(S): At the end of this session participants will be able to:

- o Outline and present for peer review a work assignment or program focusing on improving policy dialogue or building LDC capacity for agricultural policy planning and analysis through individual on-the-job assignments.

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ABSTRACT:

Present and discuss working group reports by outlining "Individual Policy Activities and Action Plans" during "Reports to the Mission Director." These presentations will involve group interaction coming to consensus/deffering opinions on how AID staff organize themselves for action.

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READINGS: Required/Optional

- o None.

AGRICULTURAL POLICY SEMINAR
Session Outline

Session Title: Course Final Evaluation
Lead Instructor: Odell
Co-Trainer(s):

Date: Friday, June 6
Session #: 2
Time: 11:00-12:00 pm

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OBJECTIVE(S): **At the end of this session participants will be able to:**

- o To receive feedback from participants on potential improvements and modifications of the course.

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ABSTRACT:

Evaluation forms will be provided.

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READINGS: Required/Optional

- o None.

APPENDIX

AGRICULTURAL POLICY
SEMINAR

Daily Evaluation and Suggestion Form

SUNDAY

Session 1: Course Orientation and Introduction

Poor		Moderate		Excellent
1	2	3	4	5

Suggestions for future:

Aspects most interesting/useful:

Other comments:

Session 2: Working Group Formation

1	2	3	4	5

Suggestions for future:

Aspects most interesting/useful:

Other comments:

Special questions or issues that you would like tomorrow's presenters to address:

Session:	Speaker:	Question:

Other comments and/or particular interests you hope can be addressed during the seminar:

AGRICULTURAL POLICY SEMINAR

Daily Evaluation and Suggestion Form

MONDAY

	Poor 1	2	Moderate 3	4	Excellent 5	
Session 1: Ag. Sector Performance Suggestions for future: Aspects most interesting/useful: Other comments:						Fletcher
Session 2: Macro/trade/exch.rates Suggestions for future: Aspects most interesting/useful: Other comments:	1	2	3	4	5	Fletcher
Luncheon Speaker: Ag. Policy Reform Suggestions for future: Aspects most interesting/useful: Other comments:	1	2	3	4	5	Mellor
Session 3: Costs/benefits/Pricing Suggestions for future: Aspects most interesting/useful: Other comments:	1	2	3	4	5	Tweeten
Session 4: Case Studies Suggestions for future: Aspects most interesting/useful: Other comments:	1	2	3	4	5	Fletcher Circle One: Econ. Non-Econ.
Working Group Session(s) Suggestions for future: improvement Aspects most interesting/useful: Other comments:	1	2	3	4	5	

Special questions or issues that you would like tomorrow's presenters to address:

Session:	Speaker:	Question:

AGRICULTURAL POLICY SEMINAR

Daily Evaluation and Suggestion Form

TUESDAY

	Poor 1	2	Moderate 3	4	Excellent 5	
Session 1: Research & Extension						Pray
Suggestions for future:						
Aspects most interesting/useful:						
Other comments:						
Session 2: Privatization/Private Sector	1	2	3	4	5	Meissner
Suggestions for future:						
Aspects most interesting/useful:						
Other comments:						
Session 4: Quantitative Models (A)	1	2	3	4	5	Norton
Suggestions for future:						
Aspects most interesting/useful:						
Other comments:						
Session 5: Quantitative Models (B)	1	2	3	4	5	D'Silva
Suggestions for future:						
Aspects most interesting/useful:						
Other comments:						
Session 6: Uses & Abuses of Models	1	2	3	4	5	Panel
Suggestions for future:						
Aspects most interesting/useful:						
Other comments:						
Working Group Session(s)	1	2	3	4	5	
Suggestions for future: improvement						
Aspects most interesting/useful:						
Other comments:						

Special questions or issues that you would like tomorrow's presenters to address:

Session:	Speaker:	Question:

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AGRICULTURAL POLICY
SEMINAR

Daily Evaluation and Suggestion Form

WEDNESDAY

Session 1: Exaction Game--All day (Cruz/Whelan/Rassas)

Poor	Moderate			Excellent
1	2	3	4	5

Suggestions for future:

Aspects most interesting/useful:

Other comments:

Session 2: Exaction De-Briefing Session (Fletcher)

1	2	3	4	5

Suggestions for future:

Aspects most interesting/useful:

Other comments:

Special questions or issues that you would like tomorrow's presenters to address:

Session:	Speaker:	Question:

Other comments

AGRICULTURAL POLICY SEMINAR

Daily Evaluation and Suggestion Form

THURSDAY

	Poor	Moderate			Excellent	
	1	2	3	4	5	
Session 1: Data vs. Information						Odell
Suggestions for future:						
Aspects most interesting/useful:						
Other comments:						
Session 2: APAP/Ag.Policy Projects	1	2	3	4	5	Hanrahan
Suggestions for future:						
Aspects most interesting/useful:						
Other comments:						
Luncheon Speaker: Political Factors	1	2	3	4	5	Lofchie
Suggestions for future:						
Aspects most interesting/useful:						
Other comments:						
Session 3: Case Studies in Ag.Policy	1	2	3	4	5	Jiron Bateson
Suggestions for future:						
Aspects most interesting/useful:						
Other comments:						
Session 4: Institutions & Implementation	1	2	3	4	5	Odell
Suggestions for future:						
Aspects most interesting/useful:						
Other comments:						
Working Group Session(s)	1	2	3	4	5	
Suggestions for future: improvement						
Aspects most interesting/useful:						
Other comments:						

Special questions or issues that you would like tomorrow's presenters to address:

Session:	Speaker:	Question:

AGRICULTURAL POLICY
SEMINAR

Daily Evaluation and Suggestion Form

FRIDAY

	Poor	Moderate			Excellent
Session 1: "Report to the Mission Director" Participant Presentations	1	2	3	4	5

Suggestions for future:

Aspects most interesting/useful:

Other comments:

AGRICULTURE POLICY COURSE

June 1 - 6, 1986

The purpose of this questionnaire is to systematically gather your views about this specific policy course in order to improve the design and content of future courses. Please offer anonymously your frank and candid perceptions.

I. General Information

1. How many years have your worked with AID?_____

2. How many years have your been involved in Agriculture Policy related projects? _____

3. Please check your current grade level.

   SFS ____ FS-1 ____ FS-2 ____ FS-3 ____ FS-4 ____
   FS-5 ____ FS-6 ____ FS-7 ____

4. What is your current Back Code? _____

5. What is your current job? (Sector and Title)

   _____

   _____

6. Have your worked in Agriculture Policy outside the Agency? _____ In what areas? (i.e. _____,_____ ____, _____.

7. Have you had formal education or training in any of the subjects covered in this course (e.g.); which ones? _____

8. What is your primary AOSC designation? _____

9. What is your highest level of formal education? _____

II. General Program Content. Please answer the following questions by circling the number associated with the choice that comes closest to your thoughts.

1 = None or not all all
2 = Very little
3 = Somewhat
4 = Quite a bit
5 = A great deal

TO WHAT EXTENT DID THE AG Policy Seminar....

1. Provide information you believe will be helpful in working with ? 1 2 3 4 5

2. Offer hard data and development experience that had a practical application to your job? 1 2 3 4 5

3. Allow sufficient time for discussion and questions? 1 2 3 4 5

4. Identify helpful suggestions and recommendations for development problems that are related to your work? 1 2 3 4 5

5. Provide you with innovative concepts/techniques and ideas that you can use on your present job? 1 2 3 4 5

6. Point to areas in which you wish to acquire further knowledge/skills? 1 2 3 4 5

7. Provide you with techniques to strengthen AID development projects? 1 2 3 4 5

8. Effectively explore means by which you can use the ideas? 1 2 3 4 5.

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CODE: None, or Not at all 1 | Very Little 2 | Somewhat 3 | Quite a bit 4 | A great deal 5

9. Increase your understanding about effective agricultural policy?
1 2 3 4 5

10. Provide a good balance between providing formal presentations and interactive group discussions and activities?
1 2 3 4 5

11. Provide a good range of useful readings and training materials?
1 2 3 4 5

12. Live up to your personal expectations?
1 2 3 4 5

III. Course Assessment. Please describe your perceptions as fully as possible for each of the following

1. Would you recommend the same one-week course to your colleagues? Not at all 1 | 2 | Moderately 3 | 4 | Highly 5

Why? (Please comment)

2. If you had a day to spend with any (or all) of the presenters, what specific questions would you like to be addressed?

•
•
•
•

3. Was the amount of time allotted for the course about right for the topics covered? Too Short A • B • About Right C • D • Too Long E •

(Please comment)

5. What were the strengths/benefits of the Ag Policy?

General: •
•
•

Specific Parts/ Sessions: •
•
•

4. What were the weaknesses/failings of the Ag Policy course?

General: •
•
•

Specific Parts/ Sessions: •
•
•

6. What would your suggestions be for future seminars like this one?

7. How would you rate the physical facilities ? Poor 1 | 2 | Medium 3 | 4 | Excellent 5
Comments?

8. How would you rate the organization/management of the course? 1 2 3 4 5