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THE PHILIPPINES AGRICULTURE AND NATURAL RESOURCES SECTOR: A PROPOSED STRATEGY

Technical Services Performed for USAID/PHILIPPINES Under the Provisions of Contract # 398-02490-C-00-9140-00

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LIST OF ABBREVIATIONS

AAPP	Accelerated Agricultural Production Project
ADB	Asian Development Bank
ASP	Agriculture Sector Program
ATI	Agricultural Training Institute
AVRDC	Asian Vegetable Research Center
BAR	Bureau of Agricultural Research
BAS	Bureau of Agricultural Statistics
BAS	Bureau of Agricultural Statistics, Department of Agriculture
CARP	Comprehensive Agrarian Reform Program
CENRO	Community Environment and Natural Resource Office
CFM	Community Forest Management
COE	Current Operating Expenditures
CPI	Consumer Price Index
CRC	Center for Research and Communication
CRDI	Cotton Research and Development Institute
DA	Department of Agriculture
DAR	Department of Agrarian Reform
DC	Directors Council
DENR	Department of Environment and Natural Resources
DLG	Department of Local Government
DLG	Department of Local Government
DPWH	Department of Public Works and Highways
DST	Department of Science and Technology
DTC	Department of Transportation and Communication
DTI	Department of Trade and Industry
ERDB	Ecosystems Research and Development Bureau
FAO	Food and Agriculture Organization
FPRI	Forest Products Research Institute
GC	Governing Council
GDP	Gross Development Product
GIS	Geographic Information System
GNP	Gross National Product
GOP	Government of the Philippines
IARCs	International Agricultural Research Centers
IBRD	International Bank for Reconstruction and Development
IFPRI	International Food Policy Research Institute
IMF	International Monetary Fund
IRA	Internal Revenue Allotment
ISNAR	International Service for National Agriculture Research
I-O	Input-Output (Model)
LGU	Local Government Unit
MAI	Multilateral Assistance Initiative
MFA	Ministry of Food and Agriculture
MMSU	Mariano Marcos State University
MOA	Memorandum of Agreement
NAARDS	National Agriculture and Resources Research and Development System
NAI	National Irrigation Authority
NAREA	National Agricultural Research Agenda

LIST OF ABBREVIATIONS
(Continued)

NARRDN	National Agriculture and Resources Research and Development Network
NCRDT	National Commodity Research and Development Teams
NEDA	National Economic and Development Authority
NFA	National Food Authority
NGO	Non-Government Organization
ODA	Official Development Assistance
OPSF	Oil Price Stabilization Fund
PCA	Philippine Coconut Authority
PCARRD	Philippines Council for Agriculture, Forestry and Natural Resources Research and Development
PCCI	Philippine Chamber of Commerce and Industry
PCGG	Philippine Council of Good Government
PENRO	Provincial Environment and Natural Resource Office
PHILDHRRA	Philippine Partnership for the Development of Human Resources
PICOP	Paper Industries Corporation of the Philippines
PIDS	Philippine Institute for Development Studies
PRI	Philippine Rice Institute
PTA	Philippine Tobacco Administration
PVO	Private Voluntary Organization
RIARS	Regional Integrated Agricultural Research System
RRDCC	Regional Research and Development Coordinating Committee
RTWG	Regional Technical Working Group
SRA	Sugar Regulatory Administration
TAC	Technology Advisory Council
TG&T	Technology Generation and Transfer
TLA	Timber Lease Agreement
TSPA	Timber Stumpage Pricing Agreement
TTF	Technology Transfer Facilitator
TV	Technology Verification
UNDP	United Nations Development Program
UPLB	University of the Philippines, Los Banos
USAID	U.S. Agency for International Development Mission in the Philippines
USDA	U.S. Department of Agriculture
VAT	Value Added Tax
VISCA	Visayas State College of Agriculture
WB	World Bank

EXECUTIVE SUMMARY

This report was prepared for USAID/Philippines for the purpose of recommending new approaches to an agriculture and natural resources strategy for the Philippines. The Chemonics Team met with a large cross-section of government, business and academic leaders in the agriculture and natural resources sector. The recommendations presented in this report represent a broad concensus of opinion on the key problems facing the sector.

There is strong agreement that the broad goal of accelerated private sector-led growth in agriculture and improved national food security require increased reliance on open market mechanisms, elimination of historical policy biases against the sector, increased choices for rural investment and employment, and improved natural resource management. Currently, this goal cannot be achieved because of serious national constraints characterized by restrictive fiscal and monetary policies and centralized government services. At the sector level, the goal is being constrained by inadequate rural infrastructure, a large, inefficient parastatal agribusiness complex, agricultural price controls, an ineffective agricultural and natural resource technology generation and transfer system, and inappropriate forest resource management policies.

The strategy recommended to overcome the sector constraints emphasizes rural development through improved infrastracture, improved forestry management, agribusiness development and improved agricultural technology generation and transfer. The strategy emphasizes cross-cutting concerns in the areas of decentralization, privatization, sustainability, economic efficiency, enhanced democratic participation, food security, and policy reform.

The Chemonics Team recommends four strategic initiatives to address sector constraints to the broad goals of accelerated economic growth and improved food security. The proposed new inititatives are focused around programs to: improve rural infrastructure, improve forest resource management, enhance agribusiness opportunities and improve the agricultural technology development system.

The Philippines Agricultural and Natural Resources Strategy presented in this report was developed in collaboration with the USAID/Philippines Mission and a broad range of government and private sector representatives of sector interests. The strategy is divided into seven parts: a sector overview; the sector goal; sector constraints; resources for addressing constraints; the theme of the strategy; programs; and policy reform issues.

A. Sector Overview

Agriculture, fisheries and forestry constitute about one-fourth of the Philippines' gross domestic product. In 1970, the sector produced almost 29 percent of GDP. By 1982, its share had fallen to about 26 percent. However the economic crisis of the mid-80's caused the sector's GDP share to rise to almost 30 percent. Since the normal course of development has agriculture's share of the economy falling, this recent increasing share of GDP is a prime indicator the Philippines' serious macroeconomic problems. Of the 226 billion pesos of gross value added by the sector in 1989, crops were the dominant subsector at 57 percent, followed by fisheries, 20 percent, poultry, 10 percent, livestock 8 percent, and forestry, 5 percent.

1. Agriculture

About 3.4 million farms cultivate about 9.7 million hectares of land. A rapidly expanding population has put strong pressure on the land. Between 1961 and 1980, about one million hectares of additional land came into cultivation, but about 1.2 million additional farms began operating, causing the average farm size to fall from 3.59 hectares to 2.84 hectares.

Rice, corn and coconut occupy 39, 20 and 29 percent, respectively, of the farm land and account for about 53 percent of the total value of crop production. Rice production grew at an average rate of about 5.12 percent per annum during 1969-1979. By the late 1970's, the Philippines had evolved to become a net rice exporter. However, the country reverted to a net importer position by the mid-1980's as the general economy declined and the effects of anti-agricultural policies began to emerge. Rice support prices have been held down to accommodate the strong political support for the urban poor.

The National Food Authority's role as the government's monopoly dealer in imported rice has served to protect the consumer by depressing wholesale prices. As a result, the annual rice production growth rate fell to 2.21 percent during 1980-1988, while rice consumption grew at 2.69 percent per annum, closely following the population growth rate. During the last decade, the low growth rate has been due to a slight decline in harvested acreage and a moderate increase in yield. During 1980-87, the harvested rice acreage declined at an average annual rate of 0.46

percent, while production per hectare increased at 2.59 percent. The country currently imports about 200,000 tons of rice annually. The experience over the last decade strongly suggests that, over the next five years, consumption will increasingly exceed production and lead to a persistent annual deficit if fundamental economic and rice technology generation policy changes are not adopted.

Corn production grew at an annual rate of 5.34 percent during 1969-1979, and at an annual rate of 4.88 percent during 1980-1988. About two thirds of the corn supply is used for feed, primarily for hogs and poultry. During 1969-1988, corn feed utilization grew at an average annual rate of 8.07 percent, while corn utilization for food grew at only 1.02 percent per annum. During the last decade, corn productivity has increased much faster than rice. During 1980-87, corn acreage increased at an average annual rate of 1.86 percent, while production per hectare increased at 2.74 percent. Annual corn imports have fallen from a steady rate of about 350,000 tons in the early 1980's to a highly variable rate of about 60,000 tons in recent years. Although corn production growth has been strong, even higher yields are needed to support the thriving hog and chicken feed markets.

Coconut production has been in slight decline over the past decade as world edible oil prices have fallen. The export value of all coconut products has fallen and the long-term prospects are pessimistic in view of increasing consumer resistance in developed, importing countries to cooking oils that are high in saturated fats.

2. Natural Resources

Fisheries production has grown steadily from 1.7 million tons in 1980 to 2.2 million tons in 1987. Of the 37 billion pesos of value added in 1987, municipal fisheries produced 43 percent, followed by aquaculture, 31 percent, commercial fisheries, 26 percent. Fish products have become an important export commodity, with sales growing from $138 million in 1980 to $407 million in 1988. About one-half of the 1988 export sales were for shrimps and prawns. However, export growth has been very erratic. In 1986, export sales fell to only $20 million. Prawn production has grown so fast throughout Southeast Asia during the past decade that prices are depressed and will continue to be weak for the next three to five years.

Log production has generally been declining during the past decade, from 6.3 million cubic meters in 1980 to 4.1 million cubic meters in 1987. During the same period, annual lumber and plywood production remained steady at about 1.2 and 0.5 million cubic meters, respectively, while veneer production plummeted from 660 thousand cubic meters to 73 thousand cubic meters, and pulpwood production increased erratically from 390 thousand cubic

meters to 618 thousand cubic meters. Wood, cork and pulp exports declined from $292 million in 1980 to $190 million in 1988. During 1980-1988, the gross value added in forestry approximately doubled while the gross value added approximately tripled in agricultural crops, livestock, poultry and fisheries. The forestry sub-sector has grown less rapidly than the total sector because of generally depressed international prices and a rapidly declining forest production base. Past policies of low timber prices and minimal reforestation have caused major degradation of upland watersheds of mainly publicly owned forests.

3. Agribusiness

The crops, livestock, poultry, fisheries and forestry subsectors generate a major demand for purchased production inputs and create a large market for product processing and marketing services. The sector produced 226 billion pesos of gross value added in 1989, to which agroindustries added 127 billion pesos in gross value of manufacturing services, and agroservices added 129 billion pesos. The agribusiness sector therefore produced 482 billion pesos of gross value added, or about one-half of the economy's gross domestic product in 1989.

Agribusiness linkages make the sector a powerful force for generating further development over a wide base of the non-agribusiness sector. The food and feed processing subsector purchases about 90 percent of all palay, corn, sugarcane and coconut production, and sells about 60 percent of its production to households. Other crops sell about 20 percent of their production to the food and feed processing subsector, and about 60 percent directly to households.

Livestock and poultry subsectors sell about 60 percent of their products to the food and feed processing subsector, and about 20 percent of their products directly to households. Fisheries sell about 15 percent of their production to the food and feed processing subsector, and 75 percent directly to households. The food and feed processing subsector has great potential to stimulate increased agricultural, fishery and forest production and strengthen economic linkages between these subsectors and the the general secondary and tertiary subsectors of the economy. According to a 20-sector aggregation of the Philippines Input-Output Model, every peso of output by the food and feed processing subsector produces 3.75 pesos of output throughout the economy.

B. Sector Goal

There is general agreement that Philippines' broad development goals for the agricultural and natural resources sector is to accelerate private sector-led economic growth in agriculture and improve national food security through: increased reliance on

open market mechanisms; elimination of historical policy biases against the sector; increased choices for rural investment and employment; and improved natural resource management. The cross-cutting policy objectives or themes for the sector program will be decentralization, privatization, financial and natural resource sustainability, economic efficiency, democratic pluralism, and food security. To achieve these objectives, development initiatives of a program and project nature will be focused on improving rural infrastructure, forest resource management, agribusiness opportunities, and technology development and transfer to address key sector constraints identified below.

C. Sector Constraints

The pursuit of this broad goal is currently limited by several constraints to further sector development.

1. General Constraints

The sector is limited by general constraints that are endemic to the national economy and cannot be eliminated by sector-level program, project and policy interventions.

a. Restrictive Fiscal and Monetary Policies

The Peso is generally believed to be overvalued by about 20 percent, which has been a major cause of acute balance of payments deficits. Agricultural exports have been particularly disadvantaged by the high peso value.

The Government faces an acute budgetary deficit, which has forced heavy borrowing and severe restrictions on most department budgets. The government's large capital borrowing needs have led to high interest rates and a relative shortage of investment capital in the private sector.

The Government's acute budget deficit has become a major constraint to fully funding basic government services. Government salaries are not competitive with the private sector and most government agencies either have large vacancies or insufficient budget positions to effectively accomplish their missions. The low salaries have caused many capable staff to leave government service for the private sector, while concentrating mediocre staff in the public sector. The revenue shortage has forced the Government to become more dependent on donors to provide either budgetary support or project-based services. The level of donor assistance has grown, without concurrent actions by the Government to sustain the donor programs with domestic resources.

b. Centralized Government Services

The Philippines has always had a centralized government structure. However, centralization increased sharply during the Marcos years, resulting in excessive political and financial control over local government units by the central government. Members of Congress have emerged as major political and financial brokers of central government services to local government units. The Marcos government nationalized a large number of private sector corporations, which have increasingly operated as monopolies within their respective industries. The Aquino government has made a strong commitment to privatize these firms, but progress has been very slow.

2. Specific Constraints

The sector is limited by some specific constraints that can be eliminated by sector-level program, project and policy interventions.

a. Inadequate Rural Infrastructure

The past economic policies have concentrated infrastructure development in urban areas, particularly in Manila. As a result, rural regions have limited land transport systems. For a land area of nearly 300,000 square kilometers over 11 major islands, there are only 162,000 kilometers of roads, of which 136,000 kilometers are local roads. Less than one-half of the road system meets all-weather standards. There are over 11,000 bridges, most of which are subject to periodic flood damage.

A national railway network of 750 kilometers is operated in Luzon. In 1984, a 16 kilometer transit railway system was initiated in Metro Manila.

About 600 ports provide transportation between the more than 7,100 islands. About one-half of the ports are privately operated. Of the 19 major ports, the Manila international port is the largest, handling about 30 percent of national shipping in 1986.

Many rural areas with adequate soil and water resources are unable to produce significant market surplus crops because of inadequate local farm-to-market roads for receiving purchased production inputs and sending products to processors and traders. Most rural roads do not receive adequate maintenance. As a result, truck transport costs are the major share of agricultural marketing costs in many rural areas. Lack of timely local transportation also causes increased post-harvest losses for perishables.

Interisland shipping is very expensive, causing the shipping costs of corn from Mindanao to Manila to exceed the CIF cost of international corn delivered in Manila. Many rural areas that could potentially produce significant surpluses of food and feed grains lack nearby port facilities to expedite interisland shipping. The sea freight system is burdened with many counterproductive rules and regulations that require duplicating work and shipping schedules that are often too inflexible to accommodate quick shipment of agricultural products immediately after harvest.

b. Large, Inefficient Parastatal Agribusiness Complex

Heavy government ownership of corporations has led to imperfect competition and excessive staffing in many industrial sectors. The heavy government intervention in market operations has become a heavy drain on government finances and has caused markets to operate inefficiently. At a time when the government faces serious budget deficits, the diversion of large fixed and working capital investments into unprofitable public enterprises distorts the capital market and further aggravates the budgetary deficit. The parastatal also often create further market distortions by their monopoly roles in the international trade of their sectors' products. Business confidence will not be sustained until the government ceases to become a major competitor, and in many cases of international trade, a monopolist.

Government ownership and operation of sugar, tobacco, cotton, lumber, pulp and paper, dairy, rice and corn processing and trading corporations has resulted in large inefficiencies and high operating costs. As a result, heavy subsidies are often required to cover operating losses. Continued government operations in these industries reduce private sector competition, particularly among traders. The overall effect of these parastatals is growing losses to farmers and consumers through price distortions and weak competition and rising international agricultural trade losses.

c. Agricultural Price Controls

The Government is a major cause of agricultural market distortions through its price control policies. The recent introduction of a comprehensive price control program, although promoted as a temporary measure, will cause major economic disruptions by reducing supplies in the face of growing demand and create institutional inertia for continued price intervention, counterproductive subsidies and ownership of agricultural parastatals. Extended use of price controls on basic agricultural commodities would only lead to increased shortages of food and feed grains, and a weaker food security position.

d. Ineffective Agricultural and Natural Resource Technology Generation and Transfer System

An extensive agricultural research system has evolved over the the last three decades. However, in addition to the common problem of inadequate funding, the system has a large bureaucratic network that isolates the research functions from the political and economic forces that are necessary for accountability of results. The public sector agricultural research system suffers from three basic problems common to research systems throughout the world: (1) lack of accountability of the research establishment to the rest of society to produce specified products of benefit to society; (2) unarticulated demand for new technology by the private productive sector, including agribusinesses and small farmers; and (3) insufficient funds to carry out research activities.

e. Inappropriate Forest Resource Management Policies

Timber production has been managed on a depletion rather than renewable basis. Sustained yield forestry practices have not been followed because most of the commercial timber is on public lands, where timber licenses have been issued at prices far below the market value of the product. Little attention has been given to reforestation, which has caused widespread erosion of upper watersheds and heavy siltation of lower watersheds. Illegal logging has been a common feature of the Philippines timber industry because the government has not applied legal sanctions against the theft of publicly owned timber.

D. Available Resources for Addressing Specific Sector Constraints

The level and trend in donor assistance provides an important basis for determining USAID's role in assisting agricultural and natural resource development. Donors are currently programming approximately $615 million of multi-year technical assistance to agriculture, fisheries and forestry and rural transportation (table 1). An additional $120 million in technical assistance is planned. During 1988, approximately $1 billion of capital assistance was being programmed. About $523 million of future capital assistance was being planned.

During 1988, about $648 million of capital assistance was disbursed. This amount was about 93 percent of total assistance for that year.

Of the current donor sector technical assistance, about $100 million is committed to agricultural development, while about $350 million is programmed to forestry. About $140 is programmed for fisheries and costal development. About $14 million is committed to transportation activities with direct sector impacts.

TABLE 1. CURRENT AND PLANNED SECTOR DONOR ASSISTANCE

		DONOR ASSISTANCE (US$ 000)
CURRENT TECHNICAL ASSISTANCE		
REFORESTATION/WATERSHED MANAGEMENT		286,890
SOCIAL FORESTRY/AGROFORESTRY		43,736
FOREST CONSERVATION/PROTECTED AREAS		3,652
FISHERIES AND COSTAL DEVELOPMENT		141,362
INVENTORIES/LAND ADMINISTRATION		15,842
AGRICULTURAL DEVELOPMENT		101,819
CROPS		2,872
LIVESTOCK		1,290
FARMERS COOPERATIVES		4,044
LAND TRANSPORT		11,900
WATER TRANSPORT AND SHIPPING		2,000
	Total:	615,407
PLANNED TECHNICAL ASSISTANCE		
AGRICULTURAL DEVELOPMENT		96,661
CROPS		9,260
LIVESTOCK		4,478
FISHERIES AND COSTAL DEVELOPMENT		2,263
FORESTRY		1,900
WATER TRANSPORT AND SHIPPING		5,000
	Total:	119,562
CURRENT CAPITAL ASSISTANCE		
AGRICULTURAL DEVELOPMENT		334,996
FISHERIES AND COSTAL DEVELOPMENT		93,500
FORESTRY		360,319
LAND TRANSPORTATION		210,720
WATER TRANSPORT AND SHIPPING		51,020
	Total:	1,050,555
PLANNED CAPITAL ASSISTANCE		
AGRICULTURAL DEVELOPMENT		203,123
CROPS		100,000
LIVESTOCK		50,000
FISHERIES AND COASTAL DEVELOPMENT		51,000
FORESTRY		1,960
TRANSPORT POLICY AND PLANNING		2,054
LAND TRANSPORT		100,000
WATER TRANSPORT AND SHIPPING		15,000
	Total:	523,137

Source: UNDP Philippines Development Cooperation Report for 1988.

The major forestry technical assistance donors are the Asian Development Bank, the World Bank, USAID, Japan, West Germany, the European Economic Community and Australia. The ADB is a major fisheries donor. Japan is providing most transportation technical assistance.

About $330 million of capital assistance is programmed for agricultural development. Forestry is receiving about $360 million, and sector-related transportation is receiving about $260 million.

Most forestry capital assistance is being provided by the ADB and Japan. The World Bank and the ADB are providing most fisheries assistance. Sector-related transportation capital assistance is being provided primarily by the World Bank and the ADB.

E. General Theme of the Strategy

The Chemonics Team recommends that the USAID Mission's general strategy pursue the goals of increased food security and rural incomes, and sustained production of forest resources through a set of programs that will counter the anti-rural effects of past agricultural policies. The programs should pursue broad rural development objectives of increased food security, full employment and narrowed rural-urban income gaps by: (1) improving rural infrastructure; (2) improved management of forest resources for sustained production; (3) strengthening the role of agribusiness as a primary engine for rural and national economic development; and (4) more effective management of agricultural technology development resources to improve food security.

1. Emphasis on Rural Development

The strategy should promote improved food security, and in the process, facilitate sustained transition of the rural economy through increased agricultural and agribusiness productivity to expand employment, narrow the rural-urban income gap, and strengthen interindustry independence between agricultural and non-agricultural industries.

a. Infrastructure

The foundation of the strategy should be improved infrastructure in rural areas with strong potential for increasing food and feed grains. Farm-to-market roads should be built and improved to reduce transportation costs. The net effects of an improved rural road network will be to: reduce post-harvest losses; reduce the delivered costs of purchased inputs; attract agricultural processors and input suppliers to build plants and distribution centers closer to production areas; and induce more effective transfer of technology to farmers.

b. Forestry

Improved forestry management programs should be implemented to increase incentives for logging companies and local communities to improve timber productivity, reduce environmental damage from logging, stabilize upper watersheds and sustain employment in the forestry and wood products sectors.

c. Agribusiness

The agribusiness sector should be used to exploit commercial development opportunities in the distribution of inputs and processing and distribution of agricultural and forest products to: improve market efficiency, which, in turn, will stimulate food and feed grain production; reduce food and forest product marketing costs; improve agricultural technology development and transfer; expand rural employment opportunities for labor leaving farms as food productivity increases; expand rural tax bases; expand opportunities for trade with the U.S.; and reduce in-migration pressures on Manila.

d. Agricultural Technology Generation and Transfer

Agricultural research and development efforts should be emphasized along food and feed grain commodity lines (rice and corn) to provide quick solutions to production and marketing problems. Agribusiness associations and commodity interest groups should be engaged to develop more effective rice and corn research and development programs.

2. Cross-Cutting Concerns

Programs and projects in the areas of rural infrastructure, agribusiness, natural resources and research should be implemented within a broad framework that: supports further decentralization of government services; encourages privatization; ensures sustainability; increases economic efficiency; promotes democratic participation; increases food security; and establishes a policy environmentment that will be necessary to accomplish sector goals.

a. Decentralization

The Government is committed to decentralizing many services to strengthen the democratic process. One of the major obstacles to decentralization is inadequate local government financial resources and weak political authority. As the agricultural and natural resource strategy is implemented, local government units (LGU's) will benefit from the general development of their economies by having a larger, more diversified tax base. As LGU's achieve more financial independence from the central government, they will be able to assume mor government

functions and build the necessary local political infrastructure. Decentralization will be facilitated in the improvement of rural infrastructure by strengthening the capabilities of LGU's to assume the recurrent cost requirements of maintaining public roads and seaports. Forest resource management should be modified to allow LGU's greater forest products tax bases for raising funds to repair environmental damage from past timber overacting and protect present and future forest resources. Agricultural technology generation and transfer should be facilitated by increased roles played by LGU's in focusing local and regional economic interests on agricultural technology problems.

b. Privatization

As the central government privatizes parastatal agribusinesses, monopoly market distortions will be reduced and private sector agribusiness firms will be on a more competitive footing. By selling these parastatal assets, the Government will be able to reallocate large amounts of capital to more urgent budget priorities. Privatization issues should be be emphasized in expanding the role of the private sector in managing forest resources.

c. Sustainability

The strategy should emphasize private sector initiatives that have economic incentives congruent with the broad goals of food security, rural development and environmental quality. To the extent that the strategy must use government services to achieve its goals, programs should be encouraged only if the relevant governments have the political will and financial resources to support the initiatives. In the exploitation of forest resources, sustained yield harvesting practices should be encouraged to ensure long-term forest productivity, in concert with maintenance of surrounding watersheds to maximize net social benefits. In programs developed to improve rural infrastructure, particularly roads and seaports, LGU's should be strengthened to assume the long-term recurrent cost requirements for maintaining those capital investments. Forest resources should be managed to optimize the net social benefits of forest products over future generations. Agricultural technology generation and transfer programs should be designed to ensure sustained funding from private and public sector sources to meet priority agricultural production needs.

d. Economic Efficiency

The strategy should promote improved economic efficiency by strengthening competition through privatization of agribusiness parastatals. Agricultural and natural resource prices will be determined by market forces, allowing producers, consumers and middlemen more freedom to stabilize their long

range production, consumption and marketing decisions. Sector tariffs should be reduced and equalized, to place more emphasis on the exchange rate's role in balancing international trade. Economic efficiency issues should be emphasized in improving rural transpiration in areas that have the highest payoff for increased food and feed grain production. Timber production programs should be designed to increase wood products utilization, reduce processing and marketing costs and stimulate long-term production in line with international wood product prices. Agribusiness development should be encouraged to strengthen competition, remove counterproductive subsidies and freely trade products in line with their long-term border prices.

e. Enhanced Democratic Participation

Private sector interest groups should be encouraged to participate in the policy dialogue process by: (1) identifying policy issues and problems for the government; (2) evaluating sector policy performance; and (3) supporting local government units' efforts in decentralization. Increased citizen participation should be encouraged to assist LGU's in improving rural road and seaport transportation, strengthening forest resource management, representing agribusiness interests in promoting effective food security policies, and facilitating more effective generation and transfer of agricultural technology.

f. Food Security

Food security should be strengthened by encouraging policies that allow the Philippines' sector comparative advantage to determine how much food is produced domestically and how much is imported to assure adequate availability to all persons at affordable prices. Protectionism should be discouraged to allow food and competing products to be produced in accordance with border prices.

g. Policy Reforms

In the implementation of the strategy, a policy dialogue should be established to assist the Government in modifying policies to improve market efficiency, reduce government involvement in agricultural and natural resource production and marketing, and promote a pluralistic democratic approach to government. Policy reforms should be proposed to realign domestic agricultural and natural resource prices with international markets, eliminate government-owned agribusiness monopolies and strengthen private rights to own and cultivate farm and forest lands. Policy reforms should also be proposed to remove counterproductive rural transportation regulations. Finally, policy reforms should be proposed to strengthen the agricultural technology generation and transfer process, including establishment of the necessary agricultural pricing environment.

F. Programs

The strategy is based on four major program areas or strategic initiatives and their contributions to six major cross-cutting policy objectives, as shown in figure 1.

1. Rural Infrastructure

One of USAID's most fruitful agricultural and rural development opportunities is support for rural infrastructure. The most urgent need is improved farm-to-market roads and regional ports. The farm-to-market road network should be upgraded to allow farmers easier access to purchased farm input and product markets to reduce post harvest losses, increase cropping intensities and attract processors closer to production centers.

Developing and upgrading regional seaports will reduce inter-island transport costs, allow regions to more easily exploit their comparative advantages in international markets and stimulate the development of regional economic enclaves. The enclaves will, in turn, stimulate regional economic development, which will increase local government units' revenue potential. As local governments become more financially independent of the central government, the process of decentralization will evolve more smoothly as the LGU's raise the funds needed for the services they provide.

Figure 1. The Philippine Agriculture and Natural Resource Strategy Matrix

	STRATEGIC INITIATIVES			
CROSS-CUTTING POLICY OBJECTIVES	IMPROVED RURAL INFRASTRUCTURE	EFFECTIVE FOREST RESOURCE MANAGEMENT	ENHANCED AGRIBUSINESS OPPORTUNITIES	RESPONSIVE TECHNOLOGY DEVELOPMENT SYSTEM
DECENTRALIZATION				
PRIVATIZATION				
SUSTAINABILITY				
EFFICIENCY				
DEMOCRATIC PLURALISM				
FOOD SECURITY				

In general, capital-intensive, road projects are increasingly inappropriate targets for assistance from donors such as USAID. However, the Philippines case is much different from the typical situation in Asia and the Near East. Rural roads in the Philippines have been neglected to such an extent during the Marcos years that much of the rural economy is constrained by expensive land transport costs. The Aquino Government's meager financial base does not allow even rudimentary maintenance of current rural roads, and even less funding for new roads. Moreover, the private agribusiness sector has consistently voiced strong support for improved rural roads as the prime prerequisite for sustained rural economic development.

a. Contribution to Cross-Cutting Policy Objectives

Decentralization

The recommended program will shift more responsibility for rural road maintenance to local governments, in accordance with the Government's commitment to decentralization.

Privatization

Balanced rural road maintenance and construction programs will strengthen the private sector by contracting most of the required services to private construction companies. Contracts should be designed to encourage the economies of size necessary in private construction companies to reduce their average costs and strengthen allied construction industries.

Sustainability

Shifting financial responsibility for rural roads to local governments will contribute to fiscal sustainability by forcing local governments to raise the revenues required to pay the long-terms costs of their road systems.

Efficiency

Economic efficiency will be improved by stimulating competition among private construction companies. At the local political level, public sector economic efficiency will be strengthened by the local governments' need to evaluate the political benefits of road expenditures against the political costs of raising tax revenues from their taxpayer constituents.

Democratic Pluralism

Shifting responsibility for rural roads to local governments will strengthen the local political process by allowing local citizens to have a greater voice in transportation decisions that are now too often made by the central government.

Food Security

The most immediate payoff of improved rural roads will be in the area of food security. Transportation costs of food products will be lowered and new food production and processing will be stimulated.

b. Linkages to Other Strategic Initiatives

Effective Forest Resource Management

In view of the current problem of illegal logging in remote areas, it is unlikely that new roads will be built in these areas. Instead, improved roads in non-forested areas where wood processing industries are operating will help lower their market costs for transportation.

Enhanced Agribusiness Opportunities

Improved rural roads will stimulate agribusinesses, particularly food processors, to invest in processing facilities closer to production areas because of eased transportation of inputs and finished products.

Agricultural Technology Generation and Transfer

Robert Evenson of Yale University has consistently demonstrated that agricultural technology is transferred faster and more efficiently to rural areas that have better road systems. These results hold after accounting for regional differences in soil productivity, farmer education and prices.

c. Method of Intervention

This program should be implemented through the combined efforts of USAID's Capital Development Program and its Local Development Assistance Program (LDAP). Most of this program's goals can be achieved by providing budgetary support to the Government for progress in using large road-related funds already in the donor pipeline for improved maintenance, a modest amount of new construction in rural areas with high food and feed grain potential and improved sustainability of rural roads through local government financing.

2. Forest Resource Management

The natural resources sector has major opportunities for progress. In the area of fisheries and costal development, other donors have established important assistance programs that are adequately addressing that subsector's problems. In the foresty subsector, USAID has a comparative advantage based on the size of the current assistance program and its expertise in forest resource management. USAID can make important contributions to economic development and environmental protection by promoting a stronger private sector in timber harvesting and production. More efficient harvesting and forest products utilization can be achieved by strengthening competition among lumber companies. Open auctions of stumpage should be encouraged to raise timber prices to their market opportunity costs, stimulate more efficient harvesting practices and force the concessionaires to assume responsibility for protecting stumpage prior to harvest.

Replanting should be encouraged by selling greater property rights to concessionaires, attaching replanting performance bonds to stumpage sales and selling replanting contracts to specialized companies at the end of a harvest.

Regional development of the forest industry can be stimulated by encouraging more labor-intensive primary sawing at the logging sites in rugged upland forests where large scale mechanical logging is more expensive and a major cause of watershed damage.

a. Contribution to Cross-Cutting Policy Objectives

Decentralization

Delegation of public forest management programs to local governments supports central government decentralization initiatives and improves the efficiency of public control of its natural resources.

Privatization

Increased emphasis on private sector opportunities for longer logging leases on public lands will strengthen overall timber production efficiency. As private mills take over operations now performed by government owned and operated corporations, the government saves valuable operating capital and milling efficiency will improve under increased private sector competition.

Sustainability

Forest management systems that encourage long range, sustained-yield harvesting will reduce the harmful effects of current and past practices of depletion harvesting. Sustained yield harvesting will also contribute to stabilized upper watersheds, including improved water quality and reduced soil erosion.

Efficiency

Increased emphasis on private sector and local government participation in forest management will improve overall timber production and marketing efficiency by introducing improved processing technologies through market competition. As the role of government owned and operated wood processing firms is reduced, costs per unit of wood product will decline.

Democratic Pluralism

By increasing local government responsibility for managing local public forests, local citizens will have new opportunities to contribute to the political process and strengthen the accountability of public forest management.

Food Security

Improved management of forest resources will reduce competition for land to be used in subsistence agriculture and thereby reduce upper watershed damage from crop cultivation. Local resident's reliance on subsistence agriculture will be reduced as the private sector wood processing industry expands and generates new local income and employment opportunities.

b. Linkages to Other Strategic Initiatives

Improved Rural Infrastructure

Expanded private sector wood processing will generate additional income and expand the local tax base. Local governments will benefit from increased tax revenues, which can be applied to maintain roads in non-forested areas and abate environmental damage from current and past logging.

Enhanced Agribusiness Opportunities

Expanded private sector wood processing will lead to increased direct income and employment opportunities, as well as indirect income and employment opportunities in downstream industries using wood products.

Agricultural Technology Generation and Transfer

As subsistence agriculture declines in upper watersheds, the demand for local agricultural technology generation and transfer would decline. However, the demand for forest and wood products technology generation and transfer would increase. Forest-related technology can be generated by a new collaborative effort between existing public sector forest research institutions and private sector timber management and wood processing firms.

c. Method of Intervention

Improved forest management should be implemented through the USAID Natural Resources Management Program (NRMP). This program should: reduce environmental damage from current logging practices; improve efficiency of logging and wood processing industries; and increase the long-range productivity of forests under sustained-yield management systems.

3. Agribusiness Development

Agribusiness can be strengthened by assisting processors in establishing new forward and backward market linkages, diversifying production into selected non-traditional, high-value crops, privatizing agribusiness parastatals, and generating more effective technologies.

Agribusiness forums should be encouraged to provide policy makers regular, objective assessments of policy problems and current economic performance.

Policy reforms should be implemented to improve agribusiness market efficiency by removing counterproductive tariffs, subsidies, and marketing quotas.

Agribusinesses should be encouraged to assume a role as an equal partner with public agricultural research agencies in designing and implementing technology generation and transfer programs to meet agricultural production and marketing priorities.

Finally, programs should be developed to assist the agribusiness subsector in identifying and developing new markets for Philippine food and fiber products. Particular emphasis will be given to opening new international markets for non-traditional, perishable food products. The agribusiness subsector should also be strengthened by developing new channels for reciprocal trade with U.S. agricultural marketing firms.

a. Contribution to Cross-Cutting Policy Objectives

Decentralization

The transfer of responsibility for basic public services to local governments will strengthen private sector confidence in rural areas by increasing the opportunities for business leaders to address their needs to locally elected officials. Rather than relying on distant central government offices, agribusinesses will find local officials more responsive to their concerns about infrastructure needs.

Privatization

Divestiture of the many government owned and operated agribusinesses will release hundreds of millions of pesos of investment and operating capital to the Government for more efficient employment in providing basic public services. Privatization of these businesses will strengthen competition by improving efficiency, attracting new technologies, lowering food costs and increasing export potentials for agricultural and wood products.

Sustainability

Stengthening private sector agribusinesses will reduce the Government's need to support wasteful public sector firms. Increasing private agribusiness volume will increase employment and income opportunities, and lead to an expanded local tax base. With an increased tax base, local governments will be more independent of the central government in sustaining the delivery of local public services. Agribusinesses will be one of the prime beneficiaries of sustained local public services.

Efficiency

Expanding the role of the private agribusiness subsector will increase economic efficiency by reducing the relative burden of inefficient public sector agribusinesses on the economy and the government treasury. A strong private sector will strengthen the price discovery process for agricultural and wood products to ensure alignment of domestic prices with international opportunity costs. By encouraging broad expansion of the private agribusiness subsector, competition will be improved and the market losses from frequent monopoly conditions under current policies will be sharply reduced.

Democratic Pluralism

Agribusinesses have a key role to play in assisting all levels of government in promoting effective agricultural policies. By extending political participation to

agribusinesses, the agricultural and natural resources sector will gain a valuable voice for formulating improved economic policies.

Food Security

Food security will be strengthened as a stronger agribusiness subsector becomes more competitive and lowers marketing costs. By expanding the volume of private agribusiness and reducing the role of agribusiness parastatals, the Philippines will gain the benefits of freer access to international markets. Commodities with comparative advantages will be exported more easily, with benefits accruing directly to the producers and processors. Imports of commodities without comparative advantages will bring immediate benefits to consumers in the form of lower prices and free up domestic agricultural resources for more efficient employment.

b. Linkages to Other Strategic Initiatives

Improved Rural Infrastructure

Agribusinesses will benefit from improved rural roads, and will, in turn, generate new local tax bases for local governments to support those roads.

Effective Forest Resource Management

Agribusinesses have a major role to play in introducing improved wood processing technology to the forest products subsector. By expanding the role of private sector wood processing firms, wood processing losses will be reduced, marketing costs will be reduced and new financial incentives will flow upstream to stimulate long-range timber productivity.

Agricultural Technology Generation and Transfer

Agribusinesses have a pivotal role in developing and transferring new technologies to agriculture. The public sector agricultural research and development system has matured, but it is not suited to meet many of the technology needs of farmers in a rapidly changing international market. Agribusinesses have demonstrated that they can harness market forces to develop

c. Method of Intervention

Agribusiness development should be promoted through the USAID Agriculture Sector Program (ASP).

4. Agricultural Technology Generation and Transfer

The agricultural research network has evolved to become a complex system with considerable human resources, but weak funding and a very diffused system of research priorities and accountability. Agricultural research tends to be supply-driven rather than demand-driven, as linkages between researchers and clients are weak. Until the central government is able to provide substantially greater, sustained funding there appear to be few opportunities for donors to provide comprehensive assistance.

A more promising approach is to provide narrowly focused research support on a regional, commodity specific basis, through the derived research demand that is stimulated by the regional economic development of enclaves and improved transportation systems. A available evidence indicates the largest benefits to the food system would be produced from the application of concentrated, non-traditional technology generation and transfer methods to the two commodities with the most important role in food security: rice and corn. Therefore, research assistance should be delivered through systematic collaborations between research institutions and agribusiness groups to shorten the research and development cycle, improve research accountability and stabilize funding for long-term, commodity-based (rice and corn) research programs that have clear economic payoffs in growing regional markets.

The proposed strategy aims at shifting the emphasis from inputs (agricultural research and extension) to outputs/results (technology generation and transfer). Teams of highly-qualified national and international professionals should be assembled and given support to capitalize on the installed capacity of public and private sector organizations either performing or with the potential capacity to perform the functions of research and extension. These technology transfer facilitators (TTF) will act mainly at the interfaces between the suppliers and providers of new technology, facilitating communications between both by: (1) assessing the demand for new technologies; (2) assessing the supply of existing technology; (3) capitalizing on existing research capacity; and (4) initiating innovative technology transfer through a combination of public and private sector extension organizations.

a. Contribution to Cross-Cutting Policy Objectives

Decentralization

The TTF strategy will operate at the regional level as teams directly assess technology needs of producers of specific commodities under various types of agro-climatic conditions. As needs are identified, the TTF will directly contract

with local public and/or private agencies, providing them with critical technical guidance and operating support, rather than by having funds introduced and dissipated at the central level.

Privatization

The TTF strategy will indirectly promote the private sector undertaking some previously government functions, especially technology transfer. There are currently about 2000 PVOs and NGOs which work at the grass roots level and can be tapped as effective, unbureaucratic transfer agents of new technology to farmers, as well as providers of feedback to the research system, helping to articulate future technology demand.

Sustainability

After a reasonable period of time, the performance of the TTF will be evaluated by the various beneficiaries, including agribusinesses and producers associations. If, as a result of their efforts, the TTF have effectively promoted the development of demanded new technologies and/or have made the agricultural research system more responsive to the needs of producers, then the beneficiaries will be expected to fund an increasing share of the TTF efforts in the future. This will assure the sustainability of the TTF effort when successful, as well as its demise when and if it ceases to serve the needs of its client group.

Efficiency

The TTF will achieve efficiency by maintaining a very modest staff, operating independently of institutional constraints, and channeling technology generation and transfer resources to those local organizations which are most ably equipped to accomplish the task at hand without regard to whether it is public or private.

Democratic Pluralism

The TTF will enhance democratic pluralism by helping disadvantaged parts of the population to articulate their need for technology which will increase their productive capacity as well as incomes and family food security. It will also strengthen local organizations (PVOs, NGOs, farmers organizations) by giving them guidance and funding, as well as a concrete opportunity to provide services needed by the local community.

Food Security

By choosing to work with basic food commodities such as rice and corn, and if it is successful in promoting the generation and adoption of new technology, the TTF

could have a major effect on food security since such a large percentage of land and labor is dedicated to the production of these crops.

b. Linkages to Other Strategic Initiatives

Improved Rural Infrastructure

A major barrier to adoption of new and existing technology and increased productivity in rural areas is the lack of critical infrastructure which allows movement of people and products. Foremost here are farm-to-market roads. As increased market opportunities arise, farmers will be better able to adopt new technology as it becomes available. The TTF will provide knowledge of existing technology, and help articulate the demand in new areas as they open up.

Effective Forest Resource Management

Enhancing the ability of marginal farmers to sustain themselves on the land they now work, then the need to seek new forest lands for slash and burn production will diminish, thus slowing the rate of forest destruction.

Enhanced Agribusiness Opportunities

The TTF will enhance agribusiness opportunities in marketing and processing as supplies of basic food commodities increase. By choosing to work on fruit and vegetable crops, the TTF will provide increased opportunities for agribusiness development in the domestic and export market areas of processing, packaging, transportation, and brokering.

c. Method of Intervention

The agricultural technology generation and transfer program will be implemented through the USAID ASP. Private sector agribusiness firms will be encouraged to develop innovative technology generation and transfer programs that complement current public sector research and development programs and provide supplemental technologies in areas where the public sector is not competitive.

G. Policy Reform Issues

The proposed strategy will combine its implementation of programs with emphasis on several policy areas that require reforms for the programs to be effective. The areas of policy concern are: privatization, pricing, infrastructure development, forest resource management, decentralization, agrarian reform and rural finance.

In the area of privatization, the government's plans to privatize all agribusiness parastatals should be implemented, along with a rationalization of pricing policies to assure domestic alignment with the border prices of agricultural and forest products.

In the area of infrastructure development, policies should be designed to improve local and regional transportation efficiency by rationalizing tax collections of shipped goods, remove counterproductive shipping regulations that waste labor, slow port clearance and raise insurance rates for shipping. Policies should also be developed to improve LGU's financial security by extending their authority to collect and retain taxes for local maintenance of infrastructure.

Policies should be implemented to: align prices of stumpage with wood product border prices; extend land tenancy rights to timber production firms; expand the role of private wood processing firms in improving production and marketing efficiency; and expand the role of LGU's in protecting local public forests and repairing upper watershed damage from past environmentally unsound logging practices.

In the area of decentralization, policies should be implemented in coordination with program initiatives in rural transportation, forest resource management, agribusiness development and agricultural technology generation and transfer to strengthen the role of LGU's in raising local revenues to sustain these programs and expanding opportunities for democratic participation in the development process.

The basic thrust of the Comprehensive Agrarian Reform Program should be complemented by policies to rationalize domestic agricultural prices with long-term border prices, removal of counterproductive tariffs and subsidies, and the promotion of strong agribusiness competition.

Rural credit policies should be designed to align interest rates with national capital opportunity costs and eliminate current barriers to the free flow of credit imposed by the government agencies, particularly the Board of Investment.

ANNEX A

THE MACROECONOMIC SETTING

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This annex describes the country's basic macroeconomic setting and establishes the framework for understanding the agriculture and natural resources sector's role in the national economy. The gross national product, exchange rate, monetary and fiscal policies and foreign trade are surveyed to better understand the key forces in the national economy. The prime macroeconomic constraints are described to allow development of a sector strategy that is coordinated with economic conditions that are beyond the control of sector-level policies and programs.

A. Gross National Product

1. General Overview of the Economy

The Marcos government left the economy in a severe depression. Between 1980 and 1985, the real annual rate of economic growth declined from 5.0 percent to -4.1 percent. During the crisis period of 1983-1985, the GNP growth rate fell from 1.1 percent in 1983 to -7.0 percent in 1984.

A broad economic recovery began in 1986 when GNP grew at 1.9 percent, followed by growth rates of 5.9 percent in 1987 and 6.8 percent in 1988. The major economic indicators for 1986-1989 are summarized in table A-1.[1] During this period, population grew at about 2.4 percent per annum. Nominal GNP grew at about 14 percent per annum, from P627 billion in 1986, to a preliminary estimate of P960 billion in 1989. The annual rate of price inflation averaged 7.2 percent during this period, with a sharp increase coming in 1989 as strong personal consumption expenditures, private investments, and good export performance led the expansion of demand.

The nominal exchange rate increased only 2.2 percent per annum over 1986-1989, placing heavy pressure on the trade deficit. Exports surged ahead from P4.8 billion to P7.8 billion, at a nominal average growth rate of 16.5 percent. However, imports grew even faster, from P5.0 billion to P10.5 billion, at an average annual rate of 23.7 percent. These divergent trade flows resulted in the annual trade deficit rising from P0.2 billion in 1986 to P2.6 billion in 1989.

The labor force grew at a steady rate of three percent per annum. The recovery resulted in a steady drop in the annual unemployment rate, from 11.8 percent in 1986, to 9.0 percent in 1989.

The money supply grew sharply, at an average annual rate of almost 17 percent during 1986-1988. International debt remained steady at about P28 billion and annual debt service held steady

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1. All tables are presented at the end of this annex.

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at about P3 billion. Debt service as a percentage of exports fell at an annual average rate of 14.7 percent, from 60.6 percent in 1986, to 41 percent in 1989. Foreign exchange reserves fell slightly from $2.5 billion in 1986, to $2.3 billion in 1989.

National government revenues and expenditures grew at average annual rates of 20.7 percent and 22.8 percent, respectively. However, the budget deficit more than doubled, rising from P35.3 billion in 1986, to P82 billion in 1989.

2. Composition

a. Agriculture

During 1981-1988, the gross domestic product (GDP) in agriculture, fishery, and forestry grew at an average rate of 15.5 percent per annum in current prices, but only 1.7 percent per annum in 1972 prices. The growth is mainly attributed to the relatively high growth rates in the corn, pineapple, livestock, and poultry subsectors. This effect was offset by low or negative growth rates in coconut, sugarcane, mango, citrus, vegetables, fiber crops, and forest products. The overall growth of the sector resulted from reforms such as the removal of export taxes on primary exports, and the improvement of marketing, post-harvest, and other support services and facilities. However, the momentum of growth was hampered by production setbacks brought about by inadequate infrastructure support, unfavorable weather, pests and diseases, and restrictive agricultural policies.

Crop production declined by an average of 1.57 percent per year, from 47.1 million MT in 1980, to 42.9 million MT in 1987 (annex B, table B-4). Preliminary estimates place crop production at 55.9 million MT in 1988. This sharp increase is attributed to the use of high yielding varieties and intensive use of inputs. Agricultural inputs such as fertilizers and pesticides, as well as agricultural products in their original form, were exempted from value-added tax starting in early 1988.

Palay production rose by an average of 2.13 percent per year during 1980-1987. The increase in production was noticeable during 1984-1986. In 1987, production dropped due to a serious drought. Production revived in 1988 and early 1989 due to improved yields brought about by the Rice Production Enhancement Program launched in November 1987. This involved a buy-two-take-four bags of fertilizer subsidy program. In 1988, rice was imported to offset low production in 1986/87 and 1987/88.

Corn output grew at an annual rate of 4.6 percent over 1980-1987, mainly due to strong demand from the livestock sector. Corn imports dropped sharply after 1984 as production rose above 4 million MT per annum.

Coconut production, on the other hand, dropped by 4.4 percent per year from 1980 to 1987, due to the effects of droughts in 1983 and 1987. The abundance of old, low-yielding and disease-infected trees contributed to the continuing decline in coconut yields over the years.

Sugarcane production declined at an annual rate of 2.05 percent during 1980-1987, but began a slow increase in 1988. The cutback in area planted in the early 1980's was in response to the long-run decline in world sugar prices, and the reduced U.S. sugar quota starting in 1985, although the quota has been raised recently, thus stimulating production. Some sugar farms have shifted into more profitable corn, ramie, and prawn farming. Meanwhile, a 3.7 percent annual increase in the production performance of the other crops from 1984 to 1988 was attained. This increase can be attributed to the shift to higher value, non-traditional crops, such as coffee and pineapple, as well as improvements in yields.

Livestock and poultry production registered annual GDP growth rates of 18.1 and 20.5 percent, respectively, during 1980-1988, with sharp increases in both subsectors after 1983. This is attributable to improved breeding and dispersal programs. The carabao development program also contributed to a 19 percent production growth during the period.

b. Fishery

Fishery production grew at 3.6 percent annually from 1980 through 1987. Municipal and commercial fishing grew minimally, reflecting the problems of over-exploiting of traditional fishing grounds and illegal fishing.

c. Forestry

There has been a general decline in the production of major forest products for several years. During 1980-1987, log and lumber production decreased at annual rates of 7.9 and four percent, respectively. Commercial timber production has relied solely on natural stands in public forests. However, recent bans on log exports, heavy deforestation in the past, and growing security of public timber lands has reduced the commercial timber supply.

d. Industry

During 1980-1988, industry GDP in current prices increased at 12.6 percent per annum, but declined at 2.3 percent per annum in 1972 prices. Manufacturing, particularly agro-industries, and utilities have been the strongest performers. After undergoing a contraction in 1984 to 1986, industry has been the best sectoral performer since 1987. Construction, manufac-

turing and electricity, gas and water were the main sources of growth. Mining and quarrying performed sluggishly due to financing and technical difficulties encountered in 1984 and 1985 even as copper prices have continued to be strong. The existence of excess capacity facilitated rapid recovery in industry in the face of higher domestic consumption, more investments particularly in construction, and brisk external demand for manufactured exports.

In the manufacturing sector, the growth of subsectoral value added was broadly based except for tobacco and wood products, the output of which was still below that generated in 1984 and 1985 The subsectors which grew briskly during the 1985-1988 period were transport and electrical machinery, metal industries, textile, paper products, printing, footwear and food. In the first semester of 1989, manufacturing generally continued to fare well, with such sub-sectors as basic metals, machinery (except electrical) and transport equipment posting double-digit expansion rates.

Stronger consumer spending and investment activity have created capacity and price pressures on both the macro economy and many sectors. Given full capacity utilization in many manufacturing industries, capacity building, upgrading and rehabilitation programs have induced a surge in imported manufacturing, construction and transport equipment. This contributed to an enlarged current account deficit in the first four months of 1989. Occasional shortages of critical materials like cement have occurred despite import liberalization.

Infrastructure bottlenecks in energy, transport equipment and industrial facilities have also become more acute. This and environmental considerations have led to the identification of regional industrial centers for development, expansion and upgrading by government, and the extension of Board of Investments fiscal incentives to the establishment of private small and medium-sized industrial estates and parks outside Metro Manila. The recently approved 1989 Investment Priorities Plan lists 234 preferred investment areas, including 118 in the manufacturing sector and 81 in agriculture. It provides incentives for common industrial and service facilities, telephone and telegraph services in less developed areas, and mass transport systems.

The industrial sector has faced critical energy constraints since the advent of high OPEC oil prices in the 1970's. Fortunately, the energy development program has resulted in less dependence on oil imports over the past decade. About 40 percent of energy requirements are now locally sourced. Hydropower remains the largest source of conventional energy, followed by geothermal and coal. The power development program emphasizes the rehabilitation of existing power plants, the expansion of transmission lines to increase service coverage, the reduction of

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technical losses, the completion of ongoing projects such as coal plants, and negotiations for the installation of additional gas turbine plants based on the BOT scheme. The installed capacity of the National Power Corporation remained at 5,788 megawatts while rural electrification covered 2.9 million households as of December 1988, or 51 percent of the target.

Energy consumption in 1988 increased by 8.9 percent, exceeding the growth of real GNP, as has been the trend since 1985. Imported energy (oil and coal) consumption was larger by 9.4 percent in 1988. Three rollbacks in petroleum product prices were implemented in 1988, resulting in a fall in average prices by about P1.06 per liter. An increase of P0.50 per liter was implemented in August 1989 on four types of petroleum products. The price adjustment in other sensitive products like gasoline and kerosene is being held back for political reasons.

Due to funding constraints and the non-operation of the 620 MW Bataan nuclear power plant, the energy program is now faced with capacity limitations. In 1985, power outage in the Luzon grid averaged 125 hours per year. The economic recovery process has exacerbated the projected power supply demand gap with the critical period envisioned in the next 2 to 3 years.

The energy sector program is being updated with the objectives of: (a) formulating a least-cost development strategy to be pursued in the various energy subsectors; (b) privatizing certain energy sector activities through joint venture, BOT and other schemes; (c) establishing efficient energy pricing systems in line with the Cabinet-approved long-run-marginal-cost pricing principle; (d) consolidating regulatory activities into an integrated system with the objective of monitoring the quality of service and consumer prices of petroleum, coal and electricity; (e) developing capabilities for assessing, managing and monitoring the environmental impacts of energy projects; (f) implementing an action program to improve the operational efficiency of the sector by reducing technical and transmission losses (about 15 percent) and rehabilitating damaged plants and facilities; and (g) developing a sector-wide institutional capability to plan and coordinate the development and operational policies of the sector.

Delays in implementing new infrastructure projects have raised questions regarding the Philippines' absorptive capacity to fully and efficiently utilize Official Development Assistance (ODA). The availment rate on scheduled ODA disbursement was 77 percent as of the first quarter of 1989. This issue is now being addressed through the training of project personnel, a streamlined project preparation mechanism, and project implementation facilitation measures.

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The first phase of the import liberalization program, which began in 1981, was concluded in April 1988 with the delisting of 129 restricted products. This brought the total number of liberalized items to 2,321. Implementation of the second phase, which covers 673 products still subject to import restrictions, started in December 1988 with the liberalization of 94 products without need for tariff adjustments. Subsequently, 63 more items were deregulated, of which three required tariff adjustments that were simultaneously implemented.

A phased liberalization schedule is being developed to remove remaining quantitative restrictions or replace them with tariffs by the end of 1994. However, resistance to the import liberalization program, and to the maximum 50 percent nominal tariff protection fostered by the economic slowdown is slowing down the program's completion.

e. Services

During 1980-1988, the services sector led the economy with an average annual increase in GDP of 15.9 percent in current prices, or 5.2 percent in 1972 prices. The main sources of growth were in finance and insurance, ownership of dwellings, and government services.

The transport subsector has been targeted for special emphasis. The public investment program (PIP) for 1989-92 was recently updated with an overall rate of expenditure of about 5 percent of targeted GNP, compared to 3.7 percent in 1988, and a little less in previous years. The transport sector investment program for 1989-92 amounts to about $3.0 billion, with road and bridge projects comprising about 80 percent of total costs, followed by ports, 11 percent and the remaining projects -- railways, aviation and urban transport -- accounting for 2 to 3 percent each. Rehabilitation, upgrading and maintenance are emphasized due to the depreciation of existing infrastructures in high traffic density and typhoon-prone areas. The road network as of the end of 1988 was equivalent to 0.53 km. per square km. of land and 2.78 km. per 1000 population.

Portworks development focused on the construction of the Manila International Container Terminal, the completion of 12 provincial ports and the preparation of a development plan for a rollon-rolloff system. The Nationwide Air Navigation Modernization Project is now 60 percent complete, while the Mactan International Airport Development plan for terminal expansion is being prepared. Meanwhile, the construction of the Manila Railcar Maintenance Depot has started. The proposed second Light Rail Transit (LRT) line has been approved by the National Economic and Development Authority (NEDA) Board under a build, operate and transfer (BOT) scheme.

The sector is faced with: neglect in maintenance; rising transport costs; inadequate infrastructure, vehicle fleets and railway locomotives; and financial and administrative restrictions on private sector activities. These problems are being addressed through a more balanced maintenance and investment budget, building of implementation capacity, liberalization of the import of automotive spare parts and the issuance of Certificates of Public Convenience (CPC) on land transportation by the regulatory agency, and comprehensive review of the road and user charges system to promote fuel efficiency, reduce road damage, and raise tax collection. The maritime measures provide for the upgrading of navigation and safety systems, the liberalization of inter-island shipping, and the improvement of port planning, investments, maintenance and coordination among participating agencies and local governments.

3. Deflators

Over the 1980-1988 period, GDP increased at an average annual rate of 14.6 percent in current prices (table A-2). During this period, the 1972 price deflator increased at an annual rate 14.7 percent, thus resulting in an average rate of growth in real GDP of -0.1 percent.

4. Factors Affecting Variation in GDP

The most striking cause of variation in GDP over the past decade has been the transition from the recession of the Marcos government to the modest recovery of the Aquino government. Exports grew at an annual rate of 2.3 percent over 1981-1988, while imports declined at about 2.2 percent per annum (table A-8). Agriculture was particularly weak in export growth due to a persistent international decline in commodity prices. Industry made strong contributions to exports in chemicals, mineral fuel, lubricants, and abaca products, but faced both weak consumer demand and investment.

B. Monetary Policy

Since 1986, the government's primary monetary policy objectives have been to moderate the money supply to control inflation and improve international confidence in the Philippines' economy by reducing the international debt service ratio and increasing net international reserves.

1. Change Over Time

During 1981-1988, the money supply increased at an average annual rate of 13.53 percent, compared to a 14.6 percent growth rate for the 1972 price deflator (table A-3). During 1986-1988, the money supply expanded slightly faster, at about

16.7 percent per year (table A-1). Currency circulated grew at an average annual rate of 18.12 percent, but checking deposits increased only 6.51 percent per annum.

Quasi-money deposits grew slightly faster, at 14.89 percent per annum, with savings deposits accounting for most of the overall growth. Time deposits grew only 9.21 percent per year.

The amount of fiscal debt that has to be financed and the degree to which different programs are supported by credit at concessional terms are the main monetary policy issues.

Since 1984, the fiscal deficit has been financed by selling T-bills/Notes to the public. The national government has sold more Treasury instruments than needed for financing the the deficit, since the CB is no longer issuing CB bills. In effect, the national government is performing open market operations and thus has negative domestic credit as far as the system is concerned. Furthermore, the CB is unloading its deficits on the national government. As a result of these Treasury operations, interest rates rise and remain high until the effect of lower deficits is felt.

Likewise, the different credit programs have been abolished, a uniform discounting rate based on the Treasury Discount rate has been adopted. In efffect, credit facilities are market oriented. There is problem, however, with reference to official development assistance that is to be relent to the private sector. One donor country would like to relend the funds to industry at interest rates lower than the prevailing market because they consider the difference between the borrowing rate and the lending rate too high.

If the government deficit is largely due to capital investment programs financed by foreign assistance, then the GOP will not be borrowing as much from domestic sources. When the government fails to comply with program or loan covenants, then the foreign fund disbursements are delayed, hence requiring domestic borrowing to service the debt or to continue implementing the project using domestic financing. Since the ODA pipeline is increasing, implementation inefficiency is probably the main problem.

The basic objective of monetary policy is to sustain economic growth and employment under conditions of lower inflation. The increase in money supply is estimated to allow for the targeted growth of GNP of about 6 percent, at an inflation rate of 5-6 percent in 1991. The GOP expects the inflation rate to fall to a single digit level by the end of 1990. The Philippines has committed to an Extended Funds Facility program with the IMF until 1992. It is anticipated that the Philippines will continue to have stand-by programs with the IMF for the next few years.

Since IMF programs tend to emphasize tight monetary growth, the Philippine monetary aggregates can expand only consistent with growth and low inflation objectives.

In previous years, control over monetary aggregates was monitored through increases in net domestic assets. Since 1984, the basic control has been through control of the growth of reserve money, with allowances for improved net international reserve position.

According to the IMF, the average annual growth in broad money is projected to decline gradually from about 20 percent in 1988 to 13-14 percent by 1991 in line with the projected income elasticity of about 1.2. The velocity of broad money would decline gradually, but would still be above the velocity before the crisis in 1983. Private sector credit expansion is targeted at about 14 percent during 1989-90 and about 12 percent in later years. This credit expansion assumed inflation of 8 percent in 1989 and 6-7 percent in 1990. The IMF review team would probably adjust the credit growth to meet the actual situation.

The government has discontinued its New Disbursement Scheme of Budgetary Funds through 5 major banks so that all funds were out of the banks by the end of 1989. This scheme tended to increase the budgetary float, thus increasing Treasury borrowings and interest costs. The funds are now deposited with the CB, thus helping to attain base money targets.

In addition, the government revived the 1984 Circular requiring government corporations to deposit pesos equivalent to their debt service as if their external debt were not restructured. Under this Circular, the CB would assume the exchange risk when the restructured debt becomes due. A similar scheme is available under the private sector restructuring.

The Aquino government's monetary policy has tended to:

- restrict the money supply to control inflation;
- restrict credit growth in view of past high loan default rates;
- concentrate the domestic debt burden in short-term securities;
- reduce the debt service ratio on international debt and;
- reduce the rate of overvaluation of the peso.

2. Rate of Inflation

The money supply is controlled by limiting the growth of the reserve money. In the past, the money supply was controlled by limiting the growth of net domestic assets. The monetary program aimed to reduce reserve money levels from the December 1988 levels, even if the economy was expected to grow by 6.5 percent at an inflation rate of 8 percent. This was supposed to dampen inflation, but the minimum wage was increased by 39 percent, which became an across-the-board increase. Hence, there was an inflationary effect. The average inflation rate for 1986-1989 was 7.2 percent, but the annualized inflation in September 1989 was 12.7 percent. And for the 3-month period, June-August 1989, the average inflation was about 18 percent. Therefore, the inflation targets for 1989 and 1990 cannot be attained. The delayed price increase on oil products plus the corresponding increases in transport fares, wages, food will keep inflation up in 1990.

3. Credit Generation and Applications

The credit market has been bleak over the past decade. During 1981-1988, total loans and investment outstanding declined at an average annual rate of 2.54 percent (table A-4). Total loans and investment increased from P163 billion in 1981 to P247 billion in 1984, before falling to P144 billion in 1987 and recovering to only P163 billion in 1988. Rural and savings banks, the smallest sources of credit, had moderate annual growth of 3.56 percent and 7.56 percent, respectively. However, development bank lending declined by an average annual rate of 17.82 percent. And the largest source of credit, commercial banks, were static in average annual growth, but volatile from year-to-year.

4. Savings and Investment

From 1986 to 1988, gross national savings increased at an average annual rate of 12 percent, from P114.6 billion to P145 billion. During the same period, gross domestic investment increased at an average annual rate of 28 percent, from P81.1 billion to P141.4 billion.

These trends reflect a strong demand for investment following the economic depression during the last two years of the Marcos government. However, the continued strong growth in investment will quickly exhaust savings at the current respective rates of growth. Furthermore, the 1988 levels of savings and investments were only about 17 percent of GNP. In previous years, annual savings rose to 25 percent of GNP and investment rose to 30 percent of GNP.

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5. Domestic Debt

Domestic debt grew steadily from P49 million in 1981 to P208 million in 1988, at an average annual rate of 21.6 percent (table A-5). National government debt, which is the bulk of domestic debt, grew from P29 million in 1981 to P195 million in 1988, at an average annual rate of 28.4 percent. Debt of monetary institutions, with the next largest share, was erratic over the decade, but declined at an average annual rate of 20.3 percent.

The most striking aspect of the domestic debt situation over the last decade has been the sharp shift toward short-term debt. In 1981, domestic debt was about equally divided between short, medium, and long-term maturities. During 1981-1988, medium and long-term debt grew at average annual rates of only 2.8 and 4.9 percent, respectively. However, short-term debt grew at an average annual rate of 38.1 percent. By 1988, 70 percent of total debt was short-term.

6. International Debt and Debt Service

External debt increased only 2.9 percent per annum during 1983-1988, from $25 billion to $28 billion (table A-5). Approximately one-half of the debt is held by banks. About one-fifth of the debt is held in bilateral loans. Almost one-half of the bilateral debt is held by Japan. The U.S. holds about one-tenth of the bilateral debt.

During 1986-1988, annual debt service held steady at about $3 billion. During this period, the debt service ratio fell steadily at an annual rate of about 10 percent, from 32.3 percent to 26 percent.

The debt service ratio is sensitive to the interest rate level and the relative movements of the different currencies. In pursuing an aggressive policy of reducing the debt service ratio, the Aquino government has held external debt relatively flat to minimize interest costs and vulnerability to stronger creditor currencies.

Net international reserves (NIR) increased at an average annual rate of only 2.9 percent during 1981-1988, but the annual fluctuations have been one of the country's most serious macroeconomic problems. The reserves fell from $2.6 billion in 1981 to only $900 million during 1983 and 1984. At the end of 1988, reserves stood at $2 billion, or about one-fourth of the 1988 import bill. A key goal of monetary policy is to build up the official NIR until it reaches the equivalent of 3 months of imports. Commercial banks have been permitted to hold their international reserves since 1984. When the floating rate regime was adopted on a world wide basis, it was anticipated that the

reserve requirements would fall, but experience has shown that the same volume of reserves are needed to maintain confidence as compared to the regime of fixed parities.

The trade balance at the end of September 1989 was already over $1.7 billion deficit whereas, the 1989 target was only $1.52 billion. The increase in exports is on target but the imports increased much more hence, the higher deficit. The overall balance will not also be attained since the restructuring and associated fund flows will take place beyond January 1990. Similarly, the gross official reserves target will not be attained. It is likely that the targets will be reset to take into account the actual inflows as a result of restructuring and other fund flows.

Export expansion is one of the most important aspects of Philippine development efforts. Export development will be emphasized in new investment plans.

Much of the recent increase in imports has been due to reduced import tariffs and an overvalued peso. Allowing the peso to devalue about 20 percent would cause a sharp reduction in the trade deficit and the debt service ratio.

It is anticipated that $1.0 billion will be provided by Japan, IBRD and IMF during 1990 for use in the debt buy back scheme which is set at 50 percent discount.

The Paris Club rescheduling of international debt is finished but has to be finalized on a country to country basis. Additional Paris Club rescheduling is anticipated since the Paris Club previously rescheduled on an annual basis. More recently they have allowed multi-year reschedulings.

The results of the first review of the IMF standby program has to considered also. The GOP is seeking a waiver of the base money performance criterion and adjustments in the budgetary deficit and inflation targets.

Commercial bank debt rescheduling will have a significant impact on the Philippines. The options include new money contribution (exceptional financing) or buy back of debt at 50 percent discount. The financing of the buy back will be provided by IMF, IBRD and the Japan Eximbank.

C. Fiscal Policy

Fiscal policy since 1985 had been characterized by measures to raise revenue effort principally through improved collection and availments of ODA, to increase public investments and maintenance of physical infrastructure, to deliver more social services and to minimize the budget deficit.

1. Sources and Applications of Revenues

During 1981-1988, national government revenues increased at an average annual rate of 17.9 percent, from P34.6 billion to P112.9 billion (table A-6). Revenue effort averaged 11.8 percent of GNP per year for the period 1980-1985. During 1986-1988 the average revenue effort increased to 13.6 percent due to the major tax reform program in 1986 and the introduction of the value added tax regime in 1988. Revenue effort reached 13.7 percent in 1988, but still below the target of 15.1 percent. The below target performance was partly due to the fact that only 68 percent of newly registered domestic enterprises filed VAT returns due to inadequate information.

On the average, tax revenue constituted 87.5 percent of total revenue for the period 1980-1985, of which the share of domestic based tax to total tax accounted for about 64 percent while the remaining 36 percent accrued to international taxes. From 1986-1988, tax revenue comprised 82.4 percent of total tax revenue with domestic based tax amounting for 71 percent and international taxes 29 percent. The share of domestic based taxes grew from 61.9 percent in 1980 to 71.6 percent in 1988 and 69.9 percent for the first semester in 1989.

Non-tax revenue, on the other hand, accounted for approximately 12.5 percent of total revenue for the period 1980-1985. Non-tax revenue shot up in 1983 due to the rationalization of the users charges in that year, but this was subsequently reversed by the high rate of inflation in 1984. The trend from 1986-1988 had been a see-saw, with the increases seen in 1986 and 1988. Higher non-tax revenue starting in 1986 stem from larger foreign grant disbursements including economic support funds, additional proceeds from the sale of assets and higher interest receipts. For 1989, about half of the revenue increase reflected a jump in non-tax receipts and most of the remaining increase was generated by the first phase of the comprehensive program to strengthen tax administration.

Local government revenues have grown much slower than the national government. During 1981-1987, local government revenues increased at an average annual rate of 9.6 percent, from P5.1 billion to P8.9 billion.

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National government expenditures have consistently exceeded revenues. During 1981-1988, expenditures grew at an average annual rate of 20.2 percent, from P49.5 billion to P206.5 billion.

Government expenditures on a cash basis for the period 1980-1982 when expressed as a proportion of GNP was firmly stable at 15.3 percent on the average. It decreased in the subsequent years from 1983 to 1985 to about 13.3 percent of GNP largely due to the expenditure cutting measures undertaken by the government following the economic crisis of 1983 and 1984.

After the change in government in 1986, expenditures of the National Government increased by 38 percent from 1985 and reached a level of P110 billion. As a proportion of GNP, total expenditures for that year increased to 18 percent. Since then the expenditure/GNP ratio remained at about 17 percent and for the 1st semester in 1989, is estimated at 17.6 percent.

During 1980-1985, over 60 percent of total expenditures went to current operating expenditures (COE) and almost 40 percent were for capital expenditures. The COE share has increased sharply since 1986. In 1987, COE accounted for 78 percent of total expenditures. This was further increased to 83.5 percent of total expenditures in 1988. The bulk of the increases in current expenditures were due to increases in personnel services and interest payments.

Among the first measures that the Aquino administration took was to increase government salaries. It was noted that the expenditures on personnel services barely kept up with inflation so that it was perceived that the compensation structure of the National Government and that of the private sector was widening. Additionally, so as to streamline government bureaucracy, the National Government granted an early retirement scheme for those who wanted to leave government service.

The growth in COE for 1989 will be about 21 percent. COE as a share of GNP will rise temporarily to 14.5 percent in 1989 but will fall back in 1990. The temporary rise in 1989 will be due to the 17 percent increase in the wage bill; a 28 percent increase in the maintenance and operating expenditures; and a one-time increase in subsidies reflecting government decision to achieve greater transparency by replacing implicit interest subsidies on government advances with explicit outlays, and by higher interest payments.

The increase in personnel expenditures in 1989 was expected due to the impact of the early retirement and implementation of the Compensation Standardization Bill which is supposed to be retroactive to July 1989. However, the Standardization Bill has not yet been implemented.

Capital expenditures of the National Government have declined noticeably from 37.2 percent of total expenditures for the period 1980-1985 to 25.8 percent for 1986-1988. A shift in the composition of capital expenditures is evident for the period 1980-1985. On the average, equity contributions to government corporations accounted for 40.19 percent of total capital expenditures, infrastructure 37 percent, other capital outlays 13.2 percent and net lending a minimal 9 percent. However for the period 1986-1988, on the average, net lending accounted for 28.7 percent of total capital expenditures, infrastructure 27.57 percent, other capital outlays 22.6 percent and equity contributions 21.2 percent.

According to NEDA and IMF staff estimates, planned public investment for 1989-92, in billion pesos, at 1988 prices will be allocated as follows:

	Amount (Billion Pesos, 1988 prices)	Percent
Agriculture	P 23.8	12.2
Communications	10.0	5.1
Power & Energy	39.2	20.1
Flood Control	5.1	2.6
Industry/Utilities	2.0	1.0
Social Services	22.1	11.3
Transportation	47.5	24.3
Urban Infrastructure	3.3	1.7
Water Supply/Sewer	19.3	9.9
Other Projects	23.1	11.8
T o t a l	P195.4	100.0
Percent of GNP	5.1	

The agricultural investment schedule reflects increased emphasis in agroforestry and conservation of natural resources, agricultural productivity, agrarian reform, improved agribusiness delivery systems, and irrigation rehabilitation.

With respect to the sectoral classification of expenditures, from 1980-1985, about 40 percent of National Government expenditures went to economic services, followed by general public services at 28.8 percent, most of which went to debt servicing, social services at 18.6 percent, and defense at less than 10 percent. By 1986, the share of economic services had drastically declined to 24.6 percent of total expenditures, and reached only 15.6 percent in 1988. Social services and defense expenditures have maintained their relative shares of total expenditures. For the period 1987-1988, more than half of the expenses were allotted to general public services, particularly debt service.

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While the ratio of social services to total expenditures have remained about the same, the allocations for health and education were appreciably increased to implement the constitutional mandate of free secondary education starting in 1988, and to reverse the major drop in real per capita expenditures for social services during the 1983-1984 crisis.

In 1988, a new budget disbursement scheme featuring a common fund concept was adopted using large private banks to speed up fund utilization in all budgetary components.

After the fall of the Marcos government, the new government immediately engaged in an expansionary fiscal program in 1986, raising the deficit of the National Government to P35.9 billion or 5.1 percent of GNP. This was the highest deficit to GNP in the last decade. The deficit was reduced to an average of 2.8 percent in 1987-1988. The target deficit under the IMF program for 1989 is P15.3 billion or 1.6 percent of GNP. For the first semester 1989, the deficit reached P11.5 billion or about 2.6 percent of GNP.

In order to meet the IMF targets, the government embarked on the sale of government securities and took steps to reduce government deposits with private banks. These sales have caused interest rates on T-bills to rise above 20 percent. Now the government has to contend with the problem of meeting its deficit target in the face of higher expenditure needs. The Oil Price Stabilization Fund (OPSF) needs about P500 billion, while the Standardization Law requires about P1.5 billion.

Local government expenditures have generally exceeded revenues. During 1981-1987, local expenditures increase at an average annual rate of 10.7 percent, from P5.1 billion to P9.6 billion. Current operating expenditures have become a progressively larger share of the budget, with capital outlays increasing only 2 percent per year over the same period.

2. Public Sector Debt and Debt Service

The national government deficit increased from P14.9 billion in 1981 to P93.7 billion in 1988. The local government budget moved from a P10 million surplus in 1981 to a P664 million deficit in 1987, with wide fluctuations in the intervening years.

The National Government deficit is being tightened to 0.9 percent of GNP for 1990-1991. This is a very tight program, and the GOP is seeking a relaxation of this target since the 1989 budget deficit target was not met. With a lower public sector borrowing, domestic interest rate levels are expected to fall, thus spurring economic activity and allowing the exchange rate between the peso and the US dollar to depreciate further.

As discussed above, the national government is the largest source of debt. In 1988, the national government owed P195.5 billion of the total internal debt of P207.7 billion (table A-5). During 1981-1988, national government internal debt increased at an average annual rate of 28.4 percent, while local government debt declined at an average annual rate of 20.3 percent. Debt of monetary institutions also declined by 20.3 percent per year over this period.

The net international reserve was supposed to improve by September 1989 from negative to positive. In preparing the program, it was assumed that the ODA and new money loans would have been agreed upon and flowed into the Philippine economy. This was not accomplished, so it is anticipated that such targets will be reset. In this connection, the depreciation of the exchange rate is important in achieving the target of continuously improving the net international reserve.

The medium and long term liabilities, although growing much more slowly than short term debt, are expected to continue to increase. The amount of short term is limited whereas, the long term loans over 12 years have no limits.

The net domestic assets show that the credit to the public sector is negative, meaning that the deposits with the CB are to be maintained at high levels. The private sector credit is going to be allowed to expand, but to be offset by the deposits of government. Under these circumstances, the interest rate will stay at a relatively high level.

The assistance to financial institutions remain at the same level, no increase over the program period. The rediscounting window will be open slightly, about a P800 million annual increase.

Blocked deposits refer to the restructuring schemes whereby, the private sector has the option to deposit pesos with the Central Bank and then the Central Bank assumes the obligation and risks of paying the creditor when the rescheduled amortization falls due. Sometimes such deposits are relent to the original obligators if the creditors wish to refinance the obligators, like for example PLDT.

The growth of the base money for 1989 was programmed to be lower than the sum total of the growth rate and the anticipated average inflation rate. The monetary aggregates were tightened whereas, the growth of the base money for 1990, 1991 and 1992 seem to be normal, that is, the growth rate plus inflation rate, with a leeway of about 2 percent. Empirically, base money growth is planned that way during normal years, assuming the velocity and deposit ratio remain steady.

The debt service was lowered by rescheduling by about $600-$700 million per year, although it is still sensitive to interest rate levels.

The outcome of the private sector restructuring remains unclear. Early indications show that Japanese and major U.S. Banks opted for new money contributions, while smaller U.S Banks opted for a sell-out at a 50 percent discount. European banks have mixed reactions -- some for a sell-out, but others are staying in. The British banks are also divided between the new money and sell-out options.

The buy-back of the debt will be financed by the IMF, IBRD and Japan Eximbank, probably up to the level of $1 billion. With a 50 percent discount, about $2 billion can be retired.

The Bataan nuclear facility, with outstanding credits of over $2 billion, remains inoperative. On the other hand, the Government is looking for funds to put up more generating plants to fill in the capacity deficiency.

Debt-to-asset swaps are still being implemented, although the attractiveness of using them is waning because the government does not leave much margin for the user.

The government also announced in 1989 the revival of the debt-to-equity program when the new Extended Fund Facility Program was adopted. The EFFP was introduced in 1987, but it tapered off immediately because of its destabilizing effects on money supply and inflation. So far, the Central Bank has not issued any new circular resuming debt/equity conversions.

While private debt paper was allowed without limitation, the supply of private debt paper was so limited so its application did not prosper. There were very few companies which could redeem its debt paper hence, the scanty supply, unlike in Chile where private debt redemption or swap was highly successful.

The Government has to reduce subsidies, improve tax collections and introduce new tax measures for 1990-91 if the budget deficit targets are to be met. It is anticipated that the GOP will introduce tax measures that will yield P3 billion in 1990.

The consolidated public sector deficit is targeted to be successively reduced. Government corporations must reduce their deficits as well. The corporations operating within the agriculture sector have deficits, for example, the National Irrigation Administration, the National Food Authority, and the Philippine Crop Insurance Corporation.

D. Exchange Rate Policy

1. Change Over Time

From 1960 through 1981, the nominal exchange rate devalued slowly, at an annual rate of only 5.8 percent (table A-7). However, the 1982-1985 period experienced major economic instability with the annual rate of devaluation averaging 27.4 percent. During 1986-1989, relatively stable economic conditions were accompanied by the nominal exchange rate declining slowly from P20.4 per US$ to P21.8 per US$, at an annual rate of 2.2 percent

2. Relative Valuation

The nominal exchange rate measures the actual value of the national currency in terms of its purchasing power of a popular tradeable foreign currency. More realistic measures of the exchange rate are based on relative values. Exchange rates are often deflated with respect to inflation rates, but this measure does not deal with the fundamental attribute of the exchange rate: its role in balancing the demand for imports aginst the supply of exports, in terms of foreign exchange. It is therefore more realistic to compare the nominal exchange rate with the rate that would imply a balance of payments equilibrium under free trade conditions.

A recent World Bank study estimated the annual Philippine equilibrium exchange rate during 1960-1986 and found rates of annual change similar to the nominal rate (table A-7). During 1960-1981, the equilibirum rate devalued at an average annual rate of 6.3 percent. And during 1982-1985, this rate devalued at an average annual rate of 24.4 percent. However, the relative nominal and equilibrium rates show quite dramatically that the peso has been consistently overvalued by at least 15 percent over the last three decades. In many years, the rate of overvaluation has reached 25 to 30 percent. These gaps strongly suggest that the Central Bank has not been successful in setting exchange rates that lead to a sustained balance of payments equilibirum.

3. Policies and Control Mechanisms

Considering the overall objectives of the Philippine program, the Philippine peso will continue to depreciate in order to approach balance of payments equilibrium. Narrowing the gaps between the actual and the equilibrium exchange rates will enable the Philippines to return to the financial markets.

The basic thrust of the exchange rate policy is to improve the balance of payments position so that the total net international reserve position of the Philippines will be able to meet at least 3 months of import payments. Since the present net

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international reserve position is still below target, there will be a tendency for the peso exchange rate to continuously depreciate.

The Philippines adopted the floating exchange rate system in 1970. Previously, all foreign exchange earnings and remittances were surrendered to the Central Bank (CB) and the authorized agent (AA) banks in turn bought their foreign exchange requirements from the CB. In 1984, the system was changed to allow AA banks to keep their foreign exchange proceeds and remittances. In case banks need more foreign exchange to cover their clients' needs, the banks are allowed to post their demand in the foreign exchange trading floor. Banks with excess foreign exchange are allowed to sell. The CB is allowed to buy and sell foreign exchange through the trading floor. The trading price serves as the foreign exchange guiding rate for all subsequent transactions until another trade is completed. The exchange rate between banks and their clients during the next banking day could differ from the guiding rate, especially for those importers who utilized documents/acceptance (DA) orders versus obligations/ acceptance (OA) facilities. Interbank transactions can only be made on the foreign exchange trading floor. The change in the system in 1984 was thought to be an improvement, since the AA banks hold foreign exchange, and therefore could bargain better with the CB or other banks. The resulting bidding or trading on the floor among banks could therefore determine a more realistic exchange rate.

The exchange rate is expressed in Pesos to one U.S. Dollar. All other peso exchange rates are determined by the exchange rates between the U.S. dollar and the other foreign currencies. Therefore, there is no independent determination of the peso exchange rates with other foreign currencies. At one time, the CB experimented with determining the exchange rate based on a basket of currencies, but there was no apparent benefit in using this system. Ultimately, it was simplified to rely on a peso-US dollar exchange rate and thereafter derive cross rates for the other most used currencies.

Trade in goods is not completely free. There are certain categories of imported goods that are regulated, prohibited, or banned, although these represent a minor fraction of the total imports. The average tariff for industrial raw materials in is the range of 10 to 30 percent, with an average of about 22 percent. There are fiscal incentives, usually given to industry, so machinery and equipment are usually tariff and tax free. However, there are restrictions on Philippine exports like tropical agricultural products, quotas on garments, prohibitions on licensing or franchise agreements, and subsidies or support prices given by the EEC.

The settlement of trade is done through a trade facility maintained by commercial banks with the CB in the amount of about $3 billion under the restructuring agreement negotiated in 1985. Trade payments are usually settled within a 6 month period, and any unused facility is deposited with the CB. Some banks have sell their facilities to other banks, or they convert it to a term facility if it is used finance a sale of machinery or equipment.

Payments for services are on a current basis. Philippine workers abroad do not remit their earnings entirely through official banking channels, thus providing foreign exchange to parallel markets which could buy foreign exchange at about 10 percent higher than the going rate. In turn, the parallel market sells their foreign exchange to smugglers, travelers and those who would like to remit capital abroad at higher rates too.

With reference to <u>in</u> and <u>out</u> flow of capital, these are regulated by the Securities and Exchange Commission, the Board of Investment, and the CB. There are specified limits to foreign investments under the Constitution and laws. Current in and out flows of investment is free. However, the liquidation and remittance abroad of major investments require CB approval and registration. There are regulations requiring staggering of remittances over a five-year period.

The Philippines currently does not have free access to the international loan market. New money loans have to be negotiated with the advisory committee of the commercial banks (New York Club). Restructuring agreements have been entered into in 1985, 1987, and another amendment is being negotiated for signing in 1990. However, official creditors continue to offer export credit and official development assistance (ODA), and at the same time restructure previous loans under the Paris Club rules. There is a provision in the new agreement granting a waiver to the Philippine Government to directly buy back debt at a discount of 50 percent with funds provided by the IMF, World Bank and the Japan Eximbank.

The multilateral institutions like the IBRD, IMF, ADB, and IFAD continue to extend various types of program and project loans. Payments of these institutions have not been rescheduled. Similarly, bonded indebtedness issued at various capital markets have not been rescheduled. There is a special effort to provide the Philippines with ODA under the Multilateral Assistance Initiative (MAI) or the Philippine Assistance Program (PAP).

The main control instruments of the CB over the exchange rate are monetary in nature: interest rates and reserve requirements. The CB is mandated under an agreement with the IMF to improve the official net international reserve (NIR) position and, therefore, the CB will continue to buy foreign exchange from the

banks, rather than sell. The CB will also buy the foreign exchange borrowed by the Government from other governments and institutions. The interest rates and reserve requirements are managed with the goals of lowering the consolidated budget deficit; lowering inflation to about 5 to 6 percent per year by 1991; maintaining real income growth of 6 percent, with better income distribution; and lower unemployment and underemployment.

One of the key elements in the policy is the lowering of the consolidated deficit. If this is achieved, the GOP will borrow less, thus lowering interest rates. With lower interest rates, the growth objective will be easier to attain and it is also anticipated that the peso exchange rate will depreciate more. Lower interest rates and a higher depreciation of the exchange rate would be a better situation than the reverse because it would support the objectives of improving exports and conserving foreign expenditures.

Improved alignment of the peso with other currencies would also encourage more effective use of workers' remittances in the national capital market. f the official exchange rate is perceived to be fair, then the earnings of Filipino workers abroad would be remitted through official channels, otherwise it goes to the parallel market.

E. Foreign Trade

1. Composition of Total Imports and Exports Over Time

During 1981-1988, the Philippines had balance of trade deficits ranging from a high of $2.6 billion in 1982 to a low of $202 million in 1986 (table A-8). Total exports increased at an average annual rate of 2.3 percent, but the the trends among the major categories was very mixed. Agricultural exports generally suffered sharp declines due to depressed world markets and the Philippines' inability to stimulate agricultural production during the economic crisis years of 1983-1986. Mineral fuel, lubricants, and chemicals experienced annual growth rates of over 14 percent, but their shares of the total export market are small.

Although total imports declined at an annual rate of 2.2 percent, the trend was U-shaped, with the trough occuring in 1986. Total producer imports declined at an average annual rate of 2.6 percent, while total consumer goods, which are about five percent of total imports, increased at an annual rate of 5.6 percent.

Average export taxe rates have been very low, at about 1-2 percent. However, import tax rates are are quite high, at about 50 percent. These high import tax rates, while mainly defended as necessary to prevent even greater trade deficits, have ul-

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timately resulted in highly inefficient protected industries, high consumer prices due to weak international competition, and high government dependence on import tax revenues.

2. Composition of Agricultural Imports and Exports Over Time

Although agricultural trade volume has declined over the past decade, the positive agricultural trade balance is one of the economy's bright spots. Agricultural trade during 1980=-1988 is summarized from National Statistics Office data as follows:

Year	Ag Exports	Ag Imports	Trade Balance
	$'000		
1980	2,409,050	606,197	1,802,853
1981	2,241,794	668,970	1,572,824
1982	1,911,151	763,644	1,147,507
1983	1,813,254	688,367	1,124,887
1984	1,867,456	549,280	1,318,176
1985	1,516,916	548,084	968,832
1986	1,491,758	528,721	963,037
1987	1,607,569	635,947	971,622
1988	1,821,807	842,290	979,517

The major agricultural exports have been fish products, vegetables and fruits, sugar, and vegetable oils and fats. The primary agricultural imports have been wheat, rice, and dairy products.

3. Trade Accounts Over Time

During 1981-1988, current trade transactions, the net effects of merchandise and non-merchandise trade and transfers, although deficit in most years, showed dramatic improvement after 1984 (table A-8). Transactions improved from a deficit of $3.2 billion in 1982 to a surplus of $1 billion in 1986.

Non-monetary capital decreased at an average rate of 23.8 percent, with most of the change due to high outflow of long-term capital. Direct investments were relatively low until 1988, when inflows increased sharply to $1 billion.

The overall trade account moved from a deficit of $2 billion in 1983 to a surplus of $2.4 billion in 1985, with surpluses sustained during 1986-1988.

F. Constraints and Limits

The agriculture and nature resources sector is bound by serveral important constraints and limits. The constraints are generally responsive to program and project interventions, while limits are relatively intractable and long-term problems that result from the accumulation of counterproductive national policies and international conditions beyond the nation's control.

1. Constraints

The Philippine economy suffers from restrictive fiscal and monetary policies that have three major effects: overvaluation of the pesc, persistent budgetary deficits, and high external debt.

The peso has been consistently overvalued by about 20 percent over the last three decades. This policy has resulted in higher imports and lower agricultural exports than would have been the case under a free trade exchange rate policy.

The national budgetary deficit has generally tripled over the past decade, resulting in high debt service costs.

Policies that liberalize trade, stimulate domestic production, and streamline government revenue collection will remove many of the most serious constraints.

2. Limits

Over the past decade, the weak international agricultural commodity market has been a serious problem for the Philippines. Historically, the Philippine sugar market has been a prime source of export earnings. However, the country's limited crop mix and industrial development capacity caused the sharp fall in world sugar prices has not left much opportunity for short-term redirection of domestic agricultural resources.

The highly centralized nature of the Philippines government is a fundamental, long-term limit to efficient public resource allocation and policies that encourage sustained private sector development.

TABLE A-1. PHILIPPINE KEY ECONOMIC INDICATORS, 1986-1989

Indicator (million Pesos, unless noted)	1986	1987	1988	Prel. 1989	% Annual Growth
Population (millions)	56.0	57.4	58.8	60.2	2.4
Gross National Product	627,129	708,368	826,749	960,200	14.3
Per Capita GNP (pesos)	11,199	12,341	14,060	15,950	11.9
Consumer Price Index (1986=100)	100.0	103.8	112.9	123.7	7.2
Exchange Rate (Pesos/$)	20.4	20.6	21.1	21.8	2.2
Labor Force (millions)	22.07	22.98	23.45	24.25	3.0
Unemployment (%)	11.8	11.2	9.6	9.0	-9.7
Money Supply	42,657	52,090	59,548	n.a.	16.7
International Debt	28,256	28,649	27,915	28,000	-0.5
Debt Service	2,936	3,057	2,805	3,208	1.8
Debt Service Ratio (as % of exports)	60.6	53.4	39.7	41.0	-14.7
Foreign Exchange Reserves (million $)	2,459	1,959	2,059	2,324	-1.1
National Government Revenues	79,245	103,214	128,253	146,946	20.7
National Government Expenditures	114,505	155,500	190,700	228,900	22.8
National Government Budget Balance	(35,260)	(52,286)	(62,447)	(81,954)	---
Total Exports (million $)	4,842	5,720	7,074	7,820	16.5
Total Imports (million $)	5,044	6,737	8,159	10,420	23.7
Balance of Trade (million $)	(202)	(1,017)	(1,085)	(2,600)	---

Sources: National Statistics Coordinating Board. 1989 Philippine Statistical Yearbook. Manila: Republic of the Philippines, National Statistics Coordinating Board, October 1989.

National Statistics Office. Philippine Yearbook 1989. Manila: Republic of the Philippines, National Statistics Office, December 1989.

U.S.D.A. Foreign Agricultural Service. "Philippine Annual Agricultural Situation Report, 1990". Washington, D.C.: U.S. Department of Agriculture, Foreign Agricultural Service, February 1990. (NOT OFFICIAL USDA DATA)

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TABLE A-2. PHILIPPINE GROSS NATIONAL PRODUCT, 1981-1988

	1981	1982	1983	1984	1985	1986	1987	1988	Growth Rate % Prices Currnt	Growth Rate % Prices 1972
	(million pesos at current prices)									
Agriculture, Fishery, and Forestry Sector	69,391	76,721	84,546	139,505	162,519	155,989	170,770	189,988	15.5	1.7
Industry Sector	111,597	122,583	138,180	186,154	200,544	204,980	232,585	277,175	12.6	-2.3
Service Sector	124,270	141,293	161,370	214,807	246,396	266,160	305,013	359,586	15.9	5.2
GROSS DOMESTIC PRODUCT	305,258	340,597	384,096	540,466	609,459	627,129	708,368	826,749	14.5	-0.1
Net Factor Income from Abroad	(1,630)	(5,162)	(5,350)	(13,111)	(14,941)	(12,426)	(5,007)	(2,982)		
GROSS NATIONAL PRODUCT	303,628	335,435	378,746	527,355	594,518	614,703	703,361	823,767	14.6	-0.1
Indirect Taxes Net of Subsidies	25,928	28,665	34,689	43,920	49,346	52,309	70,231	67,380	14.8	
Depreciation	30,658	34,664	39,180	53,749	67,222	71,682	77,615	78,470	15.0	
NET NATIONAL INCOME or NATIONAL INCOME	247,042	272,106	304,877	429,686	477,950	490,712	555,515	677,917	14.4	
TYPE OF EXPENDITURE										
Personal Consumption	206,942	234,486	268,188	403,431	469,133	474,991	526,081	603,281	15.9	
Government Consumption	24,792	29,215	29,481	35,567	44,044	48,441	58,472	76,482	15.5	
Gross Domestic Capital Formation	93,261	96,521	102,526	91,951	85,402	81,106	110,394	141,353	3.3	
Exports	57,806	56,150	75,267	117,701	126,571	155,104	163,472	200,868	19.4	
Less Imports	74,359	79,321	101,138	118,382	108,506	116,188	157,397	198,137	12.6	
Stat. Discrepancy	(3,184)	3,546	9,772	10,198	(3,960)	(16,325)	7,346	2,902		
GROSS DOMESTIC PRODUCT	305,258	340,597	384,096	540,466	612,684	627,129	708,368	826,749	14.5	
Net Factor Income from Rest of the World	(1,630)	(5,162)	(5,350)	(13,111)	(14,941)	(12,426)	(5,007)	(2,982)		
GROSS NATIONAL PRODUCT										
(Current Prices)	303,628	335,435	378,746	527,355	597,743	614,703	703,361	823,767	14.6	
(1972 Prices)	95,722	97,539	98,620	91,644	87,867	89,504	94,797	101,186		-0.1
GNP Price Deflator										
(1972=100)	317.2	343.9	384.0	575.4	680.3	686.8	742.0	814.1	14.7	
(1981=100)	100.0	108.4	121.1	181.4	214.5	216.5	233.9	256.7	14.7	

Source: National Statistics Coordinating Board. 1989 Philippine Statistical Yearbook. Manila: Republic of the Philippines, National Statistics Coordinating Board, October 1989.

Note: 1988 data are revised estimates as of April 1989.

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TABLE A-3. PHILIPPINE MONEY SUPPLY, 1981-1988

	1981	1982	1983	1984	1985	1986	1987	1988	Growth Rate
	(million pesos at current prices)								(%)
SUPPLY BY COMPOSITION									
Money Supply	23,524	23,495	32,489	33,629	35,827	42,657	52,090	59,548	13.53
Currency Circulated	11,626	12,680	19,607	21,798	24,066	29,311	35,452	40,725	18.12
Checking Deposits	11,898	10,815	12,882	11,831	11,760	13,346	16,638	18,824	6.51
Quasi-Money Deposits	42,115	55,208	63,366	76,310	88,447	93,608	103,536	132,857	14.89
Savings Deposits	24,198	28,919	34,090	38,190	46,412	60,557	70,632	89,683	18.52
Time Deposits	17,916	26,288	29,277	38,120	42,035	33,051	32,904	43,175	9.21
Deposit Substitutes	16,452	16,566	17,106	11,276	8,608	4,874	3,605	2,534	-29.47
DOMESTIC LIQUIDITY	82,091	95,269	112,962	121,215	132,882	141,140	159,232	194,940	11.17
SUPPLY BY SECTOR									
Internal	46,358	65,097	106,984	133,567	157,490	155,171	160,303	154,261	16.91
Public	19,497	35,304	75,528	118,986	138,413	171,224	178,876	186,822	31.59
Private	26,861	29,792	31,456	14,580	19,077	(16,053)	(18,573)	(32,561)	
External	(22,835)	(41,601)	(74,495)	(99,937)	(121,664)	(112,494)	(108,213)	(94,713)	
MONEY SUPPLY	23,523	23,495	32,489	33,629	35,827	42,677	52,090	59,548	13.53
Interest Rate: 91 Day Treasury Bills (%)						16.3	11.4	16.4	

Source: National Statistics Coordinating Board. 1989 Philippine Statistical Yearbook. Manila: Republic of the Philippines, National Statistics Coordinating Board, October 1989.

Note: 1988 data are revised estimates as of April 1989.

TABLE A-4. PHILIPPINE LOANS AND INVESTMENTS OUTSTANDING, 1981-1988

	1981	1982	1983	1984	1985	1986	1987	1988	Growth Rate
	(million pesos at current prices)								(%)
Type of Bank									
Commercial	117,790	136,508	171,558	180,667	162,172	163,377	113,473	130,406	-0.56
Rural	5,659	6,923	7,974	7,384	7,072	7,266	7,694	8,428	3.56
Development	33,930	40,684	51,014	53,731	41,413	12,485	14,612	15,757	-17.82
Savings	5,275	4,590	5,692	5,510	4,796	5,924	8,136	8,705	7.56
TOTAL LOANS, INVEST.	162,653	188,705	236,238	247,293	215,453	189,052	143,914	163,296	-2.54

Source: National Statistics Coordinating Board. 1989 Philippine Statistical Yearbook. Manila: Republic of the Philippines, National Statistics Coordinating Board, October 1989.

Note: 1988 data are revised estimates as of April 1989.

TABLE A-5. PHILIPPINE DEBT, 1981-1988

	1981	1982	1983	1984	1985	1986	1987	1988	Growth Rate (%)
	(million pesos at current prices)								
Internal Debt	49,365	57,563	61,114	84,146	116,286	144,352	161,100	207,658	21.6
National Government	28,657	35,344	41,841	57,735	75,972	108,085	150,751	195,494	28.4
Local Government	362	432	380	174	182	161	116	116	-20.3
Government Corps.	6,656	9,855	12,157	13,206	14,004	12,411	9,313	8,082	1.4
Monetary Institutions	13,689	11,932	6,735	13,031	26,128	23,694	920	3,966	-20.3
Internal Debt	49,365	57,563	61,114	84,146	116,286	144,352	161,100	207,658	21.6
Long-Term	16,477	20,085	21,728	21,086	26,278	27,596	24,252	22,558	4.9
Medium Term	17,617	19,579	24,972	24,154	20,427	16,976	22,997	26,699	2.8
Short-Term	15,271	17,899	14,415	38,906	69,581	99,780	113,851	158,400	38.1
	(million U.S. dollars at current prices)								
External Debt (by creditor)	---	---	24,807	25,418	26,252	28,256	28,449	28,039	2.9
Banks	---	---	14,671	14,721	14,474	15,356	14,624	13,719	-0.8
Financial Institutions	---	---	1,015	1,089	795	828	390	399	-22.0
Supplier Credit	---	---	2,855	3,103	3,264	3,085	2,355	2,036	-7.4
Multilateral	---	---	3,996	4,090	4,486	4,688	5,033	4,928	4.9
IBRD	---	---	2,041	2,215	2,256	2,297	2,454	2,507	3.9
IMF	---	---	1,166	973	1,232	1,336	1,342	1,129	2.5
ADB	---	---	693	799	885	943	1,097	1,148	10.1
Other	---	---	96	103	113	112	140	144	8.4
Bilateral	---	---	2,138	2,276	2,860	3,925	5,203	6,234	23.3
Japan	---	---	41	914	1,273	1,769	2,487	2,880	70.3
U.S.	---	---	415	454	561	574	579	639	8.3
Other	---	---	1,682	908	1,026	1,582	2,137	2,715	15.4
Others	---	---	132	139	373	374	844	723	39.8
Debt Service	---	---	---	---	---	2,937	3,005	2,983	0.8
Debt Service Ratio	---	---	---	---	---	32.3	30.8	26.0	-10.8
International Reserves	2,574	1,711	865	886	1,061	2,459	1,959	2,059	2.9

Sources: National Statistical Coordination Board. 1989 Philippine Statistical Yearbook. Manila: Republic of the Philippines, National Statistical Coordination Board, October 1989.
National Statistics Office. Philippine Yearbook 1989. Manila: Republic of the Philippines, National Statistics Office, December 1989.

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TABLE A-6. PHILIPPINE GOVERNMENT REVENUES AND EXPENDITURES, 1981-1988

	1981	1982	1983	1984	1985	1986	1987	1988	Growth Rate (%)
	(million pesos at current prices)								
NATIONAL GOVERNMENT									
National Revenues	34,600	38,206	46,614	56,861	67,958	79,245	103,214	112,861	17.9
Taxes	30,062	33,800	39,821	50,118	60,253	65,491	85,923	90,352	16.7
Income and Profits	9,710	8,406	9,056	12,139	18,655	19,148	21,799	27,409	17.5
Property	217	262	301	271	173	205	239	384	2.3
Goods and Services	9,851	12,243	13,106	18,793	22,677	26,659	35,893	33,207	19.3
International Trade	9,771	12,153	16,522	17,756	17,444	17,851	26,274	25,580	12.9
Import Taxes	9,425	11,809	16,225	15,448	15,785	16,859	25,977	25,011	13.0
Export Taxes	305	287	263	1,737	997	637	15	3	-53.6
Other Int. Taxes	41	57	34	571	662	355	282	566	39.9
Other Taxes	513	736	836	1,159	1,304	1,628	1,718	3,772	24.2
Non-Tax Revenue	4,538	4,406	6,793	6,743	7,705	13,754	17,291	22,509	24.2
National Expenditures	49,481	55,874	61,798	92,107	82,826	115,102	159,274	206,546	20.2
Personal Services	11,961	13,617	14,468	18,304	22,530	26,733	31,537	49,503	19.3
Maintenance, Operations	9,000	10,954	10,235	11,318	12,665	13,443	63,274	76,694	29.4
Debt Service	6,266	8,591	11,251	38,360	22,264	40,562	37,434	45,949	29.3
Interest Payments	2,369	3,560	4,928	10,383	14,901	21,442	37,434	45,942	44.4
Loan Repayment	3,897	5,031	6,323	27,977	7,363	19,120	0	7	----
Transfer Payments	3,196	2,913	4,219	4,316	5,558	7,919	6,767	10,788	17.7
Capital Outlay	19,058	19,799	21,625	19,809	29494	26,445	20,261	23,612	3.1
National Revenues minus Expenditures	(14,881)	(17,668)	(15,184)	(35,246)	(14,868)	(35,857)	(56,060)	(93,685)	
LOCAL GOVERNMENTS									
Local Revenues	5,102	5,929	6,700	7,348	8,512	8,661	8,923	---	9.6
Tax Revenues	3,805	4,501	5,040	5,454	6,198	6,537	6,777	---	9.6
Operating, Misc.	752	879	1,052	1,205	1,431	1,323	1,460	---	11.1
Capital	7	10	12	5	15	5	9	---	-2.0
Grants	424	459	452	525	750	734	633	---	9.4
Extraordinary Income	10	12	16	11	39	12	30	---	15.7
Borrowings	104	68	127	149	79	50	13	---	-25.9
Local Expenditures	5,092	5,713	6,545	7,616	8,508	8,719	9,587	---	10.7
Personal Services	2,001	2,358	2,600	3,101	3,732	4,355	4,820	---	15.1
Maintenance, Operations	2,215	2,394	2,756	3,312	3,569	3,484	3,655	---	9.0
Capital Outlay	875	961	1,189	1,204	1,207	879	1,113	---	2.0
Local Revenues minus Expenditures	10	216	155	(268)	4	(58)	(664)	---	

Source: National Statistical Coordination Board. 1989 Philippine Statistical Yearbook. Manila: Republic of the Philippines, National Statistical Coordination Board, October 1989.

TABLE A-7. PHILIPPINE EXCHANGE RATES, 1960-1989

Year	Actual Nominal Exchange Rate (a)	External Balance Exchange Rate (b)	Free Trade Exchange Rate (c)	Free Trade & External Balance Equilibrium Exchange Rate (d)	Implied Degree of Overvaluation [(d-a)/a*100] (e)
	Pesos/$US				Percent
1960	2.02	2.02	2.54	2.54	25.74
1961	2.02	2.07	2.48	2.52	24.75
1962	3.83	3.79	4.61	4.57	19.32
1963	3.91	3.71	4.65	4.45	13.81
1964	3.91	3.83	4.65	4.57	16.88
1965	3.93	3.82	4.73	4.62	17.56
1966	3.90	3.78	4.65	4.53	16.15
1967	3.93	3.96	4.73	4.76	21.12
1968	3.93	4.10	4.78	4.95	25.95
1969	3.93	4.10	4.78	4.95	25.95
1970	5.91	5.96	7.11	7.16	21.15
1971	6.43	6.43	7.70	7.71	19.91
1972	6.67	6.67	7.95	7.94	19.04
1973	6.76	6.43	7.95	7.63	12.87
1974	6.79	6.88	8.06	8.15	20.03
1975	7.25	7.65	8.80	9.20	26.90
1976	7.44	7.90	9.20	9.66	29.84
1977	7.40	7.70	9.22	9.52	28.65
1978	7.37	7.72	9.32	9.67	31.21
1979	7.38	7.75	9.44	9.81	32.93
1980	7.51	7.90	9.55	9.93	32.22
1981	7.90	8.33	9.96	10.39	31.52
1982	8.54	9.21	10.76	11.43	33.84
1983	11.11	11.83	13.86	14.58	31.23
1984	16.70	17.28	20.82	21.40	28.14
1985	18.61	18.65	22.65	22.69	21.92
1986	20.39	19.79	24.39	23.79	16.67
1987	20.60				
1988	21.10				
1989	21.80				

Sources: Intal, Ponciano, S., Jr., and John H. Power. Trade, Exchange Rate, and Agricultural Pricing Policies in the Philippines. World Bank Comparative Studies: The Political Economy of Agricultural Pricing Policy. Washington, D.C.: The World Bank, 1990, Table A2.1, p. 314 (for 1960-1986 data).

U.S.D.A. Foreign Agricultural Service. "Philippine Annual Agricultural Situation Report, 1990". Washington, D.C.: U.S. Department of Agriculture, Foreign Agricultural Service, February 1990. (NOT OFFICIAL USDA DATA, for 1987-1989 data)

TABLE A-8. PHILIPPINE FOREIGN TRADE, 1981-1988

	1981	1982	1983	1984	1985	1986	1987	1988	Growth Rate (%)
	(current F.O.B. value in million U.S. dollars)								
Major Export Categories									
Coconut Products	750	590	680	727	459	470	560	577	-4.4
Sugar, Sugar Products	609	445	321	327	189	108	78	83	-31.5
Forest Products	469	362	331	323	246	251	306	339	-5.0
Mineral Products	758	532	440	266	243	267	224	383	-12.7
Fruits and Vegetables	378	374	327	392	354	346	382	418	1.0
Abaca Products	25	26	25	37	31	35	47	41	8.6
Tobacco Products	50	49	35	31	28	26	23	26	-11.1
Mineral Fuel, Lubricants	42	33	115	87	42	66	97	153	14.3
Chemicals	107	96	87	104	151	243	246	257	17.0
Textiles	69	56	25	38	39	44	68	73	3.7
Misc.	2,453	2,449	2,586	2,934	2,807	2,874	3,540	4,718	8.0
Re-exports	10	9	33	125	40	112	149	6	15.5
TOTAL EXPORTS	5,720	5,021	5,005	5,391	4,629	4,842	5,720	7,074	2.3
Average Export Tax (%)	2	2	1	2	1	1	n.a.	n.a.	
Major Import Categories									
Total Producer Goods	7,598	7,286	7,160	5,813	4,718	4,729	6,277	7,591	-2.6
Machinery, Equipment	1,123	899	790	474	317	305	454	837	-10.4
Unprocessed Raw Materials	2,394	2,088	2,052	1,696	1,504	997	1,360	1,386	-9.8
Semiprocessed Raw Materials	3,537	3,784	3,764	3,283	2,532	3,105	4,093	4,982	2.3
Supplies	543	515	554	359	365	321	371	384	-6.8
Total Consumer Goods	348	380	326	257	393	315	460	569	5.6
Durable	34	34	36	12	16	20	20	38	-4.2
Non-Durable	314	346	290	245	377	295	440	531	6.4
TOTAL IMPORTS	7,946	7,667	7,487	6,070	5,111	5,044	6,737	8,159	-2.2
Average Import Tax (%)	59	56	53	56	49	45	n.a.	n.a.	
BALANCE OF TRADE	(2,226)	(2,646)	(2,482)	(679)	(482)	(202)	(1,017)	(1,085)	
	(current million U.S. dollars)								
I. Current Transactions (current account balance)	(2,063)	(3,200)	(2,750)	(1,298)	(77)	1,022	(444)	(373)	
A. Merchandise Trade	(2,226)	(2,646)	(2,482)	(679)	(482)	(202)	(1,017)	(1,085)	
Exports	5,720	5,021	5,005	5,391	4,629	4,842	5,720	7,074	2.3
Imports	7,946	7,667	7,487	6,070	5,111	5,044	6,737	8,159	-2.2
B. Non-merchandise Trade	(309)	(1,040)	(740)	(855)	26	783	0	(77)	
Inflow	2896	2,983	3,127	2,619	3,288	3,791	3,454	3,606	3.7
Outflow	3205	4,023	3,867	3,474	3,262	3,008	3,454	3,683	-0.7
C. Transfer (donations,etc)	472	486	472	236	379	441	573	789	5.6
Inflow	485	498	483	237	388	445	575	791	5.2
Outflow	13	12	11	1	9	4	2	2	-27.3
II. Non-monetary Capital	1,074	1,302	499	1,406	1,685	14	421	626	-23.8
D. Long-term Capital	1,332	1,548	1,392	539	2,787	815	159	(329)	
Inflow	2,072	2,533	2,336	1,308	3,962	2,545	2,598	2,372	2.9
Outflow	740	985	944	769	1,175	1,730	2,439	2,701	18.9
E. Direct Investments	175	17	112	(7)	(9)	114	326	986	
Inflow	248	194	255	121	124	186	439	1,077	16.0
Outflow	73	177	143	128	133	72	113	91	-3.2
F. Net Short-Term Capital	(219)	(56)	(618)	623	(1,731)	(814)	80	(205)	
Errors and Omissions	(214)	(207)	(387)	251	638	(101)	(144)	174	
G. Monetization of Gold	400	277	183	150	221	279	365	314	1.6
H. Allocation of SDRs	27							0	
I. Revaluation Adjustments						(68)	(78)	83	
J. Unremittable Arrears					560				
III. Overall Surplus (deficit)	(562)	(1,621)	(2,068)	258	2,389	1,247	264	649	

Source: National Statistical Coordination Board. 1989 Philippine Statistical Yearbook. Manila: Republic of the Philippines, National Statistical Coordination Board, October 1989.

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ANNEX B

THE SECTOR SETTING

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The agriculture and natural resources sector is the nation's largest source of employment. Its resources and productivity form a critical foundation for strengthening the food security of both the rural and urban populations. However, the sector's large incidence of poverty constitutes one of the government's most important challenges in promoting overall economic development and political stability. This annex reviews the sector's current resource base, productivity, inputs, rural infrastructure, land reform and policy setting to establish a better understanding of the constraints and challenges that must be addressed in developing a new sector strategy

A. The Resource Base

1. Land

In 1980, about 3.4 million farms operated about 9.7 million hectares of land (table B-1)[1]. Average farm size fell from about 3.61 hectares in 1971 to about 2.84 hectares in 1980, due to about one million new farms being added during the period. Most of the new farms probably were started in logged-over areas and other public lands in upland and hilly regions. About 95 percent of all farms are less than seven hectares in size.

2. Population

In 1980 the Philippines's population was 48 million, with about 63 percent living in rural areas. In 1970, about 68 percent of the population was rural. By the end of 1988, the National Demographic Survey estimated the population to be 58.4 million, which implies an annual growth rate compounded growth rate of 2.18 percent during 1980-1988. This rate is substantially lower than many popular estimates of 2.4 to 2.8 percent. The most common rate currently being applied to population projections is 2.5 percent.

According to the National Statistics Office's 1988 family income and expenditure survey, 62 percent of the country's 10.7 million families live in rural areas, but they have a disproportionate share of poverty (table B-2). Average rural incomes are only 47 percent of average urban family incomes. One-half of all families have incomes below the poverty threshold level, so it is safe to assume that the incidence of rural poverty is greater than the rural share of total population. Five of the 12 regions have poverty incidence levels of less than 50 percent, Central Luzon being the lowest at 39.6 percent. Bicol is the poorest region, with 65.3 percent of its families below the poverty thresnold income.

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1. All tables are presented at the end of this annex.

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3. Institutions

The major central government support to the agriculture and natural resource sector comes from the Departments of Agriculture, Agrarian Reform, Local Government, Environment and Natural Resources, Trade and Industry, Science and Technology, and Public Works and Highways. Agriculture has primary responsibility for maintaining adequate food security by implementing a broad agricultural development program. Agrarian Reform implements the Comprehensive Agrarian Reform Program to transfer about 2.5 million hectares of agricultural lands to landless farmers. Local Government has traditionally operated as the primary liaison between the strong central government and the weak local governments (LGU's) to assist LGU's in complying with administrative codes and financial operations. With the recent emphasis on decentralization, the Department of Local Government has the main responsibility for assisting LGU's in assuming responsibility for most LGU services. Environment and Natural resources has regulatory authority over forests (above 18 percent grade), fisheries and environmental protection. Trade and Industry regulates business activity, formulates trade policy, and recently, assumed responsibility for administering emergency price controls. Science and Industry provides the primary agricultural technology development leadership through its administration of the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD). Public Works and Highways has primary responsibility for maintaining the national road network and providing overall supervision and some equipment for maintaining local barangay roads.

The Center for Research and Communications has identified more than 1,000 agribusiness firms in its 1989-90 directory. These firms serve as a nucleus for stimulating new rural-based economic development through their associations with the Philippine Chamber of Commerce and Industry, the Management Association of the Philippines and other agribusiness associations.

Over 2,000 non-government organizations operate at the community level to improve the quality of life, alleviate poverty and introduce innovative, sustainable community self-help programs. Five of the more prominent rural NGO's are discussed in annex E.

B. Sector Productivity

The agriculture and natural resources sector has a key role in the economy, through its broad cultivation of land, management of forests and fisheries and employment of about one-half of the labor force.

1. Sector Contribution to GDP

Table B-3 summarizes the Philippines' gross domestic product by sector. During 1981-1988, agriculture (includes crops, livestock, poultry, fishery and forestry) grew at an annual rate of 15.5 percent, at current prices. The service sector grew at about the same rate. At 1972 constant prices, however, agriculture grew at a rate of only 1.7 percent during this period, while industry declined at 2.3 percent per annum, and services grew at a rate of 5.2 percent.

Agriculture has contributed about 25 percent of GDP over the last decade, compared to about 34 percent for industry and 41 percent for services. During the 1985-85 recession, agriculture's share increased as the industrial sector suffered serious economic stagnation. The crops subsector dominates agriculture, contributing about 14 percent of GDP. Agroindustries is the largest industry subsector, with about 13 percent of GDP. Trade is the largest service subsector, with about 20 percent of GDP.

An interindustry analysis in annex C shows the importance of agroindustries in the economy. The food and feed processing sector has one of the highest market linkage indices and business multipliers. The sector has the highest employment multiplier.

2. Crops

Table B-4 summarizes crop production during 1980-1987. Over this period, total production fell at an annual rate of 1.57 percent, while harvested acreage grew very slightly and yield fell at 1.75 percent per annum. The largest production growth rates were in pineapple and corn. Coconut, sugarcane, mango, vegetables, and fiber crops had declining production rates.

The first page of table B-4 describes the physical shifts in acreage and yield. The second page gives some indication of the effects of price, through the interaction of supply and demand and government policies, on production response. The total value of crop production grew at an annual rate of 14.36 percent, led by pineapple, corn, palay and banana. Overall production value per ton grew at 15.9 percent per annum, led by fiber crops, banana, palay, corn, and mango. Finally, production value per harvested hectare grew at an overall rate of 14.17 percent, led by pineapple, palay and corn.

Several implications seem evident from these data. The negative rates of vegetable production contrast sharply with strong, positive growth in production value. Production decline resulted in higher prices, but the magnitude of the shift suggests a much stronger, offsetting increase in demand. The vegetable subsector deserves closer scrutiny to determine the

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composition of these shifts. Asia is experiencing a general increase in demand for vegetables as incomes rise, so it is reasonable to assume that the Philippine vegetable market is expanding toward higher value commodities.

Production values grew at low rates during 1980-1983, then grew sharply during 1984-87. In the case of palay and corn, the low productivity in the early 80's was largely due to government policies favoring consumers. The sharp increases in palay production values per ton and per hectare after 1983 suggest that the fears of a growing rice deficit are overstated. The next three years should reveal whether the sharp price increases since 1984, if continued, result in increased supply response along the supply curve, and as the supply curve shifts outward as new technologies are absorbed in the production process.

The overall growth of the crops subsector has been stimulated by reforms such as the removal of export taxes on primary exports, and the improvement of marketing, postharvest and other support services and facilities. Productivity was also increased through increased use of high yielding varieties and intensive use of agricultural inputs. Agricultural inputs such as fertilizers and pesticides as well as agricultural outputs in their original form were exempted from value-added tax starting in early 1988. However the momentum of growth was retarded by production setbacks brought about by inadequate infrastructure support, unfavorable weather conditions, pests and diseases, limited price stabilization funds and slow crop diversification efforts.

Palay production rose by an average of 2.13 percent per year during 1980-87. Most of this production gain came through higher yields, with harvested acreage declining slightly. The increase in production was noticeable during 1984-1986. In 1987, production dropped due to the long drought experienced during the year. Production rebounded in 1988 and early 1989 due to improved yield levels brought about by higher prices and the Rice Production Enhancement Program launched in November 1987. This program involved a buy-two-take-four bags of fertilizer scheme. Rice was imported during 1983/84 - 1985-86. No imports were required during 1986/87. However, rice importation resumed in 1987/88 and current trends indicate a growing annual import requirement of more than 200,000 tons over the next decade if pricing policies are not changed to allow market adjustment of production and consumption.

Corn output recorded a strong 4.6 percent annual growth rate over the 1980-87 period, mainly due to the significant expansion in hectarage. Sharp corn price increases, particularly after 1983, and as a result of the strong demand from the livestock

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sector, provided most of the stimulus for increased production. Corn's strong growth shows better business possibilities since its use as feedstocks has grown over the years.

Coconut production, on the other hand, dropped by 4.43 percent per year from 1980 to 1987, with major setbacks caused by the 1983 drought. Acreage remained steady, because it is a tree crop, but yield dropped sharply by an average of 5.18 percent per year. The predominance of old, low-yielding and disease infected trees also contributed to the continuing decline in coconut yields over the years. Prices rose sharply between 1983 and 1984, but declined sharply during 1984/85. Copra represents practically all of the country's oilseed production. Like rice, most of the crop is produced by small farmers. The Philippines is the world's largest coconut oil producer and exporter. The U.S., Japan and the European Common Market are the largest Philippine coconut oil importers. Exports will be stimulated if the EEC and Japan lower their coconut oil tariffs. However, the long-term market for coconut oil is very uncertain. Domestic consumption is stagnant and consumer in developed countries are slowly shifting toward polyunsaturated vegetable oils such as canola.

Sugarcane production declined about two percent per annum during 1980-87, with reductions in acreage exceeding increases in yield. The cutback in areas planted in the early 1980's was in response to the long-run downtrend in the prices of sugar in the world market and the reduced U.S. sugar quota starting in 1985, although the latter has been raised again recently and hence the positive production performances. In recent years, the country has produced about 1.6 million tons of sugar per year and exported about 300 tons per year. Some sugar farms have shifted from sugar into the more profitable corn, ramie and prawn farming.

Coffee production showed the strongest increase in total production value, 26.95 percent per year. However, this gain was primarily through expanded acreage. During 1980-87, annual production decreased by almost two percent per annum, while harvested acreage increased by 6.32 percent per annum. Yield declined by almost eight percent per annum over this period.

Pineapple has shown the highest annual growth in production. During 1980-87, pineapple production grew at 13.26 per annum, primarily due to increases in yield. In recent years, annual fresh production has been about 1.65 million tons per year, with about 170,000 exported per year. Pineapple exports sales reached $146 million in 1989.

Among the specialty crops, banana has the highest acreage, at about 325,000 hectares. During 1980-87, annual production decreased slightly, with the decrease in yield slightly

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offsetting the increase in acreage. In recent years, annual production has held at about 3.2 million tons, with about 870,000 tons exported for $150 million. About three-fourths of the exports go to Japan, with most of the remaining volume going to the Middle East. The long-term prospects for the crop are not promising. Banana production value per hectare is only about one-fourth of the pineapple value. Large banana plantations gain some economies of size, but the Comprehensive Agrarian Reform Program may restrict the size of future landholdings to such an extent as to make banana production even less profitable.

Wheat is the country's second largest import bill, after dairy products. In recent years, annual imports have been in the range of 1.0 to 1.2 million tons. Less than 100,000 tons of feed wheat is imported annually.

The Philippines has a strong demand for soybean meal to support the rapid expansion of domestic poultry and swine production. Each year, about 10,000 tons of meal is produced locally each year, while about one-half million tons are imported.

3. Livestock

The livestock subsector has performed dismally over the past decade. During 1981-1988, carabao and goat populations increased at annual rates of only 0.3 and 0.2 percent, respectively (table B-5). Cattle numbers fell at an annual rate of 2.0 percent. In all cases, the commercial operations declined sharply. A severe shortage of pasture shortage and low-cost, high-quality feeds have been a major cause of the decline. Cattle production on private ranches has declined because banks have become reluctant to provide credit as the CARP appears to restrict the future size of land holdings for cow-calf operations. The relatively land-intensive ranching has also declined as feedlot operations have become more attractive through the use of imported stock, and many more rural cattle ranching areas have become less secure.

Hog numbers also declined, although the rate was not as steep as carabao and cattle. Since 1987, the swine industry has grown rapidly. About 80 percent of swine production is based on backyard operations. However the recent expansion has largely been in commercial production, where operators are building large, technically advanced farms, stocked with relatively more efficient imported breeds. Pork production is not expected to grow further as long as there are severe food shortages and meat price controls.

In recent years, annual production of beef and veal has hovered at about 90,000 tons, while pork production has risen from about 480,000 tons in 1986 to an expected 600,000 tons in 1990.

Less than five percent of Philippine dairy product consumption is domestically produced. The 1989 dairy import bill was about $214 million, mostly for milk powder from Australia, New Zealand and the EEC.

4. Poultry

The commercial poultry industry also declined over the 1980-1987 period (table B-6). Duck numbers declined at an annual rate of 12.88 percent, while the chicken population fell at 4.68 percent per annum. Since 1987, large integrated poultry operations have expanded sharply in response to strong consumer demand and improved supplies of low-cost feed and chicks. New investments in breeding, growing, slaughtering/processing and feedmilling have led to short-term oversupplies. Growing shortages of feed and labor pose long-term constraints to the industry. The supply and demand situation will become more stable over time as the large integrated operations gain a greater market share and stabilize supplies of feed, chicks and eggs more in accordance with demand trends.

5. Fisheries

The fishery subsector has faced generally favorable prices over the past decade (table B-7). During 1980-1987, commercial production increased at only 2.1 percent per year, but its value per ton increased at the rate of 13.2 percent. Marine fishing led the industry in production, growing at 13.8 percent per year, compared to an industry growth rate of 3.6 percent. Fishpond production value grew the fastest, at 30.3 percent per year, and also led in the rate of growth in value per ton at 24.6 percent per year.

The farm-grown shrimp/prawn market has expanded sharply since the early 1980's. The introduction of the giant black tiger prawn has meant a quick, large investment in a new technology. By 1989, the entire Southeast Asia market was in serious oversupply, causing a sharp fall in prices and production. By 1989, shrimp/prawn production has reached about 40,000 tons, with about 26,000 tons being exported. However, 1989 exports declined about $20 million, to about $230 as the market became crowded with many low-cost producers. The long-term outlook for the Philippine shrimp/prawn market is not optimistic. Growing credit restrictions, due to the general poor state of the economy and fears about the negative impact of CARP on the industry, and declining labor productivity will weaken the country's competitiveness for the Japanese market.

6. Forestry

Forestry production is in decline. During 1980-1987, log production declined at a rate of 7.9 percent per annum (table B-8). Lumber declined four percent per year, while plywood declined at 1.9 percent and veneer, at 39.1 percent per annum. Pulpwood growth was flat. Production of poles, fuelwood and charcoal grew at 6.5 to 20.1 percent per year, but these commodities are a very small share of total wood production.

The sector earns about two percent of national GDP and employs about 200,000 workers. Production has relied solely on pure exploition, logging without replanting, until recently. Unfortunately, past over-harvesting and slash-and-burn agriculture have depleted many commercial forests. Forest land area declined from about 17 million hectares in the 1930's to about 6 million hectares today. Log production peaked at about 11 million cubic meters in the late 1960's, then steadily declined to current annual production of about 3.2 million cubic meters.

Annual lumber exports have declined to about 0.3 million cubic meters and annual plywood exports have declined to about 0.2 million cubic meters. In the late 1960's, the sector accounted for about one-third of all for foreign exchange earnings. By 1986, annual lumber exports had declined to about four million cubic meters and the sector's share of foreign exchange earnings had declined to about five percent.

Domestic lumber supplies will be drastically restructured as the market adjusts to a recent ban on logging in major areas areas of illegal logging and rugged terrain, and ban on log exports. This policy will increase the supply of lumber available for domestic value-added processing and consequently stimulate the demand for more processing capacity. The simultaneous increase in construction demand will stimulate price increases and lumber import demand.

C. Inputs

1. Labor

Based on 1983 data, as reported in annex C, there were about 19.2 million workers in the labor force, with unemployment averaging about 10.5 percent. The National Statistics Office estimated unemployment at 8-11 percent during 1989, but these figures are widely challenged as too low. The employment numbers for the 19 production sectors in annex C, table C-8, were based on initial estimates of the labor force allocated as follows: agriculture, 51.2 percent, industry, 14.4 percent, and services, 34.4 percent. These allocations were further divided among the 19 sectors of the I-O model according to various estimates of

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wages, wage rates, and employment. The allocations reveal that rice production employs about 9.5 percent of the labor force, or about 1.824 million workers. "Other crops", mainly fruits and vegetables, employs 3.022 million workers, or about 15.7 percent of the work force. Rice and other crops employ about one-half of the agricultural labor force, but they have relatively low employment multipliers, 1.41 and 1.37, respectively.

In the industry sector, the food and feed processing only employs 693,000 workers, but it has the highest employment multiplier, based on its strong forward and backward linkages.

2. Fertilizer

Fertilizer use has increased sharply over the last decade, rising from 975,000 tons in 1980 to 1.87 million tons in 1987. Fertilizer production fell from 230,000 tons in 1980 to only 103,000 tons in 1984, but then rose steadily to 788,000 tons in 1987 as the economy improved and fertilizer import duties were reduced sharply. In recent years, annual usage has hovered around 1.3 million tons, with annual production at about 525,000 tons and annual imports at about one million tons.

Fertilizer usage on rice is closely correlated with the availability of irrigation and the adoption of high-yield varieties. Irrigated rice fertilizer usage is about 60 kg. per hectare, but rainfed rice receives only about 25 kg. per hectare. These rates are some of the lowest among Asian countries.

3. Credit

During the 1970's the rural banking system expanded rapidly amid weak supervision and unsound operation and resulted in high default rates and the closure of many banks during the mid-80's. The subsidized, supervised credit programs begun under the Masagana 99 and Maisagan programs helped boost rice and corn production, but they seriously distorted the credit market and weakened the sound development of rural banks.

About one-third of the approximately $4.4 billion annual agricultural credit demand is supplied by the formal banking system. Government officials complain the informal rural lenders' high interest rates (25% to 96% have been reported), but those markets serve an important credit need in rural communities. While most formal bank credit is extended to larger agricultural producers and corporations, smaller farmers depend mostly on informal credit sources, such as other wealthier farmers, input suppliers, agricultural commodity brokers and local businesses.

The supply of bank credit to the agricultural credit has fallen sharply in recent years. Aggregate lending fell by 24 percent between 1988 and 1989. The supply of agricultural bank credit has declined because bank policy has discouraged rural banks from competing for savings at competitive rates. Macroeconomic policies have caused Treasury Bill yields to exceed the returns on agricultural investments. Also, deteriorating rural security and fears of negative effects from the CARP have further restricted the agricultural credit supply.

Total lending to the sector has declined throughout the last decade. In 1980, the sector received about 9.2 percent of the total credit supply. By 1989, the sector's credit share had fallen to about 5.9 percent.

Agricultural loans for exports and commercial crops, which normally account for about one-third of all agricultural loans, fell about 18 percent during 1989. The food commodity sector receives about one-half of all agricultural loans, but its total volume fell about 15 percent during 1989.

D. Agribusiness

The agribusiness sector is composed of all firms producing goods and services in the marketing channels that extend from the manufacturing and distribution of agricultural inputs, through farm production, to the retail sale of agro-based products to household consumers. This sector is considerably larger than the usual descriptions given from national income accounting statistics. The sector's large foundation of integrated markets and agro-based manufacturing groups make it well suited to expand its value-added and accelerate complementary development in non-agribusiness industry and services subsectors.

1. A Redefinition of Agribusiness

Glen Allen and Rolondo Dy have modified the usual classification of agribusiness in the Philippines. Using data from the National Economic and Development Authority, they estimate agribusiness produces one-half of the nation's GDP (table B-9). They took the conventional gross value added statistics for the three sectors, agriculture, industry, and services, and estimated the shares of goods and services that are directly attributable to agribusiness. In 1989, "agriculture" produced P226 billion, or about 24 percent of GDP. Allen and Dy attribute all of this production to agribusiness, as is the usual case.

"Industry" produced P320 billion, or about 33 percent of GDP. Allen and Dy classified "agro-based" manufacturing as producing about 12 percent of GDP. This subsector is similar to the "Food and Feed Processing" sector in the Input-Output Model

described in annex C. They also identified another one percent of GDP as directly attributable to agribusiness services in "other manufacturing" and "electricity, gas, and water" subsectors. Their estimated share of GDP due to agribusiness services in the "industry" sector is about 13 percent.

Most estimates of the agribusiness share of the Philippine economy are limited to classifications similar to Allen and Dy's treatment of "agriculture" and "industry" above. However, they added another 13 percent of GDP from agribusiness services in the transport, storage, trade, finance, government services and private services subsectors.

Their estimate of the 1989 agribusiness share of the Philippine economy can be summarized as follows:

Sector	GDP Share	Agribusiness Share
Agriculture	23.5%	23.5%
Industry	33.3%	13.2%
Services	43.3%	13.4%
Gross Domestic Product	100.0%	50.1%

2. Key Agribusiness Groups-Integrated Markets

Allen and Dy have identified 25 key agribusiness groups that have strong regional/national market leadership in food and feed processing. These groups have established forward and backward linkages in the production and processing of coconut oil, desiccated coconut, coconut oil, sugar, banana, coffee, cacao, rubber, pineapples, hogs, chicken broilers, chicken eggs, ocean fishing, seaweeds, aquaculture (prawns), poultry and hog feed milling, aquaculture feeds, seeds/seedlings, fertilizers, and agricultural chemicals.

E. Rural Infrastructure

The Philippine transportation system consists of about 740 km of railways, over 161,000 km of roads, about 600 ports, about 400 loading points, and 219 airports, of which 82 are national. Road transport handles about 65 percent of freight shipments and about 90 percent of all passenger traffic. Road and sea transportation are generally complementary services.

1. Road System

The road transportation system plays a crucial role in the development of the agriculture and natural resources sector, but the current lack of routine maintenance and the absence of all-weather roads in many areas with strong agricultural potential pose some of the most significant constraints to the

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sector. It is striking to note that, for a country with a land area of almost 300,000 square kilometers over 11 major islands, there are only 162,000 kilometers of roads. About 136,000 kilometers of those roads are local and in varying degrees of continual disrepair. Less than one-half of the road system was built to all-weather standards. The road system is traversed by over 11,000 bridges, most of which are subject to periodic flood damage. In more remote areas, bridges can remain inaccessible for years after a rainstorm.

The road system is not adequate to exploit the port and loading point facilities. In many cases, new trans-island roads are needed to connect sea ports with remote agricultural areas that now suffer high land and sea freight costs just to reach the other side of the island's main access to high-volume sea lanes.

Mindanao corn farmers and marketing agents often describe the magnitude of their transportation disadvantage with respect to the Manila market. Interisland shipping is so expensive that the transportation cost of corn from Mindanao to Manila is greater than the CIF cost of imported corn delivered to Manila.

An infrastructure study prepared for USAID/Manila in 1984 by Tippetts-Abbett-McCarthy-Stratton, et. al., gives an important example of how building new roads into fertile agricultural areas can provide a strong impetus for economic growth and social improvement. The study reviewed the impact of six rural roads reconstructed in six provinces in 1976 and 1977. The improvements were as follows:

- rights-of-way widened to 15 meters;
- gravel surfacing of the 6-meter traveled way;
- construction of 1.5 meter shoulders;
- construction of side ditches and culvert pipe drainage; and
- construction of permanent bridges.

The total area served by the project included 26 barangays with an area of 8,086 hectares, with 4,684 households and a total population of 27,950. Agriculture was the main source of income for about 90 percent of the households. The roads provided the communities their primary access to farm-to-market transportation, health care, education and community activities. The project's main economic results were:

- a nearly 40 percent increase in farm income;
- a 20 percent increase in non-farm income;
- an increase in commercial enterprises from 78 to 166;
- a 10 percent increase in education enrollments;
- a 55 percent decrease in school dropouts and transferees;
- increased production of major crops (40 percent increase in seven major crops, 62 percent increase

in fruits, 46 percent increase in vegetables);

- an eight percent slower increase in fertilizer and pesticide prices due to lower transport costs relative to the surrounding area;
- a decrease in shelled corn freight charges from P70 to P30 per ton;
- an increase in the farmgate share of the ultimate market price (the average farmgate price of seven major crops increased 59 percent while the market increased only 26 percent); and
- a doubling of the percent of agricultural products brought to market (and increase from 31 percent to 60 percent).

The study conducted a survey of rural road conditions. Of the 1,970 km of roads surveyed in a typical province, 45 percent were gravel, 38 percent were earth, and the remainder were gravel and earth. The quality distribution was: "bad", 48 percent; "fair", 49 percent; and "good", three percent. In this study, a "bad" road has more than five potholes per 100 meters and/or heavy corrugations; the pavement, if any, is starting to break up; and maximum travel speed is 40 km/hour. A "very bad" road would be barely passable for two-wheel drive vehicles, at a speed of up to 30 km/hr.

The study cited the following estimates of the percentage increase in costs over those for a vehicle running on a paved road in good condition:

Road Surface	Road Condition	Cost Increase Percent Over Paved-Good
Paved	Fair	20
	Bad	40
	Very Bad	60
Gravel	Good	30
	Fair	50
	Bad	80
	Very Bad	120

In general, the priority rural road system problem is inadequate maintenance. The above cost savings provide a strong basis for forging new sustainable road maintenance programs. These programs will require major changes in the way the central government deals with local government units. LGU's need taxing authority to raise the revenues required for their road maintenance programs. All government units will have to cooperate to establish a consistent system of vehicle weigh regulations and a uniform enforcement system.

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2. Role of Roads in Stimulating Rural Development

The road system is an important part of the rural development program because it is the source of strong interindustry linkages and it is an important tool for the transfer of agricultural technology. According to the Philippine 1983 Input-Output Model, the three sectors with the highest road transportation costs as a percentage of total costs are: livestock and poultry, 1.48 percent; sugar, 1.25 percent; and food and feed processing, 1.22 percent (annex C, table C-4). In terms of sales, the agriculture and natural resource sector is an important client of the road transport sector. The livestock and poultry sector purchases 3.17 percent of all road transport sector services (annex C, table C-5). The food and feed processing sector buys 13.2 percent of all road transport services. The only sectors with a larger demand on road transport services are, understandably, manufacturing (22.9 percent) and households (17.6 percent). Based on a 20-sector "closed" specification of the economy, the road transport sector has the ninth largest business multiplier, at 3.24, and the ninth largest employment multiplier, at 2.48.

Robert Evenson, of Yale University, had conducted several studies of the returns to investment in agricultural research in Asia. He concludes that the marginal internal rate of return to investment in agricultural research in the Philippines is about 70 percent, which is consistent with all other countries studied. These results are often blindly cited as justification for investing more money in public sector agricultural research institutions. However, a more careful look at Evenson's work shows that agricultural productivity gains require much more than the technology development effort. His models regularly demonstrate that infrastructure is an important technology transfer facilitator. In the Philippines, he estimates that the elasticity of aggregate agricultural output with respect to roads (mileage per region) is 0.32, which is second only to "animal wage" (-0.33) in the magnitude of its effect. His work is increasingly demonstrating that a strong formal research effort, in both the public and private sectors, is a necessary, but not sufficient condition for increased production. Roads regularly turn up as strong technology transfer facilitators in his models because of their eminent role in fostering communication between rural communities and the outside world.

F. Land Reform

The Philippines has witnessed conflicts over land tenure issues from the earliest Spanish colonial period. The modern impetus for land reform came from the Huk Rebellion during 1945-1954. The political ramifications of land reform are simply understood in terms of the 1980 Census of Agriculture statistics

on farm distribution: only 5.6 percent of all farms were larger than seven hectares, but those few farms held 32.5 percent of all farm land.

Since the turn of the century, there have been several, largely ineffective, attempts to redress land tenure grievances. Most programs have been limited to tenated holdings devoted to grain production for domestic consumption. Large sugar, coconut and tobacco landholdings have generally enjoyed exemption from land reform programs because these crops have been the major foreign exchange earners. Successive land reform programs have reduced landowners' retention limits from 300 hectares in 1955, to 75 hectares in 1963, 24 hectares in 1971, and 7 hectares in 1972. The evolution of land reform has entered a critical stage that has important implications for future sector development.

1. Legal Foundations

The main laws enabling land reform programs have been:

- the Friar Lands Act of 1903 (Commonwealth Act 1120);
- the Rice Share Tenancy Act of 1933;
- the Commonwealth Act 539 (1940);
- the Agricultural Tenancy Act of 1954 (Republic Act 1199);
- the Land Reform Act of 1955 (Republic Act 1400);
- the Agricultural Land Reform Code of 1963 (Republic Act 3844);
- the Code of Agrarian Reform (Republic Act 6389, 1971);
- Presidential Decree 27 (PD 27, 1972)
- Executive Order 228 (July 17, 1987)
- Presidential Proclamation 131 (July 1987);
- Executive Order 229 (July 1987);
- Executive Order 129-A (July 1987); and
- the Comprehensive Agrarian Reform Law of 1988 (Republic Act 6657, 1988)

2. Current Provisions

The Republic Act 6657 established a ten-year Comprehensive Agrarian Reform Program (CARP). The main features of the act are to:

- redistribute all lands covered by the within 10 years;
- set a landowner retention limit of a maximum of five hectares;
- establish a three-phased priority approach for acquired and distributed lands; and
- establish special guidelines for lands controlled by multinational corporations and commercial farms.

The current program has much more restrictive retention limits. A land owner cannot retain more than five hectares, and each of his children who is at least 15 years old can retain up to three hectares if they till or directly manage the land. Each CARP beneficiary farmer can not own more than three hectares of agricultural land.

During 1988-1997, the CARP will distribute 10.3 million hectares to over three million landless farmers or tenants. In Phase I, 1.5 million hectares of rice and corn lands, idle and abandoned lands, voluntary offers, surrendered or sequestered lands and GOP-owned agricultural lands will be distributed. During Phase II, 7.5 million hectares of public alienable and disposable lands and lands under agricultural leases, integrated social forestry areas, resettlements and private agricultural lands in excess of 50 hectares will be distributed. In Phase III, 1.3 million hectares of other private agricultural landholdings larger than five hectares will be distributed.

These phased distributions will be implemented through four land transfer programs and three non-land transfer programs. The land transfer programs will deal with: tenated rice and corn lands; idle and abandoned, foreclosed, sequestered and voluntarily offered lands; tenanted non-rice and non-corn lands and landed estates under labor administration; and public alienable and disposable lands suitable for agriculture.

The non-land transfer programs will handle: production sharing, corporate stock transfer, and integrated social forestry program areas.

The redistribution of landownership will be accompanied by a large support program, including production credit, extension services, agricultural infrastructure facilities, irrigation and post/harvest facilities, training and research and development. The costs of supporting these services is well beyond the government's present financial capacity. Major financial support is expected from the proceeds of sales of the Asset Privatization Trust and properties recovered by the Presidential Commission on Good Government.

3. Program Performance

The program has generated many court cases and will surely be a major issue in the next Presidential election. The popular view of the program is that it is: too slow, insufficiently funded, too complex to administer, creating new market distortions with subsidies, lacking extension support and lacking systematic program evaluation.

One potential positive effect may be in the area of contract farming. If the program succeeds in breaking up large holdings, agribusiness processors, brokers, and input suppliers may have new incentives to implement extensive forward and backward contracting programs with small farmers.

On the negative side, CARP has already slowed investment in the shrimp/prawn and banana industries. The breakup of larger holdings will destroy important economies of size benefits that cannot be easily regained with new technologies.

The CARP is also guiding rural landuse decisions in a manner that may ultimately be counterproductive to the generally accepted goals of rural development. Under the CARP, rural lands selected for industrial parks must be approved by CARP for removal from agricultural production. Under the current administrative framework, the CARP does not appear to have the analytical capability to best determine what a tract of land's "highest and best use" is to society.

G. The Policy Setting

The roles of the Departments of Agriculture and Trade and Industry offer a sharp contrast in clientele and political clout in formulating national food security policies. Agriculture's role is largely restricted to supporting farmer-producer clients with on-farm programs. The critical policies affecting agricultural market behavior are mainly formulated and implemented by the DTI to favor an urban-consumer clientele.

These conflicting roles highlight the difficulty in developing a comprehensive sector strategy. The individual government agencies' will ultimately have to comply with the general social, political, administrative and economic criteria that any new policy will have to pass before it can be effective in supporting the nation's strategic interests in agriculture and natural resources. In general, new policies will be needed to:

- strengthen and exploit the sector's linkages with the general economy;
- provide flexibility for alternatives to achieving food security;
- support the political mandate of CARP without counter-productive burdens on the sector and the general economy;
- remove the economic distortions created by monopoly controls; and
- allow market forces to determine which agricultural and natural resource subsectors advance and which fall into relative decline.

These policy criteria can be addressed by concentrating on three key policy areas: pricing, subsidies and privatization.

1. Pricing

The GOP's recent imposition of price ceilings has had a negative effect on food security by discouraging producers from expecting a reasonable return on their labor and investment. The recent imposition of a price ceiling on dressed chicken also caused a major discentive to innovation and expanded production. Fortunately, the chicken price ceiling was rescinded as prices began to fall sharply in response to acute overproduction.

The other major form of direct price intervention has been through prices set by government monopolies such as NFA. These price interventions have generally favored urban, non-farm consumers.

The most serious form of indirect price intervention has been through the exchange rate. A recent World Bank study by Intal and Power concludes that, during 1960-1986, the Philippine peso was overvalued about 22 percent, assuming the conditions of free trade. If the conditions of free trade and a balanced current account are assumed, the overvaluation was about 24 percent. The implications of this overvaluation on agricultural prices and output are quite strong. Over this period, the nominal rate of protection from direct price interventions for rice averages a positive eight percent per year. However, when the peso devaluation is taken into account, the rate of protection becomes a negative protection of about -13 percent. In general, if the peso had not been overvalued, producer prices of rice, corn, sugar, and coconut would have been about 20 percent higher. Without the peso overvaluation, the agricultural terms of trade would have improved since the prices of the four crops declined relative to non-agricultural prices during the late 1970's and early 1980's. The peso overvaluation was mainly due to heavy protection of the industrial sector.

Given, this level of price disprotection, the output effects are negative. Rice output was estimated to have been three percent below the annual non-intervention output level. Corn output would have been about 0.3 percent above the annual non-intervention output level. Sugar output would have been about 5.7 percent below the non-intervention level, and coconut would have been about nine percent below the non-intervention output level.

The rural credit market has been constrained because of artifically low interest rates have been imposed locally, while credit has been allowed to be invested elsewhere at higher rates. The World Bank has viewed the current rural credit situation as a lack of market mechanisms, rather than a lack of credit. The

current credit market can be strengthened by encouraging competition between banks and between urban and rural credit markets to attract new savings into the formal credit market.

2. Subsidies

The large input subsidy program proposed under the CARP would have two serious effects: over-production would be encouraged by artifitcally low input prices, and the subsidy program would cause a serious drain on GOP finances. These same arguments would also apply to any other subsidy that might be contemplated.

3. Privatization

The privatization of firms held by the Asset Privatization Trust has begun to lose momentum as the strong, working businesses are sold and the APT's portfolio is increasingly filled with either very profitable firms the GOP does not want to sell, or very weak, unprofitable firms that will not command much of their former book values. By the end of 1989, 122 government-owned or controlled corporations (GOCC's) had been approved for privatization.

The case for aggressive privatization can be made from two perspectives. First, the longer these firms are held by the government more scarce public funds are tied up and diverted from more pressing public needs such as health, education, and infrastructure. The opportunity costs stem from several factors. In many, if not most cases, the GOCC's are no longer going concerns and therefore are operating at a loss to the taxpayer. Even in cases where the firms are breaking even or making a profit, the government has considerable fixed and working capital tied up in essential non-government operations.

Second, the GOCC's frequently operate as monopolies within their respective industries and therefore distort markets in much the same way that other direct interventions such as subsidies and price controls work. It is particularly important to move the agriculture and natural resource price structure closer to border prices to allow domestic resources to be employed more nearly in line with their international opportunity costs. The National Food Authority has been particularly active in preventing private sector traders from trading rice and corn directly on the international market. By serving as a monopolist, the NFA is causing serious distortions in the price structure, as well as accumulating large program costs that a private company would have to write off as operating losses.

The GOP's abolition of sugar, coconut and fertilizer trading monopolies was a major victory for market reform and improved food security. All other GOCC agribusinesses, including the

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NFA's Food Terminal and all of its rice mills, the Philippine Cotton Corporation, the Philippine Dairy Corporation, should be transferred to the private sector to reduce operating losses, improve market efficiency and redirect GOP efforts toward more fruitful efforts to promote food security.

Table B-1. Land by Farm Size, Use and Tenure, 1980

SIZE OF FARM	Number of Farms	Farm Area (Hectares)
Under 1.00 Ht.	775,791	369,000
1.00 - 2.99 Ht.	1,578,044	2,522,200
3.00 - 4.99 Ht.	588,151	2,066,700
5.00 - 9.99 Ht.	360,006	2,242,900
10.00 - 24.99 Ht.	103,723	1,406,400
25.00 Ht. and Over	14,608	1,117,800
TOTAL	3,420,323	9,725,000
1 Parcel	2,146,685	5,531,600
2-3 Parcels	1,084,803	3,316,200
4-5 Parcels	145,984	603,200
Over 5 Parcels	42,851	274,000
TOTAL	3,420,323	9,725,000
LAND USE (a)		
Arable Land		
Under Temporary Crops	2,840,266	4,365,200
Lying Idle	438,303	838,600
Meadows and Pasture	1,613,611	3,489,000
Land Under Permanent Crops	118,316	530,000
Land Covered with Forests	157,555	336,500
All Other Lands	459,315	165,900
ALL CLASSES	3,420,323	9,725,000

(a) Note: A farm is counted only once under all classes, but may be counted in each reported land use.

LAND TENURE		
Fully Owned	1,993,293	6,496,200
Partly Owned	367,304	986,700
Tenanted and Leased	871,536	1,806,900
Other Tenure	188,186	435,400
ALL TENURE FORMS	3,420,323	9,725,000

(b) Note: Sums do not equal total because a farm with no reported area is not classified.

Source: Bureau of Agricultural Statistics. Statistical Compendium on Agriculture, Fishery and Forestry. Manila: Republic of the Philippines, Department of Agriculture, Bureau of Agricultural Statistics, 1988.

Note: Details may not sum to totals due to rounding.

TABLE B-2. PHILIPPINE FAMILY INCOME AND EXPENDITURES, 1988

Region	No. of Families ('00)	Average Income	Average Expenditures	Average Savings	Median Income	Median Expenditures	Median Savings	Poverty Threshold (a)	Poverty Incidence (b)
Philippines	106,662	39,728	32,214	7,514	26,358	23,156	3,202	2,709	49.5
Urban	40,789	58,948	46,742	12,206	40,939	35,297	5,642		
Rural	65,873	27,826	23,218	4,608	20,872	18,516	2,356		
Rural as % of Urban	161.5	47.2	49.7	37.8	51.0	52.5	41.8		
National Capital Region	14,308	77,093	60,040	17,053	53,811	45,973	7,838	4,037	31.8
Cordillera Auton. Region	2,136	33,357	29,083	4,274	26,722	22,700	4,022		
Ilocos	6,247	33,421	27,268	6,153	25,424	21,968	3,456	2,597	47.5
Cagayan Valley	4,379	32,765	24,301	8,464	23,229	18,895	4,334	2,576	48.9
Central Luzon	10,382	46,034	38,161	7,873	34,268	30,976	3,292	2,881	39.6
Southern Tagalog	14,210	38,381	32,425	5,956	27,434	24,516	2,918	2,832	49.3
Bicol	7,380	26,676	22,745	3,931	18,400	17,333	1,067	2,443	65.3
Western Visayas	9,570	30,397	26,885	3,512	21,390	20,448	942	2,654	61.8
Central Visayas	8,296	27,351	21,928	5,423	17,549	14,839	2,710	2,173	54.6
Eastern Visayas	5,985	25,069	19,905	5,164	17,558	15,015	2,543	2,263	60.5
Western Mindanao	5,392	32,033	23,851	8,182	22,176	18,102	4,074	2,289	52.0
Northern Mindanao	6,068	34,422	28,287	6,135	23,587	20,332	3,255	2,439	51.5
Southern Mindanao	7,378	36,680	29,613	7,067	26,078	22,820	3,258	2,763	52.2
Central Mindanao	4,931	34,605	27,616	6,989	26,802	21,986	4,816	2,468	47.1

Source: National Statistics Office. 1988 Family Income and Expenditure Survey. (Preliminary Results), Manila: Republic of the Philippines, National Statistics Office. June 1989.

(a) Minimum average monthly income that a family of 6 members should receive to be considered above poverty.

(b) Proportion of families below poverty level.

TABLE B-3. PHILIPPINE GROSS DOMESTIC PRODUCT BY SECTOR, 1981-1988

	1981	1982	1983	1984	1985	1986	1987	1988	Growth Rate % Prices Currnt	1972
	(million pesos at current prices)									
Total Agriculture	69,391	76,721	84,546	139,505	162,519	155,989	170,770	189,606	15.5	1.7
Crops	40,386	44,198	47,779	83,470	98,819	87,576	95,516	106,478	15.0	
Livestock	4,195	4,616	5,330	9,435	10,068	10,969	11,742	13,792	18.1	
Poultry	4,838	5,779	7,106	11,441	14,783	14,865	16,286	18,983	20.5	
Fishery	13,821	14,777	16,790	23,116	27,984	32,705	36,319	37,227	16.2	
Forestry	6,151	7,351	7,541	12,043	10,865	9,874	10,907	13,121	9.5	
Total Industry	111,613	122,564	138,179	186,154	200,544	202,280	229,683	269,938	12.6	-2.3
Mining and Quarry.	6,849	6,106	7,021	9,714	11,529	10,198	10,757	12,870	10.2	
Manufacturing	75,151	83,126	95,172	137,251	150,523	154,719	173,501	201,757	14.5	
Agroindustries	39,794	44,102	50,244	74,758	83,404	84,738	96,640	113,839	15.4	
Other Manuf.	35,357	39,024	44,928	62,493	67,119	69,981	76,861	87,918	13.3	
Construction	26,268	29,302	30,730	31,209	27,506	22,685	28,092	35,051	9.2	
Utilities	3,345	4,030	5,256	7,980	10,986	14,678	17,333	20,260	27.7	
Total Services	124,270	141,293	161,370	214,807	246,396	266,160	305,013	381,047	15.9	5.2
Transport	17,311	18,735	20,818	28,245	32,204	32,508	34,658	37,766	11.9	
Trade	52,072	58,997	69,654	105,286	124,429	127,991	144,744	189,924	18.5	
Finance, Insurance	12,859	14,525	16,253	13,840	8,754	15,609	22,512	27,326	8.2	
Real Estate	2,956	3,589	4,315	3,773	3,331	3,897	4,480	4,973	5.1	
Ownership of Dwell	6,797	8,027	9,434	13,590	18,003	18,662	21,475	23,723	19.1	
Government Service	13,930	16,389	17,539	21,254	26,007	31,728	38,610	54,380	18.8	
Private Services	18,345	21,031	23,357	28,819	33,668	35,765	38,534	42,953	12.4	
TOTAL	305,274	340,578	384,095	540,466	609,459	624,429	705,466	840,591	14.7	-0.1
	(percent)									
Total Agriculture	22.7	22.5	22.0	25.8	26.7	25.0	24.2	22.6		
Crops	13.2	13.0	12.4	15.4	16.2	14.0	13.5	12.7		
Livestock	1.4	1.4	1.4	1.7	1.7	1.8	1.7	1.6		
Poultry	1.6	1.7	1.9	2.1	2.4	2.4	2.3	2.3		
Fishery	4.5	4.3	4.4	4.3	4.6	5.2	5.1	4.4		
Forestry	2.0	2.2	2.0	2.2	1.8	1.6	1.5	1.6		
Total Industry	36.6	36.0	36.0	34.4	32.9	32.4	32.6	32.1		
Mining and Quarry.	2.2	1.8	1.8	1.8	1.9	1.6	1.5	1.5		
Manufacturing	24.6	24.4	24.8	25.4	24.7	24.8	24.6	24.0		
Agroindustries	13.0	12.9	13.1	13.8	13.7	13.6	13.7	13.5		
Other Manuf.	11.6	11.5	11.7	11.6	11.0	11.2	10.9	10.5		
Construction	8.6	8.6	8.0	5.8	4.5	3.6	4.0	4.2		
Utilities	1.1	1.2	1.4	1.5	1.8	2.4	2.5	2.4		
Total Services	40.7	41.5	42.0	39.7	40.4	42.6	43.2	45.3		
Transport	5.7	5.5	5.4	5.2	5.3	5.2	4.9	4.5		
Trade	17.1	17.3	18.1	19.5	20.4	20.5	20.5	22.6		
Finance, Insurance	4.2	4.3	4.2	2.6	1.4	2.5	3.2	3.3		
Real Estate	1.0	1.1	1.1	0.7	0.5	0.6	0.6	0.6		
Ownership of Dwell	2.2	2.4	2.5	2.5	3.0	3.0	3.0	2.8		
Government Service	4.6	4.8	4.6	3.9	4.3	5.1	5.5	6.5		
Private Services	6.0	6.2	6.1	5.3	5.5	5.7	5.5	5.1		
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		

Source: Center for Research and Communications. Philippine Agribusiness Factbook and Directory, 89/90. Manila: Center for Research and Communications, 1989.

TABLE B-4. PHILIPPINE CROP PRODUCTION, 1980-1987

	1980	1981	1982	1983	1984	1985	1986	1987	Growth Rate (%)
Volume ('000 MT)	47,091	46,925	47,556	41,548	39,958	43,100	43,855	42,935	-1.57
Palay	7,647	7,911	8,334	7,295	7,829	8,806	9,247	8,540	2.13
Corn	3,050	3,296	3,404	3,134	3,250	3,863	4,091	4,278	4.60
Coconut	15,593	14,860	14,005	10,894	10,973	11,154	11,926	11,803	-4.43
Sugarcane	2,273	2,315	2,640	2,356	2,520	2,747	2,071	1,801	-2.05
Coffee	136	152	173	114	122	135	140	132	-1.55
Pineapple	1,005	936	1,214	1,699	1,554	1,980	2,065	2,302	13.26
Banana	4,093	3,996	4,068	3,685	3,851	3,705	3,832	3,581	-1.65
Mango	545	369	426	361	367	381	301	346	-5.37
Citrus	128	136	132	118	126	130	146	150	1.78
Nuts	49	30	47	36	42	48	46	52	3.25
Vegetables	10,236	10,493	10,571	9,614	7,387	8,049	6,479	8,436	-5.77
Fiber Crops	507	458	415	330	275	286	279	257	-10.16
Others	1,829	1,973	2,127	1,912	1,664	1,817	3,234	1,257	-0.91
Harvested Area ('000 HA)	12,764	12,826	13,117	12,649	12,602	13,004	13,248	12,804	0.18
Palay	3,471	3,419	3,351	3,054	3,162	3,307	3,464	3,256	-0.46
Corn	3,199	3,295	3,383	3,132	3,227	3,511	3,595	3,683	1.86
Coconut	3,010	3,073	3,150	3,205	3,272	3,245	3,335	3,058	0.75
Sugarcane	460	411	452	480	486	407	303	261	-6.88
Coffee	91	113	126	143	145	146	148	150	6.32
Pineapple	63	58	65	62	57	56	60	59	-0.97
Banana	287	285	292	314	322	321	330	324	2.24
Mango	39	41	39	45	43	45	48	49	3.52
Citrus	21	24	24	25	25	26	28	29	3.86
Nuts	55	40	55	48	47	50	50	53	0.60
Vegetables	1,333	1,331	1,322	1,319	1,130	1,153	1,186	1,197	-2.25
Fiber Crops	285	281	292	229	207	213	206	198	-6.13
Others	452	456	566	594	479	526	496	487	0.60
Harvested Production Per Hectare (MT)	3.69	3.66	3.63	3.28	3.17	3.31	3.31	3.35	-1.75
Palay	2.20	2.31	2.49	2.39	2.48	2.66	2.67	2.62	2.59
Corn	0.95	1.00	1.01	1.00	1.01	1.10	1.14	1.16	2.74
Coconut	5.18	4.84	4.45	3.40	3.35	3.44	3.58	3.86	-5.18
Sugarcane	4.95	5.63	5.13	5.51	4.85	6.19	9.08	7.92	7.29
Coffee	1.50	1.34	1.38	0.80	0.84	0.93	0.94	0.88	-7.87
Pineapple	16.03	16.17	18.73	27.36	27.11	35.67	34.71	38.89	14.22
Banana	14.28	14.00	13.91	11.73	11.96	11.56	11.62	11.05	-3.89
Mango	14.07	9.07	10.87	8.07	8.45	8.40	6.24	7.01	-8.90
Citrus	6.15	5.63	5.44	4.68	5.02	5.05	5.17	5.21	-2.09
Nuts	0.88	0.75	0.86	0.75	0.90	0.95	0.92	0.98	2.65
Vegetables	7.68	7.88	8.00	7.29	6.54	6.98	5.46	7.05	-3.52
Fiber Crops	1.78	1.63	1.42	1.44	1.33	1.35	1.35	1.29	-4.04
Others	4.05	4.33	3.76	3.22	3.48	3.45	6.52	2.58	-1.52

TABLE B-4. PHILIPPINE CROP PRODUCTION, 1980-1987 (Continued)

	1980	1981	1982	1983	1984	1985	1986	1987	Growth Rate (%)
Total Production Value (Million Pesos)	44,009	50,723	51,947	50,345	83,912	101,465	99,625	106,190	14.36
Palay	8,786	10,440	11,573	11,281	19,668	28,719	26,353	26,303	18.56
Corn	3,224	3,986	4,343	4,339	7,717	10,795	10,268	12,407	20.80
Coconut	8,264	7,579	6,862	6,972	18,874	15,839	12,165	13,928	11.34
Sugarcane	3,971	8,066	6,912	6,428	11,101	9,248	7,691	8,702	7.95
Coffee	1,979	2,390	1,977	1,945	3,387	3,300	4,398	4,052	12.0[illegible]
Pineapple	1,173	589	1,047	1,600	2,286	2,834	3,954	4,738	26.95
Banana	2,349	2,145	2,418	2,519	4,258	4,606	6,265	6,038	17.17
Mango	1,895	1,810	1,895	1,404	2,650	3,083	3,010	3,485	10.60
Citrus	374	478	384	358	538	595	720	713	9.87
Nuts	230	143	230	179	309	388	459	465	15.35
Vegetables	8,246	8,861	9,641	9,007	8,783	14,456	17,007	17,709	11.67
Fiber Crops	807	535	609	527	657	1,379	975	1,027	9.76
Others	2,710	3,701	4,056	3,786	3,685	6,225	6,360	6,624	12.17
Production Value per MT (Pesos)	935	1,081	1,092	1,212	2,100	2,354	2,272	2,473	15.9
Palay	1,149	1,320	1,389	1,546	2,512	3,261	2,850	3,080	16.4
Corn	1,057	1,209	1,276	1,385	2,374	2,795	2,510	2,900	16.2
Coconut	530	510	490	640	1,720	1,420	1,020	1,180	15.8
Sugarcane	1,747	3,484	2,618	2,729	4,406	3,366	3,714	4,832	10.3
Coffee	14,533	15,766	11,428	17,059	27,743	24,368	31,503	30,696	13.6
Pineapple	1,168	629	863	942	1,472	1,432	1,915	2,058	13.7
Banana	574	537	594	684	1,106	1,243	1,635	1,686	18.8
Mango	3,479	4,901	4,446	3,892	7,226	8,100	10,007	10,062	16.0
Citrus	2,920	3,522	2,914	3,023	4,284	4,566	4,942	4,753	8.1
Nuts	4,722	4,757	4,848	4,986	7,281	8,158	9,959	9,017	12.1
Vegetables	806	844	912	937	1,189	1,796	2,625	2,099	17.4
Fiber Crops	1,591	1,170	1,470	1,597	2,392	4,821	3,500	4,000	18.9
Others	1,482	1,875	1,907	1,981	2,215	3,426	1,967	5,270	13.1
Production Value per HT (Pesos)	3,448	3,955	3,960	3,980	6,659	7,803	7,520	8,294	14.17
Palay	2,532	3,054	3,453	3,694	6,220	8,686	7,607	8,079	19.02
Corn	1,008	1,210	1,284	1,385	2,391	3,075	2,856	3,369	18.94
Coconut	2,746	2,466	2,178	2,176	5,768	4,881	3,648	4,555	10.59
Sugarcane	8,639	19,630	15,305	13,403	22,860	22,734	25,409	33,302	14.83
Coffee	21,752	21,189	15,741	13,628	23,426	22,632	29,675	27,067	5.77
Pineapple	18,711	10,171	16,159	25,762	39,897	51,065	66,454	80,034	27.91
Banana	8,195	7,517	8,269	8,018	13,221	14,370	18,996	18,629	14.93
Mango	48,961	44,462	48,337	31,403	61,055	68,053	62,448	70,555	7.08
Citrus	17,966	19,830	15,847	14,146	21,508	23,043	25,532	24,757	6.01
Nuts	4,165	3,589	4,148	3,761	6,540	7,766	9.200	8,813	14.75
Vegetables	6,187	6,658	7,293	6,831	7,772	12,536	14,336	14,794	13.92
Fiber Crops	2,830	1,904	2,088	2,298	3,182	6,488	4,735	5,178	14.89
Others	5,995	8,118	7,171	6,372	7,701	11,834	12,830	13,603	11.57

Source: Bureau of Agricultural Statistics. Statistical Compendium on Agriculture, Fishery and Forestry. Manila: Republic of the Philippines, Department of Agriculture, Bureau of Agricultural Statistics, 1988.

TABLE B-5. PHILIPPINE LIVESTOCK POPULATION, 1981-1988

	1981	1982	1983	1984	1985	1986	1987	1988	Growth Rate (%)
	(thousands)								
Total Carabao	2,849	5,757	5,854	5,968	6,005	5,968	5,850	2,890	0.3
Backyard	2,807	2,866	2,912	3,014	2,973	2,974	2855	2,881	0.3
Commercial	42	42	34	8	10	11	10	9	-25.2
Total Cattle	1,940	1,942	1,938	1,849	1,787	1,815	1,747	1,700	-2.0
Backyard	1,477	1,477	1,507	1,512	1,493	1,504	1,496	1,489	0.1
Commercial	463	465	431	337	294	311	251	211	-11.6
Total Goat	--	--	1,860	2,362	2,191	2,177	2,016	2,120	0.5
Backyard	--	--	1,840	2,329	2,159	2,148	1,997	2,103	0.6
Commercial	--	--	20	33	32	29	19	17	-7.3
Total Hog	7,758	7,795	7,979	7,612	7,304	7,275	7,020	7,580	-1.2
Backyard	6,153	6,167	6,479	6,359	5,998	6,081	5,920	6,312	-0.3
Commercial	1,605	1,628	1,500	1,253	1,306	1,194	1,100	1,268	-5.1

Note: Inventory as of January 1, each year.

Source: Center for Research and Communications. Philippine Agribusiness Factbook and Directory, 89/90. Manila: Center for Research and Communications, 1989.

TABLE B-6. PHILIPPINE POULTRY POPULATION, 1980-1987

	1980	1981	1982	1983	1984	1985	1986	1987	Growth Rate (%)
	(thousands)								
Total Duck	4,725	9,508	9,688	10,324	11,182	11,038	10,483	5,036	1.67
Backyard	3,342	3,752	3,776	4,168	4,451	4,345	4507	4,617	4.36
Commercial	1,383	1,031	1,129	1,251	1,312	930	701	419	-12.88
Total Chicken	52,761	57,724	59,711	62,255	59,205	52,098	53,004	50,417	-1.43
Backyard	39,693	38,608	39,719	42,041	40,266	39,339	40,269	38,227	-0.15
Commercial	13,068	19,116	19,992	20,214	18,939	12,759	12,735	12,190	-4.68

Note: Inventory as of January 1, each year.

Source: Center for Research and Communications. Philippine Agribusiness Factbook and Directory, 89/90. Manila: Center for Research and Communications, 1989.

TABLE B-7. PHILIPPINE FISHERY PRODUCTION, 1980-1987

	1980	1981	1982	1983	1984	1985	1986	1987	Growth Rate (%)
	Production, '000 Tons								
Commercial	488	495	526	519	513	512	546	591	2.1
Municipal	894	939	978	1,146	1,089	1,045	1,072	1,061	2.4
Marine	647	710	708	771	790	785	807	816	3.1
Inland	247	229	270	375	299	260	265	245	0.4
Aquaculture	289	340	393	445	478	494	471	561	8.4
Marine	--	96	134	162	177	221	197	243	13.8
Freshwater	--	63	67	87	89	59	51	53	-5.2
Fishpond	136	181	192	196	212	214	223	265	7.3
TOTAL	1,671	1,774	1,897	2,110	2,080	2,051	2,089	2,213	3.6
	Value, Million Pesos								
Commercial	3,785	4,125	4,355	4,643	6,521	7,857	9,248	9,821	15.3
Municipal	6,017	6,963	7,316	9,540	11,863	14,715	17,251	16,107	16.4
Marine	5,410	6,263	6,488	7,463	10,291	12,795	14,611	14,216	15.9
Inland	607	700	828	2,077	1,572	1,920	2,640	1,891	20.0
Aquaculture	1,842	2,866	3,393	4,799	7,266	8,724	10,832	11,421	27.0
Marine	--	270	341	420	539	582	527	585	12.6
Freshwater	--	657	772	1,144	1,443	1,338	1,258	1,093	9.5
Fishpond	--	--	2,280	3,235	5,284	6,804	9,047	9,743	30.3
TOTAL	11,644	13,954	15,064	18,982	25,650	31,296	37,331	37,349	18.5
	Value, Pesos/Ton								
Commercial	7,756	8,333	8,279	8,946	12,712	15,346	16,938	16,618	13.2
Municipal	6,730	7,415	7,461	8,325	10,893	14,081	16,092	15,181	14.0
Marine	8,362	8,821	9,164	9,680	13,027	16,299	18,105	17,422	12.8
Inland	2,457	3,057	3,067	5,539	5,258	7,385	9,962	7,718	19.7
Aquaculture	6,374	8,429	8,634	10,784	15,201	17,660	22,998	20,358	18.6
Marine	--	2,813	2,545	2,593	3,045	2,633	2,675	2,407	-1.3
Freshwater	--	10,429	11,522	13,149	16,213	22,678	24,667	20,623	14.7
Fishpond	--	--	11,875	16,505	24,925	31,794	40,570	36,766	24.6
TOTAL	6,968	7,866	7,941	8,996	12,332	15,259	17,870	16,877	15.0

Source: Center for Research and Communications. Philippine Agribusiness Factbook and Directory, 89/90. Manila: Center for Research and Communications, 1989.

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TABLE B-8. PHILIPPINE FORESTRY PRODUCTION, 1980-1987

	1980	1981	1982	1983	1984	1985	1986	1987	Growth Rate (%)
	'000 Cubic Meters								
Logs	6,352	5,400	4,514	4,430	3,873	2,982	3,434	4,147	-7.9
Lumber	1,529	1,219	1,200	1,222	1,234	924	977	1,233	-4.0
Plywood	553	457	422	459	438	333	424	517	-1.9
Veneer	660	553	428	445	84	61	73	75	-39.1
Pulpwood	390	496	541	732	987	368	318	618	0.2
Poles & Piles	16	20	75	38	9	15	38	54	6.5
Fuelwood	92	94	84	47	355	310	125	77	7.3
Charcoal	--	28	2	30	53	36	29	29	20.1

Source: Center for Research and Communications. Philippine Agribusiness Factbook and Directory, 89/90. Manila: Center for Research and Communications, 1989.

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TABLE B-9. PHILIPPINE AGRIBUSINESS SHARE, 1989

SECTOR/INDUSTRY		Gross Value-Added (PHP Billion)	GDP	Share Agribusiness
AGRICULTURE				
Crops	Palay	36.2	3.8%	
	Corn	14.6	1.5%	
	Coconut	11.5	1.2%	
	Sugarcane	6.2	0.6%	
	Banana	5.6	0.6%	
	Other	55.2	5.6%	
	Subtotal	129.3	13.4%	
Livestock		17.4	1.8%	
Poultry		22.3	2.3%	
Fishery		44.6	4.6%	
Forestry		12.3	1.3%	
TOTAL AGRICULTURE		225.9	23.5%	23.5%
INDUSTRY				
Manufacturing				
	Food	87.0	9.0%	
	Beverages	8.3	0.9%	
	Tobacco	6.4	0.7%	
	Wood	4.8	0.5%	
	Paper	4.2	0.4%	
	Leather	0.5	0.1%	
	Rubber	2.7	0.3%	
Sub-Total "Agro-Based"		113.9	11.8%	11.8%
	Other Mfg.	126.5	13.1%	0.7%
Total Manufacturing		240.4	25.0%	12.5%
Mining		16.4	1.7%	
Construction		42.0	4.4%	
Electricity, Gas, Water		21.6	2.2%	0.7%
TOTAL INDUSTRY		320.4	33.3%	13.2%
SERVICES				
Transport, Storage		48.3	5.0%	2.5%
Trade		187.6	19.5%	7.8%
Finance, Banking		67.7	7.0%	0.[illegible]%
Government Services		61.5	6.4%	1.0%
Private Services		51.8	5.4%	1.4%
TOTAL SERVICES		416.9	43.3%	13.4%
GROSS DOMESTIC PRODUCT (GDP)		963.2	100.0%	50.1%

Source: Allen, Glen, and Rolondo Dy. Overview of the Philippine Agribusiness Sector and Recommendations. Report Prepared for USAID/Philippines. Manila: Chemonics International Consulting Division, July 1990, Page C-1.

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ANNEX C

THE ROLE OF THE AGRICULTURE AND NATURAL RESOURCES SECTOR IN THE NATIONAL ECONOMY: AN INTERINDUSTRY ANALYSIS

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The agriculture and natural resources sector is the foundation of most developing countries' economies. At the early stages of development, the sector comprises most of the economy's value added and employment. As further development occurs, the proportion of value added contributed by the sector tends to decline more rapidly than its share of employment. In terms of a simple two-sector theory of development, the primary, agricultural and natural resources sector supplies the economy's food and fiber needs and sets the stage for a transition into an industrial economy. The transition occurs as the primary sector increases its labor productivity and simultaneously generates additional income to purchase manufactured goods and services from the secondary and tertiary sectors. Increased labor productivity allows much of the primary sector's labor to be bid away for higher paying manufacturing and service jobs.

In the Philippines, the primary sector contributes about one-fourth of the Gross Development Product and employs about one-half of the labor force. Viewed from the traditional two-sector and stages of growth theories, many economic planners have been quick to dismiss the importance of the agricultural and natural resource sector after it ceases to produce most of the economy's value added. Much of the Philippines' economic policy bias against agriculture can be traced to this type of thinking. However, the sector remains the foundation of the Philippines' economy because: (1) it still employs the largest proportion of the labor force; (2) it acts as a buffer in the face of continuing stagnation in the manufacturing sector; and (3) it has interindustry linkages with the manufacturing and service sectors that can serve as an engine for transforming the nation into a modern industrial and service-based economy. This annex describes the agriculture and natural resources sector's role in the Philippine economy in terms of interindustry linkages and demonstrates opportunities for harnessing the sector for broad-based economic development.

A. The Sector's Contribution to the National Economy

1. The Composition of National Income

The Philippine economy is summarized in table C-1 in two parts. The upper portion shows that the three intermediate demand sectors produced approximately P384 billion in value added in 1983. Agriculture, fisheries and forestry contributed about 21 percent of gross domestic product (GDP) that year. In the lower portion, 1983 GDP is estimated at P822 billion, in alternative break-downs as supply and demand. The difference between the intermediate demand of P384 billion and GDP of P822 is salaries and wages and taxes net of subsidies. The data in

Table C-1. Gross Domestic Product and National Income, 1983

	Billion Pesos, 1983	Percent
GROSS DOMESTIC PRODUCT:		
Agriculture, Fishery and Forestry	84.5	22.0
Industry	138.2	36.0
Services	161.4	42.0
Total	384.1	100.0
NATIONAL INCOME ACCOUNTS:		
Total Supply	821.9	100.0
Domestic Production	721.4	87.8
Imports	100.5	12.2
Total Demand	821.9	100.0
Domestic	744.7	90.6
Intermediate	341.6	41.6
Final	403.0	49.0
Consumption	296.1	36.0
Investment	106.9	13.0
Exports	77.3	9.4

Source: National Economic and Development Authority.

table C-1 were prepared for 1983 to correspond with the 1983 Philippine Input-Output Model, however the proportions have not varied much over the ensuing years, except that the severe economic recession of 1985-86 resulted in the agriculture, fishery and forestry sector's share of GDP rising to almost 30 percent, then recently settling back at about 25 percent.

2. Classification of Sectors in the Philippine I-O Model

To gain a better understanding of the agriculture and natural resources sector's role in the economy, the NEDA 1983 Input-Output Model was reclassified from 127 sectors to a 20-sector model, with emphasis on agriculture and natural resources. The aggregation scheme is summarized in table C-2. (All tables except table C-1 are presented at the end of this annex.) In the new, 20-sector model, the first 9 sectors account for primary agricultural, fishery and forest production. Sectors 10-19 account for manufacturing and services, with sector 11 devoted entirely to the food and feed processing industries. Sector 20 accounts for household purchases (demand) and wages (supply).

3. Interindustry Transactions

Table C-3 shows the 1983 NEDA transactions table aggregated to a 20-sector model for the purposes of this analysis. The right-most column is the total sales, across each row, by respective sectors, while the bottom row is the sum of purchases, down each column, by respective sectors.

B. The Importance of Transactions as Purchases and Sales

The structure of the transactions table defines a system of linear, fixed proportions production functions which relate inputs and outputs across sectors. Direct input and sales coefficients calculated from the transactions table give a convenient summary of where, by sector, a particular sector buys its inputs and sells its products.

1. Direct Input Coefficients

Direct input coefficients are summarized in table C-4. The coefficients are calculated column-wise, by dividing the transactions (table C-3) of a particular cell by the value of total purchases for the respective column.

A few striking features of the economy are highlighted by the direct input coefficients table. Households, in the form of wages and salaries, constitute the largest single input share in most sectors. In the crop sectors, labor constitutes about 45 percent of production costs. Imports are a highly variable share of production costs across sectors, varying from zero in some sectors (questionable) to a high of 67 percent for mining. Fertilizer and pesticides stand out as an important input share for crop sectors.

The food and feed processing sector (sector 11) has a pivotal role in purchasing raw food products from farms and labor, services and products from other sectors to process the nation's food and feed supply. The relatively even distribution of food and feed processing inputs throughout the economy indicates that the sector has some of the most important interindustry linkages in the economy. For instance, 1.2 percent of its input costs are for road transportation (column 11, row 16), one of the highest road transportation shares.

2. Sales Coefficients

Sales coefficients are summarized in table C-5. The coefficients are calculated row-wise by dividing the transactions of a particular cell by the total sales for the respective row. Again, the food and feed processing sector stands out as the major purchaser of primary agricultural products, buying about [illegible] percent of rice, corn, coconut and sugarcane production.

The fact that only 20 percent of "other crops" is sold to the food and feed processing sector is a measure of great potential gains in value added. The "other crops" sector is primarily fruit and vegetable crops. The high perishability of these crops means relatively little processing is usually done before retail sales are made. Table C-5 indicates that about 56 percent of these products are sold directly to households (column 20, row 5). About eight percent of these products are exported, one of the highest export sales coefficients among the 19 production sectors.

Households are also significant direct buyers of livestock and poultry (sector 6) and fish (sector 8).

C. Interindustry Effects of the Sector

Interindustry coefficients derived from the transactions table are useful in estimating the economy-wide effects of changes in business volume in a particular sector. The most common measures of interindustry effects are total and indirect requirements coefficients and market linkage indices.

1. Total Requirements

The direct input coefficient matrix was subtracted from an identity matrix, then inverted to derive the standard total requirements, or Leontief coefficients. The coefficients summarized in table C-6 are a "closed model", with the household sector included as an endogenous sector. The sums of the 20 sector total requirements coefficients, down each column, are shown following the household sector row as the sectors' respective business multipliers. The business multiplier is a measure of the amount of additional business activity generated throughout the economy (in pesos) in response to an additional peso of business activity in the respective sector.

In a "closed" input-output model, inclusion of the household sector leads to a higher business multiplier because the interindustry effects include the direct and indirect effects of the intermediate demand (production) sectors, plus the induced effects of household consumption. In an "open" model, with the household sector excluded, the business multiplier is sometimes referred to as a "Type I" multiplier. Business multipliers in "closed" models are sometimes referred to as "Type II" multipliers.

Business and import multipliers are summarized in table C-7. The business multipliers are repeated from table C-6, but ranked to quickly show the relative degree of interindustry linkages. Because the household sector is included in the closed model, its high multiplier is expected. However, households are not a source of value added. Among the remaining 19 sectors, the agricultural and natural resource subsectors have the highest

ranking business multipliers. The food and feed processing sector has the second-highest multiplier, following livestock and poultry, among the 19 production sectors. Mining has a bottom-ranked multiplier primarily because it has a very large import dependence.

Import multipliers were calculated to estimate the total value of additional imports required throughout the economy in response to an additional peso of business activity in a given sector. Here, the mining sector has the highest multiplier, while logging is the least dependent on imports.

In formulating an agricultural strategy, it is important to consider the role of employment in achieving broad rural development goals. In table C-8, employment levels and interindustry effects are estimated for the 19 production sectors. Annual employment levels were estimated by sector for 1983 by applying various wage, employment and production data to derive aggregated employment levels consistent with available government estimates. The direct output effect (column c) is the value of output per annual worker in pesos. The direct employment effect is the change in employment resulting from an additional peso of business activity, or the inverse of the direct output effect. The total employment effect measure the economy-wide change in employment due to one peso of additional business activity (output). Therefore, the employment multiplier is the ratio to the total employment effect to the direct employment effect. The food and feed processing sector's employment multiplier is again quiet large (17.5), as would be expected, since its business multiplier is large. However, the large employment multiplier estimate should not be taken out of context: the food and feed processing sector cannot expand employment unless it has available new supplies of raw agricultural products upstream and new markets downstream. Otherwise, the employment multipliers tell a familiar story: relatively greater employment effects of business expansion generally occur in the manufacturing and service sectors, not the primary (agriculture, fishery and forestry) sector.

2. Indirect Requirements

Indirect input requirements are useful in assessing the total effect on each industry of exogenous changes in the economy. The total input requirements for a unit change in final demand of a given industry is composed of: one unit change in the exogenous variable, which is final demand; the direct input requirements; and the indirect input requirements. Table C-9 presents indirect input requirements. These coefficients were estimated by subtracting 1+ the direct input coefficients (table C-4) from the main diagonal elements of the total requirements matrix (table C-6) in table C-4, then subtracting the direct input coefficients (table C-4) from the off-diagonal elements of the total requirements matrix (table C-6).

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The total requirements are decomposed in table C-10 into direct and indirect effects by subtracting indirect effects (bottom row of table C-9) from the respective business multipliers). In general, the indirect effects are greater in the primary subsectors, again indicating a relatively higher potential for economy-wide growth benefits from any expansion coming from those subsectors.

3. Market Linkages

Another useful way estimating interindustry linkages is to estimate forward and backward market linkages that are implied by the direct requirements table. In table C-11, forward and backward marketing linkages have been estimated as indices. The forward linkage index for a particular sector is the ratio of the row sum of the direct requirements coefficients for that sector, divided by the average direct requirements over all sectors. Again discounting the high values of the household sector in the closed model, the food and feed processing sector is shown to have one of highest linkages in terms of sales downstream. Fishing, livestock and poultry, and other crops also have relatively high forward linkages, as could be expected from the structure of sales coefficients in table C-5.

The backward linkage index for a particular sector is the column sum of the particular of the direct requirements coefficients for that sector, divided by the average direct requirements over all sectors. Of the 19 production sectors, the crop sectors have some of the highest backward, upstream linkages, reflecting their strong economy-wide influences through their heavy demand for purchased inputs.

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TABLE C-2. AGGREGATION OF PHILIPPINE I-O SECTORS, 1983

New 20-Sector Model	Old 127-Sector Model
1 Rice	1 Palay, irrigated 2 Palay, non-irrigated
2 Corn	3 Corn
3 Coconut	4 Coconut, copra made in farms
4 Sugar	5 Sugarcane
5 Other Crops	6 Banana 7 Other fruits & nuts 8 Vegetables 9 Rootcrops 10 Tobacco 11 Fiber crops 12 Coffee and cacao 13 Other comm. crops, n.e.c.
6 Livestock, Poultry	14 Hogs 15 Other livestock & its prods. 16 Chicken for meat 17 Other poultry & its prods.
7 Ag Services	18 Agric'l services
8 Fishing	19 Comm. fishing, off and coast 20 In'd fishing & others
9 Logging	21 Logging 22 Other forestry activity
10 Mining	23 Gold & other precious metals 24 Copper ore 25 Other metallic mining 26 Sand, stone & clay quarrying 27 Other non-metallic m & q
11 Food, Feed Processing	28 Rice & corn milling 29 Sugar milling & refining 30 Milk processing 31 Other dairy products 32 Crude coco,veg./anml oils/fats 33 Refined (ckg) oil & margarine 34 Slaughtering, meat packing plants 35 Meat processing 36 Flour & other grain mill 37 Animal feeds 38 Fruit & veg. preserves 39 Fish preparations 40 Bakery prods. incl. noodles 41 Cocoa prods. & confectionery 42 Coffee, ground or instant 43 Dessicated coconut 44 Ice, except dry ice 45 Misc. food mfs., n.e.c. 46 Wine & liquor 47 Brewery & malt prods. 48 Soft drinks & carbonated water

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TABLE C-2. AGGREGATION OF PHILIPPINE I-O SECTORS, 1983 (Continued)

New 20-Sector Model	Old 127-Sector Model
12 Manufacturing	49 Cigars & cigarettes
	50 Tobacco leaf processing
	51 Textile mill prods.
	52 Knitting mill prods.
	53 Other made-up textile goods
	54 Wearing apparel
	55 Footwear not rubber/plast/wood
	56 Lumber, rough or worked
	57 Veneer and plywood
	58 Other wood, cork & cane prods.
	59 Pulp, paper & paperboard
	60 Converted ppr & pprbrd prods.
	61 Publishing and printing
	62 Leather & leather prods.
	63 Rubber tires & tubes
	64 Rubber footwear
	65 Other rubber prods.
	66 Fabricated plastic prods.
	67 Drugs & medicines
	68 Basic indust'l chemicals
	70 Plastic materials
	72 Paints, varnish & rel'd cpds.
	73 Soap & synthetic detergents
	74 Cosmetics & toilet prep'tns
	75 Other chemical prods.
	76 Prods. of petrol, coke & coal
	77 Cement
	78 Glass & glass prods.
	79 Other non-metal minrl prods.
	80 Primary iron & steel prods.
	81 Non-ferrous basic metal prods.
	82 Fabricated metal prods.
	83 Mach & equip no elect'l
	84 Electric ind'l mach & equip
	85 Elect'l applns & hwares
	86 Batteries
	87 Wires & wiring devices
	88 Semi-conductor devices
	89 Misc elect'l equip, supp, accs
	90 Motor vehicles
	91 Othr trans eqp/sup/ac/rep serv
	92 Furnitures & fixtures-wood
	93 Furnitures & fixtures-metal
	94 Musical instruments
	95 Artists' & office supplies
	96 Misc. mfts, n.e.c., scrap
13 Fertilizer, Pesticides	69 Fertilizer
	71 Pesticides, insecticides, etc.
14 Construction	97 Construction
15 Electricity, Gas, Water	98 Electricity
	99 Gas mfts & dist'n no LPG
	100 Water services
16 Rail and Road Transportation	104 Rail & other road pass transpo
	105 Road freight transport
17 Ocean, Interisland Transportation	106 Ocean (overseas) shipping
	107 Inter-island shippping

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TABLE C-2. AGGREGATION OF PHILIPPINE I-O SECTORS, 1983 (Continued)

New 20-Sector Model	Old 127-Sector Model
18 Other Transport	101 Bus line operation
	102 P.U. cars & taxicabs
	103 Jeepney, calesas, tricycles
	108 Air transort, dom. & int'l
	109 Services incidental to transport.
19 Services	110 Communication services
	111 Storage & warehousing
	112 Wholesale trade
	113 Retail trade
	114 Fin. instns (b & nb)
	115 Insurance, life & nlife
	116 Real estate
	117 Ownership of dwellings
	118 Government services
	119 Private education services
	120 Private health services
	121 Hotels & other lodging places
	122 Restaurants & fun places
	123 Business services
	124 Recreat'l & cult'l services
	125 Personal & household services
	126 Other social/commty services
	127 Notional industry
	129 Government Expenditures
20 Households	134 Salaries & wages (INPUTS)
	128 Private Consumption (OUTPUTS)
EXOGENEOUS INPUTS/PURCHASES	
21 Operating Surplus	135 Operating Surplus
22 Imports	133 Imports
EXOGENEOUS OUTPUTS/DEMAND	
21 Government Expend.	129 Government Expend.
22 Investment	130 Gross Fixed Capital Formation
23 Inventory Change	131 Inventory Change
24 Exports	132 Exports

TABLE C-3. TRANSACTIONS TABLE AT 1983 PRODUCERS' PRICES, THOUSAND PESOS

Sector	1 Rice	2 Corn	3 Coconut	4 Sugar	5 Oth Crps	6 Lsk Pol	7 Ag Serv	8 Fishing	9 Logging
1 Rice	521900	0	0	0	0	0	0	0	0
2 Corn	0	80390	0	0	0	54110	0	0	0
3 Coconut	0	0	797470	0	0	5600	0	1420	0
4 Sugar	0	0	0	130930	0	0	0	0	0
5 Oth Crps	0	0	0	0	1230640	65200	0	26940	0
6 Lsk Pol	0	0	0	0	0	2951970	0	0	0
7 Ag Serv	374310	42800	23490	36250	37710	33150	28190	0	0
8 Fishing	0	0	0	0	0	0	0	291320	0
9 Logging	0	0	7980	0	350	0	0	60	497390
10 Mining	0	0	0	0	0	0	0	9930	0
11 FF Proc	0	0	0	0	0	6355270	0	739510	0
12 Manuf	147800	28280	35260	60470	352710	763030	10310	1903900	654190
13 Fer Per	1612980	374470	112310	346680	632290	0	7320	66950	0
14 Const	0	0	0	0	1700	31370	0	0	0
15 EleGasWa	0	0	0	4270	2600	279620	1840	22140	5340
16 RR Trans	93000	26820	30540	51380	118000	380160	1700	211470	81310
17 OI trans	76040	57900	61610	24790	53390	128350	490	172480	65270
18 Oth Trans	21160	2610	870	3630	6610	48200	190	167550	12990
19 Serv	847610	193830	267170	166000	676200	2022770	33260	1142030	342910
20 Housld	6735500	2672100	3086800	1768800	11497500	5926700	221100	6727200	2219700
21 Op Surplus	5489500	1599900	2134200	1517200	10787300	6509300	269100	10062800	5335500
22 Imports	300	881500	0	0	2926200	56400	4200	14100	121100
TOTAL PURCHASES	15920100	5960600	6557700	4110400	28333200	25611200	577700	21559800	9335700

Sector	10 Mining	11 FF Proc	12 Manuf	13 Fer Per	14 Const	15 EleGasWa	16 RR Trans	17 OI trans	18 Oth Trans
1 Rice	0	14738100	0	0	0	0	0	0	0
2 Corn	0	5473792	0	0	0	0	0	0	0
3 Coconut	0	5825069	884	0	0	0	0	0	0
4 Sugar	0	3918770	0	0	0	0	0	0	0
5 Oth Crps	0	5501763	2753452	0	0	0	0	14126	0
6 Lsk Pol	0	14950597	0	0	0	0	0	115015	0
7 Ag Serv	0	0	0	0	0	0	0	0	0
8 Fishing	0	3286480	541615	0	0	0	0	190239	0
9 Logging	42137	37242	5630489	0	251710	110478	0	0	0
10 Mining	0	53	21370082	54939	1007094	0	0	8	0
11 FF Proc	0	20059533	3060776	0	0	0	0	466604	216519
12 Manuf	1763138	5143014	53460852	1209442	19582845	7818060	4167055	898224	6399573
13 Fer Per	0	0	4940	18864	0	0	0	82	3945
14 Const	58469	5600	92697	257	129944	9899	3751	109	22476
15 EleGasWa	374771	1948421	2931481	74896	754603	499385	81164	13601	229763
16 RR Trans	74976	1580119	2750511	33814	370746	183201	47596	41057	202696
17 OI trans	8312	135464	958716	12109	112046	51464	10736	0	50572
18 Oth Trans	4084	71455	413886	9416	94862	32599	5861	50623	1372019
19 Serv	672813	8932128	16188319	234363	3084950	1169014	1001037	286112	2451037
20 Housld	2353800	10410400	17708700	212100	9362600	1743300	3075300	1097600	5304400
21 Op Surplus	4667200	23229900	43712500	679300	19713400	3419200	3567300	1283600	5872900
22 Imports	20283600	4219800	60063000	1302200	93800	0	32600	1169600	917100
TOTAL PURCHASES	30303300	129467700	231642900	3841700	54558600	15036600	11992400	5626600	23043000

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TABLE C-3. TRANSACTIONS TABLE AT 1983 PRODUCERS' PRICES, THOUSAND PESOS (Continued)

Sector	19 Serv	20 Housld	21 Gov Expend	22 Invest	23 Inven Chng	24 Exports	TOTAL SALES
1 Rice	0	200500	0	0	364900	94700	15920100
2 Corn	35508	567200	0	0	-251000	600	5960600
3 Coconut	657	192200	0	0	-307400	41800	6557700
4 Sugar	0	25600	0	0	35100	0	4110400
5 Oth Crps	195779	15962900	122400	0	208700	2251300	28333200
6 Lsk Pol	820318	5536700	45400	0	1170000	21200	25611200
7 Ag Serv	0	0	1800	0	0	0	577700
8 Fishing	865346	16046900	112000	0	3900	222000	21559800
9 Logging	2064	1268800	6500	0	794600	685900	9335700
10 Mining	29594	273100	7400	0	1354400	6196700	30303300
11 FF Proc	4168288	75367200	695900	0	5598000	12740100	129467700
12 Manuf	9857747	50297600	4454600	35430400	1417000	25787400	231642900
13 Fer Per	172969	399200	10400	0	63900	14400	3841700
14 Const	1048928	467200	712800	51061100	0	912300	54558600
15 EleGasWa	4122005	3385900	304800	0	0	0	15036600
16 RR Trans	898404	2114600	191200	1292300	0	1216800	11992400
17 OI trans	694861	1840800	143800	531200	0	426200	5626600
18 Oth Trans	1260885	16313100	1057600	1136900	0	955900	23043000
19 Serv	28049647	74932500	23023400	6617600	414700	25699600	198449000
20 Housld	60181300	0	0	0	0	0	152304900
21 Op Surplus	77594200	0	0	0	0	0	227444300
22 Imports	8450500	0	0	0	0	0	100536000
TOT. PURCHASES	198449000	265192000	30890000	96069500	10866800	77266900	1302213400

TABLE C-4. DIRECT INPUT COEFFICIENTS MATRIX, 1983

Sector	1 Rice	2 Corn	3 Coconut	4 Sugar	5 Oth Crps	6 Lsk Pol	7 Ag Serv	8 Fishing	9 Logging
1 Rice	0.032782	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2 Corn	0.000000	0.013487	0.000000	0.000000	0.000000	0.002113	0.000000	0.000000	0.000000
3 Coconut	0.000000	0.000000	0.121608	0.000000	0.000000	0.000219	0.000000	0.000066	0.000000
4 Sugar	0.000000	0.000000	0.000000	0.031853	0.000000	0.000000	0.000000	0.000000	0.000000
5 Oth Crps	0.000000	0.000000	0.000000	0.000000	0.043435	0.002546	0.000000	0.001250	0.000000
6 Lsk Pol	0.000000	0.000000	0.000000	0.000000	0.000000	0.115261	0.000000	0.000000	0.000000
7 Ag Serv	0.023512	0.007180	0.003582	0.008819	0.001331	0.001294	0.048797	0.000000	0.000000
8 Fishing	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.013512	0.000000
9 Logging	0.000000	0.000000	0.001217	0.000000	0.000012	0.000000	0.000000	0.000003	0.053278
10 Mining	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000461	0.000000
11 FF Proc	0.000000	0.000000	0.000000	0.000000	0.000000	0.248144	0.000000	0.034300	0.000000
12 Manuf	0.009284	0.004744	0.005377	0.014711	0.012449	0.029793	0.017847	0.088308	0.070074
13 Fer Per	0.101317	0.062824	0.017126	0.084342	0.022316	0.000000	0.012671	0.003105	0.000000
14 Const	0.000000	0.000000	0.000000	0.000000	0.000060	0.001225	0.000000	0.000000	0.000000
15 EleGasWa	0.000000	0.000000	0.000000	0.001039	0.000092	0.010918	0.003185	0.001027	0.000572
16 RR Trans	0.005842	0.004500	0.004657	0.012500	0.004165	0.014844	0.002943	0.009809	0.008710
17 OI trans	0.004776	0.009714	0.009395	0.006031	0.002237	0.005011	0.000848	0.008000	0.006991
18 Oth Trans	0.001329	0.000438	0.000133	0.000883	0.000233	0.001882	0.000329	0.007771	0.001391
19 Serv	0.053241	0.032519	0.040741	0.040385	0.023866	0.078980	0.057573	0.052970	0.036731
20 Housld	0.423082	0.448294	0.470714	0.430323	0.405796	0.231410	0.382725	0.312025	0.237765
22 Imports	0.000019	0.147888	0.000000	0.000000	0.103278	0.002202	0.007270	0.000654	0.012972

Sector	10 Mining	11 FF Proc	12 Manuf	13 Fer Per	14 Const	15 EleGasWa	16 RR Trans	17 OI trans	18 Oth Trans
1 Rice	0.000000	0.113836	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2 Corn	0.000000	0.042279	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
3 Coconut	0.000000	0.044992	0.000004	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
4 Sugar	0.000000	0.030268	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
5 Oth Crps	0.000000	0.042495	0.011887	0.000000	0.000000	0.000000	0.000000	0.002511	0.000000
6 Lsk Pol	0.000000	0.115477	0.000000	0.000000	0.000000	0.000000	0.000000	0.020441	0.000000
7 Ag Serv	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
8 Fishing	0.000000	0.025385	0.002338	0.000000	0.000000	0.000000	0.000000	0.033811	0.000000
9 Logging	0.001391	0.000288	0.024307	0.000000	0.004614	0.007347	0.000000	0.000000	0.000000
10 Mining	0.000000	0.000000	0.092254	0.014301	0.018459	0.000000	0.000000	0.000001	0.000000
11 FF Proc	0.000000	0.154939	0.013213	0.000000	0.000000	0.000000	0.000000	0.082928	0.009396
12 Manuf	0.058183	0.039724	0.230790	0.314819	0.358932	0.519935	0.347475	0.159639	0.277723
13 Fer Per	0.000000	0.000000	0.000021	0.004910	0.000000	0.000000	0.000000	0.000015	0.000171
14 Const	0.001929	0.000043	0.000400	0.000067	0.002382	0.000658	0.000313	0.000019	0.000975
15 EleGasWa	0.012367	0.015049	0.012655	0.019496	0.013831	0.033211	0.006768	0.002417	0.009971
16 RR Trans	0.002474	0.012205	0.011874	0.008802	0.006795	0.012184	0.003969	0.007297	0.008796
17 OI trans	0.000274	0.001046	0.004139	0.003152	0.002054	0.003423	0.000895	0.000000	0.002195
18 Oth Trans	0.000135	0.000552	0.001787	0.002451	0.001739	0.002168	0.000489	0.008997	0.059542
19 Serv	0.022203	0.068991	0.069885	0.061005	0.056544	0.077745	0.083473	0.050850	0.106368
20 Housld	0.077675	0.080409	0.076448	0.055210	0.171606	0.115937	0.256437	0.195073	0.230196
22 Imports	0.669353	0.032593	0.259291	0.338965	0.001719	0.000000	0.002718	0.207870	0.039800

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TABLE C-4. DIRECT INPUT COEFFICIENTS MATRIX, 1983 (Continued)

Sector	19 Serv	20 Housld
1 Rice	0.000000	0.000756
2 Corn	0.000179	0.002139
3 Coconut	0.000003	0.000725
4 Sugar	0.000000	0.000097
5 Oth Crps	0.000987	0.060194
6 Lsk Pcl	0.004134	0.020878
7 Ag Serv	0.000000	0.000000
8 Fishing	0.004361	0.060510
9 Logging	0.000010	0.004784
10 Mining	0.000149	0.001030
11 FF Proc	0.021004	0.284199
12 Manuf	0.049674	0.189665
13 Fer Per	0.000872	0.001505
14 Const	0.005286	0.001762
15 EleGasWa	0.020771	0.012768
16 RR Trans	0.004527	0.007974
17 OI trans	0.003501	0.006941
18 Oth Trans	0.006354	0.061514
19 Serv	0.141344	0.282559
20 Housld	0.303258	0.000000
22 Imports	0.042583	0.000000

TABLE C-5. SALES COEFFICIENT MATRIX, 1983

Sector	1 Rice	2 Corn	3 Coconut	4 Sugar	5 Oth Crps	6 Lsk Pol	7 Ag Serv	8 Fishing	9 Logging
1 Rice	0.032782	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2 Corn	0.000000	0.013487	0.000000	0.000000	0.000000	0.009078	0.000000	0.000000	0.000000
3 Coconut	0.000000	0.000000	0.121608	0.000000	0.000000	0.000854	0.000000	0.000217	0.000000
4 Sugar	0.000000	0.000000	0.000000	0.031853	0.000000	0.000000	0.000000	0.000000	0.000000
5 Oth Crps	0.000000	0.000000	0.000000	0.000000	0.043435	0.002301	0.000000	0.000951	0.000000
6 Lsk Pol	0.000000	0.000000	0.000000	0.000000	0.000000	0.115261	0.000000	0.000000	0.000000
7 Ag Serv	0.647931	0.074087	0.040661	0.062749	0.065276	0.057383	0.048797	0.000000	0.000000
8 Fishing	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.013512	0.000000
9 Logging	0.000000	0.000000	0.000855	0.000000	0.000037	0.000000	0.000000	0.000006	0.053278
10 Mining	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000328	0.000000
11 FF Proc	0.000000	0.000000	0.000000	0.000000	0.000000	0.049088	0.000000	0.005712	0.000000
12 Manuf	0.000638	0.000122	0.000152	0.000261	0.001523	0.003294	0.000045	0.008219	0.002824
13 Fer Per	0.419861	0.097475	0.029234	0.090241	0.164586	0.000000	0.001905	0.017427	0.000000
14 Const	0.000000	0.000000	0.000000	0.000000	0.000031	0.000575	0.000000	0.000000	0.000000
15 EleGasWa	0.000000	0.000000	0.000000	0.000284	0.000173	0.018596	0.000122	0.001472	0.000355
16 RR Trans	0.007755	0.002236	0.002547	0.004284	0.009840	0.031700	0.000142	0.017634	0.006780
17 OI trans	0.013514	0.010290	0.010950	0.004406	0.011266	0.022811	0.000087	0.030654	0.011600
18 Oth Trans	0.000918	0.000113	0.000038	0.000158	0.000287	0.002092	0.000008	0.007271	0.000564
19 Serv	0.004271	0.000977	0.001346	0.000836	0.003407	0.010193	0.000168	0.005755	0.001728
20 Housld	0.044224	0.017544	0.020267	0.011614	0.075490	0.038913	0.001452	0.044169	0.014574

Sector	10 Mining	11 FF Proc	12 Manuf	13 Fer Per	14 Const	15 EleGasWa	16 RR Trans	17 OI trans	18 Oth Trans
1 Rice	0.000000	0.925754	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2 Corn	0.000000	0.918329	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
3 Coconut	0.000000	0.888279	0.000135	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
4 Sugar	0.000000	0.953379	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
5 Oth Crps	0.000000	0.194181	0.097181	0.000000	0.000000	0.000000	0.000000	0.000499	0.000000
6 Lsk Pol	0.000000	0.583752	0.000000	0.000000	0.000000	0.000000	0.000000	0.004491	0.000000
7 Ag Serv	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
8 Fishing	0.000000	0.152436	0.025122	0.000000	0.000000	0.000000	0.000000	0.008824	0.000000
9 Logging	0.004514	0.003989	0.603114	0.000000	0.026962	0.011834	0.000000	0.000000	0.000000
10 Mining	0.000000	0.000002	0.705206	0.001813	0.033234	0.000000	0.000000	0.000000	0.000000
11 FF Proc	0.000000	0.154939	0.023641	0.000000	0.000000	0.000000	0.000000	0.003604	0.001672
12 Manuf	0.007611	0.022202	0.230790	0.005221	0.084539	0.033750	0.017989	0.003878	0.027627
13 Fer Per	0.000000	0.000000	0.001286	0.004910	0.000000	0.000000	0.000000	0.000021	0.001027
14 Const	0.001072	0.000103	0.001699	0.000005	0.002382	0.000181	0.000069	0.000002	0.000412
15 EleGasWa	0.024924	0.129579	0.194956	0.004981	0.050184	0.033211	0.005398	0.000905	0.015280
16 RR Trans	0.006252	0.131760	0.229355	0.002820	0.030915	0.015276	0.003969	0.003424	0.016902
17 OI trans	0.001477	0.024076	0.170390	0.002152	0.019914	0.009147	0.001908	0.000000	0.008988
18 Oth Trans	0.000177	0.003101	0.017961	0.000409	0.004117	0.001415	0.000254	0.002197	0.059542
19 Serv	0.003390	0.045010	0.081574	0.001181	0.015545	0.005891	0.005044	0.001442	0.012351
20 Housld	0.015455	0.068352	0.116271	0.001393	0.061473	0.011446	0.020192	0.007207	0.034828

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TABLE C-5. SALES COEFFICIENT MATRIX, 1983 (Continued)

Sector	19 Serv	20 Housld	24 Exports
1 Rice	0.000000	0.012594	0.005948
2 Corn	0.005957	0.095158	0.000101
3 Coconut	0.000100	0.029309	0.006374
4 Sugar	0.000000	0.006228	0.000000
5 Oth Crps	0.006910	0.563399	0.079458
6 Lsk Pol	0.032030	0.216183	0.000828
7 Ag Serv	0.000000	0.000000	0.000000
8 Fishing	0.040137	0.744297	0.010297
9 Logging	0.000221	0.135908	0.073471
10 Mining	0.000977	0.009012	0.204489
11 FF Proc	0.032196	0.582131	0.098404
12 Manuf	0.042556	0.217134	0.111324
13 Fer Per	0.045024	0.103912	0.003748
14 Const	0.019226	0.008563	0.016721
15 EleGasWa	0.274131	0.225177	0.000000
16 RR Trans	0.074914	0.176328	0.101464
17 OI trans	0.123496	0.327160	0.075747
18 Oth Trans	0.054719	0.707942	0.041483
19 Serv	0.141344	0.377591	0.129502
20 Housld	0.395137	0.000000	0.000000

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TABLE C-6. TOTAL REQUIREMENTS OR LEONTIEF INVERSE MATRIX, 1983

Sector	1 Rice	2 Corn	3 Coconut	4 Sugar	5 Oth Crps	6 Lsk Pol	7 Ag Serv	8 Fishing	9 Logging
1 Rice	1.068472	0.034101	0.039653	0.034305	0.030962	0.070892	0.030472	0.031896	0.020373
2 Corn	0.014198	1.027672	0.016283	0.014084	0.012716	0.029735	0.012516	0.012865	0.008358
3 Coconut	0.015434	0.015221	1.156144	0.015312	0.013821	0.031478	0.013601	0.014255	0.009091
4 Sugar	0.009105	0.008979	0.010440	1.041934	0.008152	0.018762	0.008023	0.008411	0.005365
5 Oth Crps	0.065097	0.063983	0.074182	0.064646	1.103592	0.075485	0.057210	0.054466	0.038898
6 Lsk Pol	0.057608	0.056825	0.066094	0.057122	0.051464	1.225979	0.050742	0.050367	0.033969
7 Ag Serv	0.026830	0.008908	0.005747	0.010840	0.002603	0.004043	1.052423	0.001162	0.000751
8 Fishing	0.056530	0.055840	0.064924	0.056105	0.050597	0.058322	0.049765	1.058729	0.033353
9 Logging	0.013420	0.012546	0.015446	0.013385	0.011277	0.013154	0.011307	0.012614	1.065890
10 Mining	0.035624	0.032113	0.034416	0.035326	0.028182	0.034189	0.028333	0.034854	0.026276
11 FF Proc	0.288823	0.284822	0.331188	0.286532	0.258584	0.598052	0.254509	0.267192	0.170204
12 Manuf	0.358385	0.326983	0.356996	0.358059	0.291672	0.359080	0.294971	0.363272	0.278129
13 Fer Per	0.114203	0.072557	0.029487	0.096199	0.031145	0.014527	0.020977	0.010734	0.005085
14 Const	0.003845	0.003611	0.004198	0.003732	0.003293	0.005282	0.003398	0.003129	0.002330
15 EleGasWa	0.032149	0.029804	0.033265	0.032346	0.026190	0.047468	0.029889	0.026765	0.019353
16 RR Trans	0.026155	0.023535	0.026584	0.032669	0.021113	0.040361	0.019797	0.026735	0.021345
17 OI trans	0.015470	0.019872	0.022098	0.016576	0.011290	0.016399	0.009840	0.016600	0.013671
18 Oth Trans	0.055257	0.053334	0.061523	0.054251	0.048218	0.049646	0.047631	0.049900	0.032997
19 Serv	0.402256	0.366011	0.428881	0.382924	0.323649	0.434520	0.359538	0.329911	0.244001
20 Housld	0.748957	0.740744	0.862462	0.743775	0.675487	0.645580	0.661735	0.574968	0.436370
BUS. MULTIPLIER	3.407818	3.237461	3.640014	3.350124	3.004007	3.772955	3.016675	2.948825	2.465807

Sector	10 Mining	11 FF Proc	12 Manuf	13 Fer Per	14 Const	15 EleGasWa	16 RR Trans	17 OI trans	18 Oth Trans
1 Rice	0.007400	0.171888	0.015800	0.011680	0.020209	0.020024	0.026198	0.035005	0.027480
2 Corn	0.003033	0.064183	0.006377	0.004761	0.008261	0.008166	0.010725	0.013834	0.011193
3 Coconut	0.003301	0.075145	0.007027	0.005203	0.009010	0.008922	0.011684	0.015486	0.012240
4 Sugar	0.001949	0.045598	0.004167	0.003078	0.005324	0.005277	0.006900	0.009249	0.007241
5 Oth Crps	0.014604	0.106201	0.041930	0.025701	0.042217	0.043884	0.053141	0.050818	0.052667
6 Lsk Pol	0.012295	0.205806	0.025235	0.019318	0.033392	0.033019	0.043411	0.074067	0.044918
7 Ag Serv	0.000273	0.005868	0.000597	0.000435	0.000750	0.000745	0.000970	0.001286	0.001012
8 Fishing	0.012062	0.075663	0.025404	0.018979	0.032879	0.032527	0.042648	0.072935	0.042731
9 Logging	0.006382	0.012855	0.039332	0.015523	0.024593	0.033425	0.021038	0.013673	0.019478
10 Mining	1.014298	0.033449	0.134846	0.064799	0.080616	0.083159	0.064774	0.039987	0.059149
11 FF Proc	0.061842	1.456655	0.132392	0.097729	0.168966	0.167518	0.218981	0.294340	0.229896
12 Manuf	0.152147	0.349649	1.456853	0.542766	0.666677	0.894753	0.693443	0.425607	0.632231
13 Fer Per	0.001867	0.030634	0.004183	1.007963	0.005145	0.005164	0.006641	0.007868	0.007032
14 Const	0.002889	0.003733	0.002714	0.002029	1.005206	0.003776	0.003807	0.002853	0.004656
15 EleGasWa	0.020615	0.047687	0.032659	0.038051	0.039577	1.063296	0.036937	0.027529	0.040866
16 RR Trans	0.007734	0.036461	0.024751	0.021125	0.024083	0.032610	1.023950	0.024674	0.028938
17 OI trans	0.002872	0.013140	0.010123	0.008654	0.010147	0.012618	0.010574	1.008264	0.011882
18 Oth Trans	0.011597	0.043438	0.023325	0.020464	0.032840	0.032899	0.040830	0.043970	1.103498
19 Serv	0.102792	0.397635	0.242424	0.214398	0.292480	0.333057	0.375870	0.300104	0.406015
20 Housld	0.155804	0.572938	0.279191	0.227157	0.412636	0.394373	0.543632	0.464113	0.539865
BUS. MULTIPLIER	1.595757	3.748625	2.509332	2.349811	2.915010	3.209211	3.236154	2.925663	3.282989

TABLE C-6. TOTAL REQUIREMENTS OR LEONTIEF INVERSE MATRIX, 1983 (Continued)

Sector	19 Serv	20 Housld
1 Rice	0.031293	0.069432
2 Corn	0.012899	0.028521
3 Coconut	0.013933	0.030999
4 Sugar	0.008248	0.018279
5 Oth Crps	0.055140	0.130153
6 Lsk Pol	0.055287	0.115166
7 Ag Serv	0.001152	0.002557
8 Fishing	0.050951	0.113409
9 Logging	0.012304	0.023417
10 Mining	0.032393	0.055782
11 FF Proc	0.261920	0.579605
12 Manuf	0.338752	0.581978
13 Fer Per	0.008529	0.017168
14 Const	0.009050	0.006818
15 EleGasWa	0.049440	0.054835
16 RR Trans	0.022006	0.035815
17 OI trans	0.012563	0.019377
18 Oth Tran	0.050479	0.107386
19 Serv	1.439159	0.652006
20 Housld	0.596944	1.525349
BUS. MULTIPLIER	3.062443	4.168252

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TABLE C-7. BUSINESS AND IMPORT MULTIPLIERS BY SECTOR, 1983

Sector	BUSINESS MULTIPLIER	RANK (Decend)	IMPORT MULTIPLIER	RANK (Acend)
1 Rice	3.41	5	0.20	8
2 Corn	3.24	8	0.32	16
3 Coconut	3.64	4	0.17	4
4 Sugar	3.35	6	0.19	6
5 Oth Crps	3.00	13	0.25	10
6 Lsk Pol	3.77	2	0.18	5
7 Ag Serv	3.02	12	0.15	2
8 Fishing	2.95	14	0.16	3
9 Logging	2.47	18	0.13	1
10 Mining	1.60	20	0.73	20
11 FF Proc	3.75	3	0.21	9
12 Manuf	2.51	17	0.49	18
13 Fer Per	2.35	19	0.54	19
14 Const	2.92	16	0.26	11
15 EleGasWa	3.21	10	0.32	15
16 RR Trans	3.24	9	0.26	12
17 OI trans	2.93	15	0.38	17
18 Oth Trans	3.28	7	0.28	14
19 Serv	3.06	11	0.19	7
20 Housld	4.17	1	0.27	13

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TABLE C-8. EMPLOYMENT MULTIPLIERS BY SECTOR, 1983

Sector	Total Output (000) (a)	Annual Employment (000) (b)	Direct Output Effect (c)	Employment: Direct Effect (d)	Employment: Total Effect (e)	Employment: Multiplier (f)	Multiplier Rank
1 Rice	15920100	1824	8728	0.00011457	0.00016188	1.4130	16
2 Corn	5960600	755	7895	0.00012666	0.00016792	1.3257	19
3 Coconut	6557700	746	8790	0.00011375	0.00017463	1.5352	14
4 Sugar	4110400	401	10250	0.00009755	0.00014164	1.4520	15
5 Oth Crps	28333200	3022	9376	0.00010665	0.00014620	1.3708	17
6 Lsk Pol	25611200	1558	16439	0.00006083	0.00012452	2.0470	12
7 Ag Serv	577700	68	8496	0.00011770	0.00015893	1.3502	18
8 Fishing	21559800	1302	16559	0.00006039	0.00009596	1.5891	13
9 Logging	9335700	167	55902	0.00001788	0.00004336	2.4241	10
10 Mining	30303300	102	297091	0.00000336	0.00001309	3.8919	5
11 FF Proc	129467700	693	186822	0.00000535	0.00009376	17.5180	1
12 Manuf	231642900	1179	196474	0.00000508	0.00002921	5.7399	4
13 Fer Per	3841700	14	274407	0.00000364	0.00002292	6.2896	3
14 Const	54558600	697	78276	0.00001277	0.00004148	3.2475	7
15 EleGasWa	15036600	78	192777	0.00000518	0.00003684	7.1030	2
16 RR Trans	11992400	286	41931	0.00002384	0.00005926	2.4849	9
17 OI trans	5626600	87	64674	0.00001546	0.00005299	3.4276	6
18 Oth Trans	23043000	395	58337	0.00001714	0.00005474	3.1934	8
19 Serv	198449000	5838	33993	0.00002941	0.00006784	2.3063	11

Notes: (a) Total annual sales (1,000 pesos) from the transactions table (table C-3).

(b) Total annual employment (1,000 workers).

(c) Annual output (pesos) per worker, column a, divided by column b.

(d) Estimated change in employment per peso of additional output, the inverse of column c.

(e) The economy-wide change in employment per unit of sector output change (the sum of the products of the sector total output requirements [table C-6] and direct employment requirements, column d).

(f) The economy-wide change in employment per unit of sector employment change (column e divided by column d).

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TABLE C-9. INDIRECT INPUT REQUIREMENTS MATRIX, 1983

Sector	1 Rice	2 Corn	3 Coconut	4 Sugar	5 Oth Crps	6 Lsk Pol	7 Ag Serv	8 Fishing	9 Logging
1 Rice	0.035689	0.034101	0.039653	0.034305	0.030962	0.070592	0.030472	0.031896	0.020373
2 Corn	0.014198	0.014185	0.015283	0.014084	0.012716	0.027622	0.012516	0.012865	0.008358
3 Coconut	0.015434	0.015221	0.034536	0.015312	0.013821	0.031260	0.013601	0.014189	0.009091
4 Sugar	0.009105	0.008979	0.010440	0.010080	0.008152	0.018762	0.008023	0.008411	0.005365
5 Oth Crps	0.065097	0.063983	0.074182	0.064646	0.060157	0.072939	0.057210	0.053216	0.038898
6 Lsk Pol	0.057608	0.056825	0.066094	0.057122	0.051464	0.110718	0.050742	0.050367	0.033969
7 Ag Serv	0.003318	0.001728	0.002165	0.002021	0.001272	0.002749	0.003626	0.001162	0.000751
8 Fishing	0.056530	0.055840	0.064924	0.056100	0.050597	0.058322	0.049765	0.045217	0.033353
9 Logging	0.013420	0.012546	0.014229	0.013385	0.011265	0.013154	0.011307	0.012611	0.012611
10 Mining	0.035624	0.032113	0.034416	0.035326	0.028182	0.034189	0.028333	0.034393	0.026276
11 FF Proc	0.288823	0.284822	0.331188	0.286532	0.258584	0.349908	0.254509	0.232891	0.170204
12 Manuf	0.349101	0.322239	0.351619	0.343348	0.279223	0.329287	0.277124	0.274964	0.208055
13 Fer Per	0.012886	0.009732	0.012361	0.011857	0.008828	0.014527	0.008306	0.007628	0.005085
14 Const	0.003845	0.003611	0.004198	0.003732	0.003233	0.004057	0.003398	0.003129	0.002330
15 EleGasWa	0.032149	0.029804	0.033265	0.031307	0.026098	0.036550	0.026704	0.025738	0.018781
16 RR Trans	0.020314	0.019036	0.021927	0.020169	0.016948	0.025517	0.016855	0.016926	0.012636
17 OI trans	0.010693	0.010158	0.012703	0.010545	0.009053	0.011388	0.008992	0.008599	0.006680
18 Oth Trans	0.053928	0.052896	0.061390	0.053368	0.047984	0.047764	0.047302	0.042129	0.031605
19 Serv	0.349015	0.333493	0.388139	0.342539	0.299783	0.355540	0.301965	0.276941	0.207270
20 Housld	0.325876	0.292451	0.391749	0.313452	0.269691	0.414169	0.279011	0.262943	0.198605
TOTAL	1.752653	1.653761	1.965463	1.719236	1.488015	2.029315	1.489758	1.416218	1.050294

Sector	10 Mining	11 FF Proc	12 Manuf	13 Fer Per	14 Const	15 EleGasWa	16 RR Trans	17 OI trans	18 Oth Trans
1 Rice	0.007400	0.058052	0.015800	0.011680	0.020209	0.020024	0.026198	0.035005	0.027480
2 Corn	0.003033	0.021904	0.006377	0.004761	0.008261	0.008166	0.010725	0.013834	0.011193
3 Coconut	0.003301	0.030152	0.007023	0.005203	0.009010	0.008922	0.011684	0.015486	0.012240
4 Sugar	0.001949	0.015330	0.004167	0.003078	0.005324	0.005277	0.006900	0.009249	0.007241
5 Oth Crps	0.014604	0.063706	0.030044	0.025701	0.042217	0.043884	0.053141	0.048308	0.052667
6 Lsk Pol	0.012295	0.090329	0.025235	0.019318	0.033392	0.033019	0.043411	0.053626	0.044918
7 Ag Serv	0.000273	0.005868	0.000597	0.000435	0.000750	0.000745	0.000970	0.001286	0.001012
8 Fishing	0.012062	0.050279	0.023066	0.018979	0.032879	0.032527	0.042648	0.039124	0.042731
9 Logging	0.004991	0.012568	0.015026	0.015523	0.019979	0.026077	0.021038	0.013673	0.019478
10 Mining	0.014298	0.033448	0.042592	0.050499	0.062157	0.083159	0.064774	0.039986	0.059149
11 FF Proc	0.061842	0.301716	0.119179	0.097729	0.168966	0.167518	0.218981	0.211412	0.220500
12 Manuf	0.093964	0.309925	0.226063	0.227947	0.307745	0.374817	0.345969	0.265968	0.354508
13 Fer Per	0.001867	0.030634	0.004161	0.003052	0.005145	0.005164	0.006641	0.007853	0.006661
14 Const	0.000959	0.003690	0.002314	0.001962	0.002825	0.003118	0.003494	0.002834	0.003681
15 EleGasWa	0.008248	0.032637	0.020004	0.018556	0.025746	0.030085	0.030169	0.025112	0.030895
16 RR Trans	0.005260	0.024257	0.012877	0.012323	0.017288	0.020427	0.019981	0.017377	0.020142
17 OI trans	0.002598	0.012093	0.005985	0.005502	0.008093	0.009196	0.009679	0.008264	0.009688
18 Oth Trans	0.011462	0.042886	0.021578	0.018013	0.031102	0.030731	0.040341	0.034973	0.043957
19 Serv	0.080589	0.328643	0.172539	0.153393	0.235937	0.255312	0.292397	0.249255	0.299647
20 Housld	0.078130	0.492528	0.202743	0.171947	0.24[illegible]30	0.278436	0.287195	0.269040	0.309669
TOTAL	0.419126	1.960645	0.957330	0.865599	1.278054	1.436603	1.536336	1.361664	1.577656

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TABLE C-9. INDIRECT INPUT REQUIREMENTS MATRIX, 1983 (Continued)

Sector	19 Serv	20 Housld
1 Rice	0.031293	0.068676
2 Corn	0.012720	0.026382
3 Coconut	0.013930	0.030274
4 Sugar	0.008248	0.018183
5 Oth Crps	0.054153	0.069959
6 Lsk Pol	0.051153	0.094288
7 Ag Serv	0.001152	0.002557
8 Fishing	0.046590	0.052899
9 Logging	0.012293	0.018632
10 Mining	0.032244	0.054752
11 FF Proc	0.240915	0.295606
12 Manuf	0.289078	0.392313
13 Fer Per	0.007658	0.015663
14 Const	0.003764	0.005056
15 EleGasWa	0.028669	0.042067
16 RR Trans	0.017479	0.027841
17 OI trans	0.009062	0.012435
18 Oth Trans	0.044125	0.045872
19 Serv	0.297815	0.369446
20 Housld	0.293686	0.525349
TOTAL	1.496029	2.168252

TABLE C-10. DECOMPOSITION OF TOTAL REQUIREMENTS, 1983

Sector	Direct	Indirect	Total (1+direct+ indirect)
1 Rice	0.6552	1.7527	3.4078
2 Corn	0.5837	1.6538	3.2375
3 Coconut	0.6746	1.9655	3.6400
4 Sugar	0.6309	1.7192	3.3501
5 Oth Crps	0.5160	1.4880	3.0040
6 Lsk Pol	0.7436	2.0293	3.7730
7 Ag Serv	0.5269	1.4898	3.0167
8 Fishing	0.5326	1.4162	2.9488
9 Logging	0.4155	1.0503	2.4658
10 Mining	0.1766	0.4191	1.5958
11 FF Proc	0.7880	1.9606	3.7486
12 Manuf	0.5520	0.9573	2.5093
13 Fer Per	0.4842	0.8656	2.3498
14 Const	0.6370	1.2781	2.9150
15 EleGasWa	0.7726	1.4366	3.2092
16 RR Trans	0.6998	1.5363	3.2362
17 OI trans	0.5640	1.3617	2.9257
18 Oth Trans	0.7053	1.5777	3.2830
19 Serv	0.5664	1.4960	3.0624
20 Housld	1.0000	2.1683	4.1683

TABLE C-11. FORWARD AND BACKWARD LINKAGES, 1983

Sector	FORWARD LINKAGE INDEX	RANK (Decend)	BACKWARD LINKAGE INDEX	RANK (Decend)
1 Rice	0.58128	10	1.10201	5
2 Corn	0.42698	16	1.04692	8
3 Coconut	0.47773	14	1.17710	4
4 Sugar	0.39920	18	1.08335	6
5 Oth Crps	0.71596	6	0.97143	13
6 Lsk Pol	0.74767	5	1.22009	2
7 Ag Serv	0.36507	19	0.97552	12
8 Fishing	0.64816	7	0.95358	14
9 Logging	0.44983	15	0.79739	18
10 Mining	0.63141	9	0.51603	20
11 FF Proc	2.07284	4	1.21222	3
12 Manuf	3.14402	2	0.81146	17
13 Fer Per	0.48413	13	0.75987	19
14 Const	0.34936	20	0.94265	16
15 EleGasWa	0.55903	11	1.03779	10
16 RR Trans	0.49167	12	1.04650	9
17 OI trans	0.40811	17	0.94609	15
18 Oth Trans	0.63494	8	1.06164	7
19 Serv	2.59596	3	0.99032	11
20 Housld	3.81654	1	1.34792	1

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ANNEX D

A CRITIQUE OF FOOD AND FEEDGRAIN ANALYSES

by

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Rice and corn are the most important commodities in the Philippines' food security system. During the 1970's rice production expanded rapidly in the wake of the Green Revolution. By the end of the decade, the Philippines enjoyed rice self-sufficiency and a modest rice export market. However, pro-consumer rice pricing policies begun in the early 1970's began to nullify the gains from the Green Revolution by the early 1980's. By the mid-1980's the Philippines' food security in rice was again put in jeopardy as the country became an intermittent rice importer.

In the corn market, there have been fewer counter-productive policies, but there are also significant gaps between domestic production and demand. The livestock market has proved to be an important corn user, and has thereby drawn much more private sector innovation into the market than in the case of rice.

The current rice and corn gaps have raised serious questions about the appropriate agricultural strategy the Philippines should pursue over the next decade. To support increased food and feed grain production, USAID and the Department of Agriculture (DA) have sponsored the Accelerated Agricultural Production Project (AAPP). This annex reviews the main thrust of food and feed grain analyses conducted under the AAPP to assess their quality and relevance to the current policy situation and to recommend new courses of action to improve the food and feed grain component of the Philippines' food security program.

A. The Supply-Demand Situation

To better understand the corn and rice market situations, a set of supply and utilization tables were constructed for rice and corn. The trends and relationships revealed in these tables help place the food and feed-grain gap in better perspective and suggest some critical policy issues that should be addressed through additional analyses and the formulation and implementation of new policies.

1. Rice

Table D-1 summarizes rice supply and utilization during 1969-1989, based on modifications of data obtained from the DA, AAPP rice and corn studies (Daly), and an IFPRI study for the Asian Development Bank (Rosegrant, et.al.). The annual gap, defined as domestic output, minus exports, seed, feed, waste and food use, reached a deficit of about 600,000 tons during the 1971-72 crop year, then moved to a peak surplus of about 380,000 tons in 1977-78, before proceeding into another deficit period. In 1983-84, the deficit was about 500,000 tons, although only 100,000 tons were imported because of sizable carry-over stocks.

Table D-1. Rice Supply and Use, 1969-1989

Year	Begin. Stocks	Output	Import	Total Supply	Export	Domestic Use: Seed	Domestic Use: Feed & Waste	Domestic Use: Food Use Total	Domestic Use: Food Use Per Cap.	Gap (a)	Ending Stocks
	Million Tons								(Kg)	Million Tons	
69/70	0.94	3.28		4.22		0.16	0.23	3.06	84	-0.17	0.77
70/71	0.77	3.38	0.02	4.17		0.16	0.24	3.26	87	-0.28	0.51
71/72	0.51	3.25	0.63	4.39		0.17	0.22	3.47	90	-0.61	0.53
72/73	0.53	2.84	0.24	3.61		0.16	0.20	2.95	75	-0.47	0.30
73/74	0.30	3.62	0.31	4.23		0.18	0.25	3.04	75	0.15	0.76
74/75	0.76	3.70	0.24	4.70		0.18	0.26	3.43	82	-0.17	0.83
75/76	0.83	4.05	0.07	4.95		0.18	0.29	3.82	89	-0.24	0.66
76/77	0.66	4.28	0.02	4.96		0.18	0.30	3.78	86	0.02	0.70
77/78	0.70	4.61	0.01	5.32	0.05	0.18	0.30	3.70	82	0.38	1.09
78/79	1.09	4.85		5.94	0.04	0.18	0.33	3.96	85	0.34	1.43
79/80	1.43	5.10		6.53	0.24	0.18	0.35	4.23	89	0.10	1.53
80/81	1.53	5.04		6.57	0.18	0.17	0.34	4.54	93	-0.19	1.34
81/82	1.34	5.31		6.65	0.01	0.17	0.35	4.62	92	0.16	1.50
82/83	1.50	5.04		6.54	0.01	0.16	0.33	4.59	89	-0.05	1.45
83/84	1.45	5.13	0.10	6.68	0.03	0.17	0.33	5.10	96	-0.50	1.05
84/85	1.05	5.36	0.38	6.79	0.07	0.16	0.35	5.15	95	-0.38	1.05
85/86	1.05	5.95	0.34	7.34		0.16	0.39	5.20	93	0.20	1.60
86/87	1.60	5.86		7.46	0.11	0.17	0.38	5.32	93	-0.13	1.47
87/88	1.47	5.68	0.25	7.40		0.17	0.37	5.36	91	-0.22	1.50
88/89	1.50	5.96	0.19	7.65	0.02	0.17	0.38	5.61	93	-0.22	1.47
Growth Rates (%)											
69/70-88/89		3.67						3.47			
69/70-79/80		5.12						3.01			
80/81-88/89		2.21						2.69			

Sources: Adapted from reports by Daly (Apr-Nov 1988, Aug-Dec 1988), Rosegrant, et. al., and Daly estimates for 88/89.

(a) The gap is estimated as Output minus Exports, Seed, Feed, Waste and Food.

Since 1983-84, the gap has been generally in deficit, with current trends pointing toward a chronic deficit of at least 200,000 tons.

The trends in production and utilization over 1969-1989 show a serious rice deficit problem is re-emerging. Over the entire period, production grew slightly faster than food use, 3.67 versus 3.47 percent per annum, but those trends mask some serious declines in productivity. During 1969-70 to 1979-80, output grew at 5.12 percent, while food consumption grew at 3.01 percent. But that trend toward export status was short-lived. During the period 1980-81 to 1988-89, production grew at only 2.21 percent, while food consumption grew at 2.69 percent. According to DA statistics, during calendar years 1980 to 1987, palay production grew at an annual rate of 2.13 percent, while harvested area declined by an average annual rate of 0.46 percent. Declining acreage was offset by an annual increase in yield of 2.69 percent. Still, the FAO statistics for 1987 indicate the Philippines has one of the lowest rice yields in Asia. At 2.64 tons per hectare, the Philippines leads Pakistan (2.53 tons),

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Bangladesh (2.38 tons), India (1.99 tons), and Thailand (1.96 tons), but follows Vietnam (2.68 tons), Burma (2.95 tons), and Indonesia (3.92 tons). China, South Korea and Japan have even higher yields. The world average rice yield for 1987 was 2.68 tons per hectare.

Since many of the agricultural sector's current productivity problems began at the end of the 1970's, it is useful to review the trends in production and use since then. In table D-2, rice production and use data for 1980-1989 from table D-1 are forecast through 1999-2000, assuming a linear trend. If the estimated rice forecast equations are accepted as a practical extension of market conditions over the last nine years, the gap is expected to rise at about 12,000 tons annually from a deficit of 200,000 tons in 1989-90 to a deficit of 320,000 tons in 1999-2000.

2. Corn

Corn supply and utilization estimates over the period 1969-70 to 1988-89 are summarized in table D-3. The Philippines is in a chronic deficit situation, although the gap has declined from a high of 339,000 tons in 1982-83 to recent deficits on the order of 60,000 tons. Unlike rice, corn is routinely imported every year, with the import levels correlating reasonably well with the estimated annual gaps.

Trends in corn production and consumption are vastly different from the rice market. During 1969-70 to 1988-89, production grew at an annual rate of 4.33 percent. During 1969-70 to 1979-80, production grew at 5.34 per annum. During 1980-81 to 1988-89, production grew at an annual rate of 4.88 percent. According to DA statistics, during calendar years 1980 to 1987, corn production grew at an annual rate of 4.60 percent, while harvested area increased at 1.86 percent per year, and yield increased at 2.74 percent per year.

Among Asian countries, the Philippines has a lower corn yield than any other country except Bangladesh. According to FAO statistics for 1987, the eight lowest yields per hectare, beginning with the lowest were: Bangladesh (0.86 tons), Philippines (1.14 tons), India (1.23 tons), Pakistan (1.24 tons), Vietnam (1.38 tons), Indonesia (1.71 tons), Burma (1.84 tons) and Thailand (2.02 tons). The average world corn yield for 1987 was 3.58 tons per hectare.

Consumption has increased steadily over the last two decades, but feed use surpassed relatively static food usage in the early 80's. During 1969-70 to 1988-89, feed consumption grew at an annual rate of 8.07 percent, while food use grew at only 1.02 percent per annum. During 1969-70 to 1979-80, feed use grew at an annual rate of 8.63 percent, while food use grew at 3.29 percent.

Table D-2. Rice Production, Use and Gap, 1980-2000

Year	Production	Use	Gap
	Million Tons		
80/81	5.04	5.23	-0.19
81/82	5.31	5.15	0.16
82/83	5.04	5.09	-0.05
83/84	5.13	5.63	-0.50
84/85	5.36	5.74	-0.38
85/86	5.95	5.75	0.20
86/87	5.86	5.99	-0.13
87/88	5.68	5.90	-0.22
88/89	5.96	6.18	-0.22
	ACTUAL		
	FORECAST		
89/90	6.09	6.29	-0.20
90/91	6.21	6.42	-0.22
91/92	6.33	6.56	-0.23
92/93	6.45	6.69	-0.24
93/94	6.57	6.82	-0.25
94/95	6.69	6.96	-0.26
95/96	6.81	7.09	-0.27
96/97	6.94	7.22	-0.29
97/98	7.06	7.35	-0.30
98/99	7.18	7.49	-0.31
99/00	7.30	7.62	-0.32

NOTES: Production and Use were forecast from 80/81 - 88/89 data with the linear trend model,

$$Y = a + bT + e,$$

where,

Y is annual production or use,
a is the constant term,
b is the slope, or annual rate of the trend,
T is the trend index (1,2 ..... t), and
e is the forecast error (±)

Estimated Forecast Equations:

		R-square	Forecast Error
Production:	$Y = 4.875 + 0.121T$ (0.03)	0.74	0.21
Use:	$Y = 4.964 + 0.133T$ (0.02)	0.87	0.15

Table D-3. Corn Supply and Use, 1969-1989

Year	Begin. Stocks	Output	Import	Total Supply	Export	Domestic Use: Seed	Feed	Other Non-food	Food Use: Total	Food Use: Per Cap.	Gap (a)	Ending Stocks
	Thousand Tons									(Kg)	Thousand Tons	
69/70	46	2,017	9	2,072	0	43	653	79	1,207	33	35	90
70/71	90	2,012	31	2,133	0	43	671	81	1,253	33	-36	85
71/72	85	2,024	193	2,302	0	43	754	87	1,257	33	-117	161
72/73	161	1,843	90	2,094	0	40	684	80	1,267	32	-228	23
73/74	23	2,258	91	2,372	0	49	738	90	1,317	32	64	178
74/75	178	2,514	159	2,851	0	54	832	108	1,709	41	-189	148
75/76	148	2,717	54	2,919	0	58	884	111	1,822	42	-158	44
76/77	44	2,775	160	2,979	0	60	1,123	113	1,646	37	-167	37
77/78	37	2,796	134	2,967	0	60	1,205	113	1,556	34	-138	33
78/79	33	3,090	56	3,179	0	66	1,274	121	1,556	33	73	162
79/80	162	3,123	93	3,378	0	67	1,559	128	1,553	33	-184	71
80/81	71	3,110	351	3,532	0	67	1,644	134	1,553	32	-288	133
81/82	133	3,290	275	3,698	0	71	1,756	141	1,539	31	-217	192
82/83	192	3,126	406	3,724	0	67	1,777	142	1,479	29	-339	259
83/84	259	3,346	321	3,926	0	72	1,938	149	1,416	27	-230	351
84/85	351	3,439	345	4,135	0	74	2,026	157	1,445	27	-263	433
85/86	433	3,922	38	4,393	0	84	2,246	167	1,478	26	-53	418
86/87	418	4,015	12	4,445	0	86	2,282	169	1,623	28	-145	285
87/88	285	4,382	136	4,803	0	94	2,405	183	1,741	29	-40	381
88/89	381	4,422	20	4,823	0	[illegible]	2,654	183	1,538	25	-49	352
Growth Rates (%)												
69/70-88/89		4.33					8.07		1.02			
69/70-79/80		5.34					8.63		3.29			
80/81-88/89		4.88					5.85		0.93			

Sources: Adapted from Daly and Rosegrant et. al. estimates.

(a) The gap is estimated as Output minus Exports, Seed, Feed, Other Non-Food, and Food.

To compare corn trends with rice, in table D-4, corn production and use data for 1980-1989 from table D-3 are forecast through 1999-2000, again assuming a linear trend. If the estimated corn forecast equations are accepted as a practical extension of market conditions over the last nine years, the annual increase in production will exceed the annual increase in use by about 34,000 tons. This net annual gain will cause the deficit to disappear in the early 1990's, with a surplus of 330,000 tons expected in 1999-2000. While there are no convenient alternatives to the linear trend model, it is very doubtful that corn will develop a significant export market by the end of the decade. The strong productivity gains have been stimulated by: a strong derived demand for livestock and poultry feed; quick response by private sector seed companies to growing profit opportunities; and relatively little market regulation, compared to rice. Although acreage and yield trends have been positive, the corn market has grown so fast that future growth will be dampened by increased land competition from other crops and increasing strains on an already overburdened rural transportation system.

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Table D-4. Corn Production, Use and Gap, 1980-2000

Year	Production	Use	Gap
	Million Tons		
80/81	3.11	3.40	-0.29
81/82	3.29	3.51	-0.22
82/83	3.13	3.46	-0.34
83/84	3.35	3.58	-0.23
84/85	3.44	3.70	-0.26
85/86	3.92	3.98	-0.05
86/87	4.02	4.16	-0.14
87/88	4.38	4.42	-0.04
88/89	4.42	4.47	-0.05
	ACTUAL		
	FORECAST		
89/90	4.58	4.59	-0.01
90/91	4.76	4.74	0.02
91/92	4.94	4.88	0.06
92/93	5.12	5.03	0.09
93/94	5.30	5.18	0.13
94/95	5.49	5.32	0.16
95/96	5.67	5.47	0.20
96/97	5.85	5.62	0.23
97/98	6.03	5.77	0.26
98/99	6.21	5.91	0.30
99/00	6.39	6.06	0.33

NOTES: Production and Use were forecast from 80/81 - 88/89 data with the linear trend model,

$$Y = a + bT + e,$$

where,

Y is annual production or use,
a is the constant term,
b is the slope, or annual rate of the trend,
T is the trend index (1,2 ..... t), and
e is the forecast error (±)

Estimated Forecast Equations:

		R-square	Forecast Error
Production:	$Y = 2.765 + 0.181T$ (0.216)	0.91	0.167
Use:	$Y = 3.117 + 0.147T$ (0.149)	0.93	0.116

B. Price Policies

Rosegrant, et. al., have documented the declining competitiveness of rice and corn due to domestic prices lagging behind rising world prices. In 1985, rice and corn were competitive in world markets, but subsequent price support increases have not kept pace with rising world prices. In general, government policies held farm prices low prior to 1984, when the Marcos administration finally allowed quicker farm price hikes to gain short-term support in a rapidly deteriorating political situation.

1. Rice

Rice price supports were held at a remarkably steady rate of about 12.5 percent per annum over the 1979-1987 period. During the same period, the Consumer Price Index increased at an annual rate of about 14.3 percent. During 1983-1987, the CPI increased at an annual rate of 16.5 percent. Food prices increased at about 13.6 percent per annum during 1979-1987, and at about 16.6 percent per year during 1983-1987. During 1979-1987, wholesale palay prices increased at about 12.8 percent per annum, and at about 15.6 percent per year during 1983-1987.

While rice is the most important crop in the country, there is surprisingly little rice market analysis that has any relevance to food security issues. For example, the rice supply-demand gap is a major policy issue because rising deficits require costly imports for a government already struggling with deficit financing. However, there appears to be no interest in evaluating the supply-demand situation with respect to the deficit to estimate the equilibrium price necessary to remove the deficit (equate supply with demand). If Bouis's retail rice demand elasticity estimate of -0.6 (IFPRI study for ADB, cited by Wallace in the AAPP/AYC study) and Daly's wholesale rice supply estimate of 0.28 are assumed, a simple model can be built to evaluate the 1988 rice market. During that year, the retail price was P7.58 per kg. and the retail quantity demanded, based on consumption trends, was estimated at 6.16 million tons. In the wholesale market, the price was P6.82 per kg. and the quantity supplied was estimated at 5.96 million tons, resulting in a deficit of 200,000 tons. These market assumptions imply a retail supply and demand system as follows:

Demand: $P = 20.21 - 2.05Qd$
Supply: $P = -16.78 + 4.08Qs$

and at equilibrium, where $Qd = Qs$,

$P = 7.85$ (3.6% above the actual price),

and

$Q = 6.03$ (1.2% above the actual quantity)

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The Daly supply elasticity estimate seems quite plausible when compared with regional estimates for staple cereals. However, Bouis's demand elasticity seems much too elastic -- if rice is the necessity everyone claims it is, demand theory would suggest a lower elasticity, as has been found in other countries in the region. If the rice demand elasticity is more in the range of -0.3. then the equilibrium price required to end the deficit would be higher -- on the order of a 5.2 percent increase, instead of the 3.6 percent increase predicted with an elasticity of -0.6. The point to stress in this exercise is this: if market price increases of only 3-5 percent are required to end the rice deficit is there really enough political opposition to block such action? It would appear that policy analysts, and certainly the National Food Authority (NFA), have been conspicuous in avoiding this question.

The solution to the rice pricing question is somewhat more complicated than might be suggested from the above example because of the NFA's role as a monopoly seller of imported rice. This policy allows the NFA much more control over the market than the quantity imported implies, because the NFA openly admits that it uses the threat of imports to hold down domestic prices. Its actions therefore create such high risk and uncertainty within the private sector rice market that prices remain soft because of a lack of competition.

2. Corn

Corn pricing has followed a pattern similar to rice. During 1979-1987, corn support prices increased about 13.3 percent per annum, and about 14.1 percent per year during 1983-1987. Wholesale corn prices increased 14.6 percent per annum during 1979-87. However, during 1983-87, wholesale corn prices increased 18.6 percent per year, compared to wholesale palay price increases of 15.6 percent.

Corn has enjoyed much less government control than rice, but the NFA currently also has monopoly import privileges for corn. Because of the large poultry market, the strong poultry derived demand for corn has served to boost private sector corn development and draw the feed industry into more vigorous dialogues with the government over import policies.

C. The AAPP Rice Price Stabilization Study

During 1989, AYC Consultants, Inc. conducted a major study of rice price stabilization under the AAPP in collaboration with USAID and the DA. Comments on the study are addressed to issues concerning the study's objectives, the adequacy of analytical results and the need for additional analysis.

1. Study Objectives

It is not clear what objectives AYC was charged to address in the study. The title stresses "rice price stabilization", but there is very little emphasis on stabilization issues in the report.

2. Analytical Results

The study produced many valuable insights on the rice market. However many of the sections could have been packaged more effectively in an alternative approach that was more narrowly focuses.

a. Supply and Demand Analysis

The supply and demand analysis is very weak. There was no effort to develop a market model, as in the example above, to cast the rice supply-demand gap issue in a food security framework: what price is needed to close the gap? A slight elaboration on the above model could give some fruitful insights about the welfare effects of new rice technologies and alternative import regimes.

The supply and demand projections are interesting, but they do not reflect much relevance to fundamental market forces. It is useful to know that consumption is increasing faster than production, which implies a long-run divergence leading to declining stocks and eventual net deficits, but the factors affecting demand and supply, particularly those with policy leverage, were not considered.

On an even more basic level, the study failed to integrate supply and demand in a retrospective review of trends in the gap. A supply-utilization table, such as table D-1, would have been useful.

b. The Effects of NFA Market Intervention

Considerable effort was spend estimating the level of market intervention NFA would have to hold in order to maintain a certain release price is to be maintained. The equation,

Int % = 51.07 - 20.5* Pr/Pp, where

Int % is the percentage of the market NFA would have to purchase;
Pr is the desired release price; and
Pp is the procurement price;

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is a correct application of previous experience, based on usual price bands. However, NFA 's normal intervention has been in the range of four to nine percent of the market: is is very doubtful that this equation will be accurate when the required interventions are well above 10 percent.

Furthermore, the study failed to mention NFA's primary method of controlling prices: monopoly control of imports. Admittedly, such an analysis would require much more effort, but that policy is at the heart of much that is wrong with the Philippines' rice market.

b. Fertilizer Subsidies

The study's recommendation that "the price of fertilizer may have to be subsidized initially" is unwarranted. Fertilizer is not a new technology and there are no serious physical distribution problems. Implementation of a fertilizer subsidy would distort the allocation of all other inputs, increase the government's already overburdened financial resources and create a costly program that would be politically difficult to abolish later.

c. Role of Border Prices

The study summary fails to give adequate emphasis to the role of the border price in considering the appropriate price the government should pursue. The statements that border pricing is not administratively and operationally easier (than the present system?) is not correct. Border prices can be estimated easily and governments frequently perform border price trend analyses to estimate a long-term benchmark for domestic prices. However, the final report largely corrects this view, with a reasonable discussion of border pricing mechanisms. Moreover, there is no systematic treatment of market mechanisms except for the NFA intervention model.

d. Price Fluctuations - Price Stabilization

The study devotes considerable attention to price fluctuations, but does not indicate whether they are a serious problem. The extensive analysis of monthly prices is interesting, but it does not lead to any application to price stabilization and buffer stock operations. It would have been useful to have included a short analysis of the implications of seasonality on opportunities for private sector storage. Annual price fluctuations seem to be quite reasonable, as summarized in table D-5. The coefficients of variation (standard deviations divided by the means) for wholesale palay, rice and white corn, and retail rice and corn, are about 0.5, an indication of a potentially serious price variation problem. However, when the mean is divided by the standard error of the trend line fitted to

Table D-5. Average Annual Rice and Corn Prices, 1975-1987

Year	Wholesale: Palay (Spec)	Wholesale: Rice (Spec)	Wholesale: White Corn	Retail: Rice (Spec)	Retail: White Corn
	Price (Pesos/Kg)				
1975	1.08	1.86	0.90	1.94	1.34
1976	1.05	1.99	0.99	2.05	1.34
1977	1.09	2.03	1.01	2.12	1.41
1978	1.06	2.00	1.00	2.09	1.48
1979	1.11	2.12	1.03	2.29	1.46
1980	1.23	2.30	1.18	2.45	1.65
1981	1.42	2.61	1.37	2.72	1.98
1982	1.48	2.76	1.44	2.96	2.13
1983	1.65	2.99	1.57	3.19	2.24
1984	2.62	4.82	2.67	5.10	3.53
1985	3.44	6.51	3.28	7.00	4.52
1986	2.93	5.79	3.04	6.56	4.37
1987	3.08	5.84	3.31	6.61	4.62
Mean	1.79	3.36	1.75	3.62	2.47
Std. Dev.	0.91	1.75	0.95	1.96	1.32
Cof of Var	0.51	0.52	0.54	0.54	0.53
Trend Std. Err.	0.43	0.83	0.42	0.92	0.56
Index of Var	0.24	0.25	0.24	0.25	0.23

Source: Department of Agriculture, Bureau of Agricultural Statistics.

each time series, the ratio (index of variability) is one-half of the coefficient of variation, and well within the range of price variation in normal agricultural markets.

e. Buffer Stocks

The buffer stock analysis does not address important economic efficiency issues concerning the marginal cost of storage, and the interaction of storage costs with rice supply and demand. The study's price band approach reflects the government's genuine concerns about managing prices within politically acceptable limits, but it also presents some formidable administrative problems. The most serious shortcoming of the buffer stock analysis is the lack of analysis on the optimum buffer stock required to maximize net social benefits in the rice market.

3. Needed Additional Analysis

Three important areas need additional research to support improved rice food security policies.

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a. Comprehensive Estimates of Agricultural Commodity Supply and Demand Systems

The AYC study would have benefited from having updated and more comprehensive of agricultural commodity supply and demand elasticities. The systems type of estimation procedures required for these studies were clearly beyond the scope of the AYC study.

b. Use Welfare Analysis to Evaluate Price Stabilization

The government's approach to rice price stabilization is troubling in two senses: it is assumed that the current market is too unstable; and it is assumed that the NFA should have primary or sole responsibility for a comprehensive price stabilization program. However, the available evidence does not suggest that the market is as "unstable" as government officials believe. The only way to resolve this issue is to conduct a comprehensive study of the social costs and benefits of alternative interventions. Dynamic programming has been used in several price stabilization studies to give estimates within a welfare context of the effects of alternative interventions. It is also not evident that the NFA should be responsible for a buffer stock. It has severe budgetary problems, weak analytical capability, and little incentive to operate a buffer stock in the public interest. The private sector's role in grain storage and international trade should be investigated. Its net benefits could far outweigh those under the current NFA program.

c. Detailed Analysis of NFA Interventions

The NFA insists that it is responsible for price stabilization, but it has no operational model that considers the economic forces of supply and demand. It would therefore be useful to conduct a case study of the NFA's rice procurement and import operations to determine how their performance compares with standard measures of market efficiency. It would be particularly helpful to learn how the NFA decides to import, and to measure the effects of those decisions on the market.

D. The Daly Analyses

Rex Daly has considerable experience as an expatriate advisor to the DA. His current work on rice and corn is very useful to the DA's policy formulation process.

1. Analytical Results

His quarterly models on rice and corn have produced plausible results on the structure of the markets. The models are well-specified, given the severe data limitations, to reflect practical applications of econometrics to rice and corn policy

issues. These models would have been useful to the AYC study. Alternative tests of some of the results indicate that the models track well and give valuable insights on supply response. The demand side is weak, but the analytical issues involved in systems estimations of demand are beyond his immediate scope of work. His estimates of stocks are statistically derived from the supply-utilization tables, rather than observed, inventory measures, but the stock levels seem to correlate reasonably well with gap estimates and observed trade (imports).

2. Applications to Food Policy Formulation and Analysis

The DA needs a core staff of policy analysts to exploit Daly's considerable analytical expertise. In the present situation, his efforts are producing good analyses, but there is very little staff for learning his approach to analyses that are unfortunately not covered in the classroom.

The DA should implement a commodity market monitoring program to regularly assess the effects of government interventions, track changes in protection rates over time, and monitor the food and feedgrain gap.

E. Conclusions and Recommendations

The review of current food and feedgrain analyses suggests comments are in order for seven areas.

1. The Future of NFA

In spite of several shortcomings in the AYC rice price stabilization study, it raises serious doubts about the NFA's contributions to rice stabilization. The study documents NFA's slow response time when imports are needed. The NFA budget is clearly too small to support the 15 to 25 percent desired intervention level that is sometimes mentioned. And if the NFA had a larger budget, the AYC study suggests its performance would not necessarily add stability to the market.

The study briefly mentions the NFA-owned-and-operated rice mill complex. It would seem appropriate to privatize these mills in line with the government's long-term privatization goals.

The AYC study did not deal with NFA's monopoly influence in the rice import market. Available evidence suggests that abolishing the NFA import monopoly, or better yet, prohibiting the NFA from any international commodity training would improve competition among grain traders, establish efficient trading links between the private sector and international markets, allow fuller rationalization of domestic prices with border prices.

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2. Price Stabilization

Government policy assumes price stabilization programs are needed, yet there is very little local research on the issue. If new price stabilization policies are to be formulated, it would be useful to have comprehensive studies conducted on the effectiveness of price supports, NFA release pricing, and the socially optimum level of carry-over stocks before implementing what could be another round of counterproductive policies.

3. Agricultural Research

The AYC study mentions the importance of agricultural research, but the policy situation suggests that most new agricultural production research will be redundant until the government reforms commodity pricing and trading policies. No one doubts the long-term benefits of agricultural research. However, the government's traditional bias toward protecting consumers by holding farm prices below the border price is a major constraint to the derived demand for technology.

4. Fertilizer

The DA's fertilizer subsidy program is costly, distorts the market for all other agricultural inputs and commodities, and creates large political liabilities when later efforts are made to reduce or abolish the program. In general, the only justification for a fertilizer subsidy would be in cases where it has never been used and is considered a new technology. That is not the case in the Philippines.

5. Irrigation

The IFPRI study by Rosegrant, et. al., documents the benefits of extending the irrigation system. However, the construction of additional public irrigation systems would lead to further deterioration of infrastructure sustainability if the National Irrigation Authority cannot bring the current system into a user-funded maintenance and operations program that prevents further deterioration. The payoffs from additional investments in operations and maintenance of existing systems is not as great, initially, as in building new systems, but sustainability must begin with what presently exists, rather than leaving maintenance and renovation responsibilities for the next generation.

6. Credit

The government's large interventions in rural credit markets over the last two decades have produced ample evidence that subsidized credit is a serious disincentive to optimum macroeconomic performance. The World Bank's view that the current problem with agricultural credit is not the amount, but inap-

propriate credit policies, seems appropriate. Rural areas suffer from a low supply of formal credit because banks are not allowed to pay competitive prices for savings. Past experience with supervised credit programs has also shown that the government does not have sufficient capabilities to monitor the system. Low repayment rates become an institutionalized form of income transfers, and distort the allocation of credit toward less productive uses.

7. Farm-to-Market Roads

The AYC study effectively demonstrates that inadequate farm-to-market roads are one of the major constraints to increased rice production. Evidence suggests transport costs can easily be doubled on rough, as compared to well-maintained roads.

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ANNEX E

A CRITIQUE OF THE PHILIPPINES' AGRICULTURAL AND NATURAL RESOURCE TECHNOLOGY GENERATION AND TRANSFER SYSTEM

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SECTION I.

THE PUBLIC SECTOR AGRICULTURAL RESEARCH AND TECHNOLOGY TRANSFER SYSTEM

A. The National Research and Development Network

The National Agriculture and Resources Research and Development Network (NARRDN) is comprised of two basic structures and involves various agencies in the generation, development and verification, transfer and dissemination of technologies for the agriculture, forestry and natural resources sectors. These two structures are:

- a planning and coordinating body, the Philippine Council for Agriculture, Forestry and Resources Research and Development Agency (PCARRD), which administratively is within the Department of Science and Technology; and,

- a network of state colleges and universities of agriculture, research centers and stations throughout the country which are administratively responsible to several different government departments or autonomous or semi-autonomous agencies.

1. The Planning and Coordinating Body

The Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD) has, according to Presidential Executive Order dated 30 January 1987, responsibility for:

- The formulation of strategies, policies, plans, programs and projects in agriculture, forestry and natural resources;

- For programming and allocation of government and external funds for research and development;

- For monitoring research and development projects; and,

- For the generation of external funds.

PCARRD has three main organizational components: the Governing Council, the Technical Advisory Committee and the Secretariat.

The Governing Council of PCARRD has as its members:

- The Secretary of the Department of Science and Technology as Chairman;
- The Secretary of the Department of Agriculture or his designated Undersecretary;
- The Secretary of the Department of Environment and Natural Resources or his designated undersecretary;
- The Chancellor of the University of the Philippines at Los Banos;
- The Administrator of the National Food Authority;
- The Executive Director of the Secretariat; and,
- Two representatives of the private sector who have shown outstanding work in the field of agriculture, forestry or natural resources. Nominated by the Secretary of the Department of Science and Technology and appointed by the President.

The Technical Advisory Committee has as its members:

- The Executive Director, PCARRD, Chairman;
- The Director Bureau of Agricultural Research, Department of Agriculture, Vice Chairman;
- The Assistant Secretary for Planning, Department of Environment and Natural Resources, Vice Chairman;
- Deputy Executive Director for Research, PCARRD, Ex-officio Secretary;
- Director, Agricultural Programs Office, National Economic Development Authority;
- Chairman, Agriculture and Forestry Division. Philippine National Science Society (NRCP);
- Executive Director, National Food and Fisheries Council;
- Chief, Planning and Programs, Department of Agriculture;
- Chief, Budget Operations Division, (Office of Budget Management);
- Chief, Special Projects Services, Department of Science and Technology;

- Three research directors from the national agriculture and resources research and development network; and

- Four representatives from the private sector.

The Secretariat which implements the policies formulated by the Governing Council is headed by Executive Director and is assisted by the Deputy Executive Director for Research and Development, the Deputy Executive Director for Institution Development and Financial management, Technical Research Directors and Service Directors.

The Technical Research Divisions within the Secretariat include:

- Crops Research;
- Farm Resources and Systems Research;
- Forestry Research;
- Livestock Research;
- Socio-Economics Research and Technology Development; and,
- Regional Coordination.

The service divisions are:

- Applied Communication;
- Institution Development;
- Finance and Administration;
- Management and Information Services; and,
- Planning and Development.

The responsibility of processing, monitoring and evaluation of individual R and D projects rests heavily on the technical divisions. In addition, other activities supportive of the mandate of PCARRD, such as manpower development, project development, workshop coordination, establishment of linkages and others are also coordinated at the division level.

PCARRD also has National Commodity Research and Development Teams (NCRDT) whose membership comes from different government and private institutions and is composed of scientists and development workers recognized in their respective disciplines. Together with the Technical Research Division Directors concerned, these teams plan, coordinate, evaluate, monitor and update with their respective national commodity research and development programs. Through these teams, the researchers and scientists themselves, in consultation with various groups particularly the farmers, and other end-users periodically review the directions of research and development in the country. At present, there are 31 National R and D commodity teams for the various sectors. Each commodity team is composed of a team leader, and about 8-12 members. Team members serve PCARRD and

the National Agriculture and Resources Research and Development System (NARRDS) on an "on-call" arrangement; thus enabling PCARRD to maintain a minimum core of staffing.

2. The Research Institutions

The present network is composed of four national multi-commodity research centers, seven national single commodity centers, eight regional centers, 67 cooperating stations, and 8 specialized agencies. Also, within this network there are 29 state colleges and universities of agriculture, 15 other institutions and a few private research agencies engaged in agricultural, forestry and natural resources Research and Development (R&D).

The four national multi-commodity centers are based in academic institutions, namely:

- Central Luzon State University;
- University of the Philippines at Los Banos
- Visayas State College of Agriculture; and,
- the University of Southern Mindanao.

Of the seven single-commodity R and D centers these are based at academic institutions or at government owned corporations. The centers serve the NARRDN in the following commodities:

- COTTON, at the Cotton Research and Development Institute (CRDI) at the Mariano Marcos State University (MMSU);

- TOBACCO, at the Philippine Tobacco Administration (PTA) at the MMSU Campus, Batac, Ilocos Norte;

- COCONUT, at the Philippine Coconut Authority (PCA), Bago Oshiro, Davao City;

- RICE, the Philippine Rice Institute (PRI) at Munoz, Nueva Ecija;

- SUGARCANE, the Philippine Sugar Regulatory Administration (SRA) at La Granja, La Carlota City; and,

- ROOT CROPS, at the Philippine Root Crops and Training Center, Visayas State College of Agriculture (VISCA), Baybay, Leyte.

- WOOD PRODUCTS, Forest Products Research Institute (FPRI). (DENR), Los Banos.

In addition, there are regional R and D centers. A regional center conducts applied research for commodities of major importance in the regions where the center is located. The eight regional R and D centers are strategically located in places representing basic agro-climates. Most of these centers are based at state colleges or universities :

- o Mariano Marcos State University, Batac, Ilocos Norte;
- o Benguet State University, La Trinidad, Benquet;
- o Isabela State University, Echaque Campus, Isabel;
- o Palawan National Agricultural College, Abortan, Palawan;
- o Camarines Sur State Agricultural College, San Jose, Pili, Camarines Sur; and,
- o Central Mindanao University, Musuan, Bukidnon.

Or, in Department of Agriculture Centers, namely:

- o Bureau of Plan Industry, La Granja Experiment Station, La Granja, La Carlota City; and,
- o Bureau of Plant Industry, Davao Experiment Station, . Bago-Oshiro, Davao City.

Cooperating stations are selected stations of the DA and the Department of Environment and Natural Resources (DENR), state colleges or universities or private research centers or progressive farms located in various parts of the country.

Specialized agencies are institutions with responsibility for a specific commodity or commodity mixes under a given sector, whose involvement in the NARRDN are based on the laws and/or decrees that created them. An example is the DA-Bureau of Agricultural Statistics. Private agencies with research facilities specialized on specific commodity, such as the Twin Rivers Research Center for banana and cacao research are also included.

3. <u>Regional R and D Complementation Scheme: The Consortia Concept</u>

The consortia arrangement is designed to optimize use of limited resources among research centers at the regional level and involves a series of satellite institutions around a lead agency. At present there are 14 regional consortia. A Regional Research and Development Coordinating Committee (RRDCC) provides the leadership and establishes implementing guidelines and policies for mutual sharing of resources among member agencies of a consortium. A Regional Technical Working Group (RTWG), composed of Research Directors and Coordinators of the consortium's member agencies reviews the regional R and D programs and budget for implementation or fund sourcing.

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The NARRDN includes the Department of Agriculture but DA has indicated it wishes to have its own network. A rationale for such a network was set forth by the Director of BAR in a presentation at the PCARRD/ISNAR/RRDP Workshop on Research Management in Agriculture and Natural Resources in the Philippines which was held at Tagaytay City, 13-17 June 1988. The following is taken from the proceedings pp. 203-204:

> "The utility of established research priorities are only as good as the research system which will translate these in real terms. This was the major consideration of DA in its decision to put up its own research system. While there exists an overall National Research System, this caters to the priorities established by PCARRD and not necessarily those of the DA.
>
> . . . PCARRD does not conduct research so it could not be held responsible if the flow of technology is not adequate or a serious outbreak of a pest or disease occurs which requires emergency research attention. PCARRD, therefore, faces a serious limitation since it cannot respond to downstream research needs in the form of well-defined and integrated multi-disciplinary research programs at the field level."

The following is paraphrased from the same source:

> . . .In the longer term the DA believes that it is not safe to to presume that an effective research system should continue to built around the state colleges and universities (SCUs). The DA sees the SCUs, in the future, moving more and more to strategic research while the major part of applied research or technology generation will be assumed by the DA's research function. We should remember that the DA is in charge of the country's extension efforts.
>
> The DA states that it has a long history of research activities in agriculture, far longer than any other agency. Over this long period the Department has built more than 50 experiment stations. These stations were formerly administered under particular bureaus but with DA's reorganization, majority of these are now under the DA regional offices.

While there is a well defined network, there is a question as to how cohesive the network is and the degree to which members of the network are "coordinated" by PCARRD in all their research and development activities. At the present time there appears to be forces, particularly in the DA, to set its own independent research and development program.

4. The Scientific Manpower Base

It is useful in the context of the NARRDN to look at staff numbers and staff distribution. While the figures in table E-1 are for 1986, the balance has changed little by the present date. It is evident from the above figures that the present strength and the strength for the foreseeable future for agricultural, forestry and natural resources research lies in the colleges and universities where 80 percent of those holding a research level degree (MSc & PhD) are employed. While not all of the MSc and PhD level staff in the colleges and universities are engaged in research the NARRDN, which includes the Department of Agriculture and its Bureau of Agricultural Research, will continue to be heavily dependent upon this human resource.

Table E-1. Distribution of Philippine NARRDN Staff, 1986

Agency of Employment	Academic Degrees			
	BSc	MSc	Phd	Total
Colleges and Universities	1,331	1,196	509	3,036
Department of Agriculture	702	88	6	796
Department of Environment and Natural Resources	97	99	15	211
Department of Science and Technology	214	43	2	259
Other Government Agencies	332	97	10	439
Other Collaborating Agencies	104	41	11	156
TOTAL	2,780	1,564	553	4,897

Source: Manpower Resources and Development Division, PCARRD

B. Research Planning

The process of setting agricultural priorities is one which has evolved over time in the agriculture, forestry and natural resources subsectors in the Philippines and is still evolving. PCARRD has the key role in setting priorities and developing the process by which they are set.

The Technical Advisory Committee (TAC) of PCARRD has the responsibility to determine national priorities for research in crops, livestock, farm resources and systems, forestry and socio-economics which are then recommended to its Governing Council for consideration and approval. In the process of setting priorities, the TAC has a responsibility to see that they fall within the national priorities and objectives as have been given, for the current period, in the Medium-Term Philippine Development

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Plan, 1987-1992. The Technical Advisory Council is composed of designated representatives from the agencies within the NARRDN, including the private sector.

The process for setting priorities has evolved since the early 1970s soon after the founding of PCARRD. From an early date the process has involved staff from the regions. In its early years, PCARRD conducted regional agricultural congresses involving as many participants from government and non-government agencies as possible. As an outcome of one of these meetings, an ad-hoc committee was formed to determine the criteria for priority setting and to recommend the first list of priorities. The committee carried out its work and made its recommendations to the Governing Council of PCARRD in May 1977. Subsequent revisions were approved by the Governing Council of PCARRD based on recommendations prepared as a result of consultations by PCARRD with staff of various agencies and on the basis of revised criteria.

1. The Research Planning Process

The planning process (which includes the operational -ization of priorities) as it is now followed by PCARRD is described as both a top-down and bottom-up process which merges regional concerns with national concerns. It attempts to ensure that commodity systems with wider implications are attended to vis-a-vis the more specific regional concerns. The plan preparation is an integral part of the annual regional review attended by regional directors of line agencies, presidents or research directors of state colleges and universities of agriculture, managers of research stations, researchers, extension workers, applied communication specialists, planners, and farmer leaders. While this is the "planning process" it serves to regularly and systematically review priorities.

The diagram in figure E-1 illustrates the process. The policy making body of the each regional consortium, the Regional Research and Development Coordinating Committee (RRDCC), reviews the plan (priorities) which comes from this process at the regional level, makes modifications as it may deem appropriate and makes its endorsement of the plan to PCARRD. It must be noted that PCARRD central office staff participate in the process at the regional level.

PCARRD, once it receives the programs and priorities from all the regions, develops/formulates major program thrusts based on the regional thrusts. A panel composed of directors and senior staff of PCARRD, the Bureau of Agricultural Research of the the Department of Agriculture (BAR/DA), the DENR-Ecosysystems Research and Development Bureau (ERDB), representatives from the state colleges and universities and the private sector then review the list of major program thrusts. The final output is

Figure E-1. Public Sector Agricultural Research Planning Process[a]

[a] Figure 1, Priority Setting for R & D in Agriculture, Forestry and Natural Resources (1988-1992), in Research Management in Agriculture and Natural Resources in the Philippines, PCARRD/ISNAR/RRDP, 1988. p.115.

submitted to the various approving bodies of PCARRD, such as the Directors Council (DC), the TAC, and finally to the Governing Council (GC) before sending it to the central government budget bureau for financial allocation.

While the national policies and priorities in agricultural research are determined by the PCARRD Governing Council, in which the Department of Agriculture (DA) is represented by its Secretary or an Undersecretary, the Department of Agriculture also formulates its own research and development plans. These are primarily concerned with adaptive research and the transfer of technology. In the DA, these programs are formulated by the Research Advisory Committee (RAC) with the assistance of the Bureau of Agricultural Research (BAR) which recommends these policies and priorities to the Secretary of Agriculture for approval.

The RAC is chaired by the Assistant Secretary for Research, Training and Extension, with the BAR Director as Vice Chairman and the BAR Assistant Director as the EX-Officio Secretary. The members of the committee are: The Bureau Directors, Director of the Agricultural Training Institute (ATI), one DA Regional Direc-

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tor (by rotation), one representative from the non-government organizations (NGOs), one representative from the attached agencies, and six representatives from farmers' organizations.

The Bureau of Agricultural Research of the Department of Agriculture, in cooperation with PCARRD and the Philippine Council for Aquatic and Marine Research and Development, has recently completed and published the National Agricultural Research and Extension Agenda 1988-1992 (NAREA). It appears that the priorities presented in this document were established through a top-down, bottom-up process with the same individuals and institutions/agencies as presented in figure E-1. However, this document includes aquatic and marine research which is not included in PCARRD's mandate. Further, in the case of the priorities set forth in this document, they are approved by the Secretary, Department of Agriculture, rather than through the PCARRD organization.

The Department of Environment and Natural Resources (DENR) has as its major concerns the acceleration of research and the development of technology on managing the Philippine Ecosystems and natural resources. Under the new set up, research on natural resources and environment is being realigned using the "ecosystems concept/approach" considering PCARRD's research and development thrust for 1988-1992, which is based on the National Economic and Development Authority's thrust. An Integrated Research and Development framework is still in preparation but Regional Technical Directors including those for the Ecosystems Research and Development Sector, have just been appointed. It is expected that the new R and D network and Ecosystems Research and Development Bureau organizational set-up can provide the DENR and other target clienteles the necessary information and technology for rational use, development and management of the Philippine ecosystems and natural resources. The Ecosystems Research and Development Bureau is a staff unit that is concerned primarily with planning.

2. Research Prioritization

There is a well established process for the determination of research priorities. PCARRD collaborates with other agencies in priority setting exercises. However, the Bureau of Agricultural Research (BAR) of the Department of Agriculture has gone through an additional exercise, in collaboration with PCARRD, to assure the establishment of its own discreet priorities for research and extension which are set forth in its National Agricultural Research and Extension Agenda (NAREA). According to information received, BAR is institutionalizing a planning/priority setting process that appears to parallel that already established by PCARRD. This will need to be investigated further since it seems to be a duplication which involves the same individuals at the regional level.

C. The Current Research and Technology Transfer Strategy

The public sector approach to agricultural research and technology transfer strategy can be better understood by considering the system in terms of the implementation process, constraints to the system, and priorities for overcoming the constraints.

1. The Research Implementation Process

There does not appear to be an explicit "strategy" in the transfer of technology. The process is stated somewhat as follows in its most simplistic terms as four steps:

1. Research priorities and problems are identified through the process noted above;
2. A research scientist (or scientists) applies for research support through his/her institution/agency;
3. Research support is provided through the NARRDN on approval by PCARRD to the individual's(s) institution to support his/her work; and
4. Research is carried out and "handed over" to extension staff for verification and to work with farmers on adoption.

This is too simplistic an analysis. There is an inherent strategy that recognizes that to bring about change, the "new technology or practices" must be demonstrated and shown to be economically viable and significantly better than present practices. Therefore, the process that is used is technology verification (TV) on farmers' fields and demonstration plots on farmers' fields and on R & D stations.

The technology verification is the first step to assure that the technology developed by the researchers is viable under farmers' conditions or whether it needs some adjustments to be adapted to the particular conditions of the region. From the first TV trials, it may be necessary to go back to the researchers for more work or the adaptation may be carried out by the extension staff.

Following verification, demonstrations are then laid out in key locations in farmers' fields or in pilot areas. Observations of these demonstrations are expected to interest others to take up the new technology. The observations are made through visits by individuals or groups of farmers or through field days at various times throughout the life of the demonstration. The farmers who control the fields, in so far as possible, explain the demonstrations and their opinion of them. This is the process through which the new technology is made known to a wider audience with the expectation that, through "seeing", technology adoption (TA) by this wider audience will occur.

The DA established a Regional Integrated Agricultural Research System (RIARS) in every DA regional office during the first reorganization of the DA in 1982, Its main functions are the conduct of adaptation and verification trials for products of applied research considering promising in actual farmers' fields with at least one site per province. It has been reported that this system is being changed to the establishment of Regional Integrated Agricultural Research Centers.

2. Critical Constraints to Effective Research Management

The constraint most often mentioned is insufficient financial support. There is no doubt that the research and technology transfer system is underfunded, but additional funds alone is not the answer.

The "system" is not performing to fully exploit its institutional resources. Over the years, through the leadership of PCARRD, a research system has developed whose parts can be recognized and, even more important, the institutions and agencies within this "system" recognize themselves as a part of it. This is a considerable achievement for which a large number of countries have strived but not succeeded. The members of the "system" have accepted and willingly participate in a planning, monitoring and review process that is well structured and gives good recognition to the views, strengths and weaknesses of each institution or agency participant. Again, this is an achievement that has been beyond the reach of many countries. And yet, the "system" is not achieving the output it should in terms of research products or packages of technology being used by clients to bring about necessary increased productivity and production.

What is it about the "system" that has kept it from achieving the expected output or objectives? This is a key question that must be answered.

It appears that, even with what can be described as an excellent process in planning at the regional level for research and development, somehow the most important research issues are not being identified, or they are being addressed in segments, rather than through in a multi-disciplinary and comprehensive manner. Further, it may be possible that the research that is being conducted is not carried all the way through to verification by the researchers. If this is the case, it is possible that the "packages of technology" are not really being tested/verified at the user level and still may be faulty. If this is the case the users are quick to note and reject the technology.

Even with the process that is being used to determine the research plan for a region, there is room for considerable bias in favor of the views of the researchers since they have a major

role in the decision making process. It appears that there is very limited farmer feedback and effective influence of small farms into the research and extension system at the present time. The product is "supply side" research rather than "demand pull" research based upon the real problems of the clients. Greater attention may be required in using a farming systems perspective where the research and extension programs essentially accommodate the needs and capabilities of rural-households and therefore require their participation, directly or indirectly, in the whole process of technology development and extension. Further, in looking at the research projects being undertaken, it appears that there is a need for more multi-disciplinary research and post-research evaluation by the researchers to verify research results at the client level before considering that the initial research project is finished.

To increase research productivity, it is very important to increase the participation in R & D priority setting by farmers and agribusiness. Support may need to be provided to existing farmer groups and private companies for their participation in priority setting and research planning, or support may be required to help organize farmers groups to participate in this activity. Greater participation in R&D decision-making by farmers and private companies is highly desirable, since farmers and agribusinesses can provide scientists with market-relevant information on farmers' needs, provide incentives for effective research and provide financial and political support to public research. The present process being followed in research planning and priority setting can easily accommodate these elements.

With respect to the current process for planning and conducting research, it does not appear that commodity or other research is sufficiently integrated with development programs for specific commodities or regions. In most countries where there have been major breakthroughs in production, there has been a well-coordinated and integrated research and development program. In such an integrated program, there is close cooperation and complementarity between the research institutions and their staff and the extension or development staff. Also, in such programs, research and development are concerned with the total program - policy, prices, input availability, credit, transport, processing and marketing and not just production-based research.

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3. Technology Development and Transfer Priorities

In 1986, following the change of Government with subsequent replacement of most senior officials of the DA, a task force on Research and Extension was convened to provide the then Minister of Agriculture an assessment of the research and extension situation and their recommendations. Based on their recommendations, the DA identified research priorities for the medium term (1988-1992). Although these were formulated under the two major goals of the DA, which are equity and economic recovery, these research priorities kept close to the following R and D thrusts jointly established by PCARRD, DA-BAR, and the DENR-Ecosystems Research and Development Bureau (ERDB):

- Profitable production and post-production environment sensitive technologies;
- Development, rehabilitation, conservation, utilization, and management of resources and ecosystem;
- Production, processing, storage, and distribution system for seeds, stocks, and planting materials;
- Breeding and management systems for better production;
- Biotechnology in production and post-production systems;
- Integrated and commodity based approaches towards better food production and nutrition and balanced ecosystems;
- Efficient and effective technology transfer systems for producers;
- Efficient marketing, distribution and support systems;
- Assessment of plans, programs and policies, and formulation of appropriate policy recommendations; and,
- Support for emergency projects.
- The medium term research and extension priorities for agriculture recommended by the task force are as follows:
- Farmer-focused socioeconomic research;

- Better upland rice varieties, rice based multiple cropping and postharvest technologies;
- Use of open-pollinated corn varieties;
- Breeds suitable to tropical conditions and back-yard processing;
- High yielding coconut varieties, production diversification, and on-farm processing;
- Product diversification for sugar;
- For fibers, sericulture technologies, pest-resistant cotton varieties, better varieties and processing technologies for ramie and abaca;
- Postharvest processing technologies for fishery products; and,
- For fruits, pest management,postharvest handling and processing technologies and export market research.

These priorities aim to generate technologies that would help sustain and improve the country's agricultural production base. The characteristics and focus of the research agenda are expressed in the acronym "WELFARE":

W = Wise and efficient utilization and management of agricultural resources and systems.
E = Environmentally sensitive and resource conservation oriented farming system.
L = Low cost but sustainable farming systems.
F = Farming oriented problems, farmer participation and community mobilization.
A = Areas of priority development which include rainfed lowlands, uplands, hillylands, coastal and plains.
R = Resource poor and subsistence farmers/fishermen as prime targets.
E = Economic returns or profitability for the farmer.

The BAR states that "The National Agricultural Research and Extension Agenda (NAREA) is not an exclusive DA output. It is an embodiment of research priorities for the next five years, as determined by researchers, and by the intended users and beneficiaries of research results. Essentially, the NAREA is a summary of regional priorities."

The following are excerpts from the same source as above, pp. 211-212 in relation to the DENR:.

"The Department of Environment and Natural Resources (DENR) has as its major concerns the acceleration of research and the development of technology on managing the Philippine ecosystems and natural resources. Under the new set up, research on natural resources and environment is being realigned using the "ecosystems concept/approach" considering PCARRD's research and development thrust for 1988-1992, which is based on the National Economic and Development Authority's thrust. An Integrated Research and Development framework is still in preparation based on the output of the Regional Research and Development Workshop.

The implementation of the reorganization plan of the DENR is under way. Regional Technical Directors, including that of the Ecosystems Research and Development Sector, have just been appointed. Next, the staffing of the regional office will be tackled, after which, infrastructure and facilities development will be given attention.

It is with high hope that the new R and D network and Ecosystems Research and Development Bureau organizational set-up can provide the DENR and other target clienteles the necessary information and technology for rational use, development and management of the Philippine ecosystems and natural resources."

In addition to the priorities defined above by the NARRDN, experience suggests that a very high research priority should be to gain an understanding of why "improved technology" which has been developed is not being utilized. The refrain "we have lots of technologies that are not being adopted" is one that is heard frequently. There seems to be much hand wringing over this, but there is no real attempt to learn whether the technologies are really viable under present farm conditions, policies and prices. Farmers are good economists and usually readily take up new technologies if they are not too high risk and when implemented will give a good economic return (good means at least 25% above present practices).

Additional priorities that would improve technology development and transfer include:

- Policy research which is concerned with prices, marketing, supply and demand and with other policies relevant to the rural sector, such as: credit, transport and infrastructure;

- Rationalization and clear delineation of the role of the Bureau of Agricultural Research of the Department of Agriculture. At present its role is not well understood in the "system". It can have an important role which is complementary to other institutions in the

system, particularly the state colleges and universities in working with them on identifying problems for the "demand side" of research and in adaptive on-farm research. They should not become a funding agency for research outside the normal funding that is approved under the responsibility given to PCARRD.

- More attention must be made to processing and utilization of products with at least one of the objectives to be to identify opportunities to locate processing and utilization closer to the source of production. If viable options can be found to locate processing closer to production, this can have an important spin-off through the creation of off-farm employment. This research must be carried out in partnership with the agribusiness sector, or by the agribusiness sector itself.

- There are too many stations, state colleges and organizations involved in agriculture research and technology transfer. Particularly given limited funding, there is a need for rationalization and consolidation of these stations and colleges.

- Move away from project to program funding.

- Private sector research and extension represents a significant input and should be further encouraged through collaboration and joint funding.

- PCARRD needs sufficient resources for the coordination and evaluation of research programs which should be its main tasks along with facilitating easy and smooth flow of financial resources to the research system, and strengthening of linkages between public and private research and extension and farmers.

- The agricultural research priorities now being used need to be reviewed and the number reduced. There are so many that they are almost meaningless.

- Many members of the network have noted the need for better research management through more research management training at all levels - provinces, regions, state colleges and universities and in the line agencies and bureaus, and

- There is a need for the timely collection, interpretation, and presentation of reliable rural economic data, including production figures, inputs and their costs,

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transport routes and costs, market and middleman prices, smallholder credit sources and costs, and other basic agricultural data.

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SECTION II.

A FRAMEWORK FOR STRENGTHENING THE AGRICULTURAL RESEARCH AND TECHNOLOGY TRANSFER SYSTEM

A. Agriculture in the Philippines

Agriculture has a very key role in development in the Philippines as may be noted that in 1986 agriculture contributed 30% of Philippine GDP, compared with 30.6% for industry and 39.4% for services.

1. The Crops Subsector

Rice, corn and coconuts occupy about 80% of the country's cropped area in almost equal proportions, yet together produce less than 50% of the total crop value.

About 60% of the Philippine population is rural and the agricultural sector accounts for most of the Filipino families living in poverty. Unless agricultural systems which are environmentally and economically sustainable are used, land degradation and further impoverishment of agricultural families will exacerbate the problem of rural poverty and urban immigration in the Philippines.

Yields of the main staple food crop, rice, are low by international standards and considerable scope for sustainable yield increases exists in both the lowlands and uplands. For the approximately 2.5 million hectares of irrigated lowland rice the average yield is about 3.0 tons per hectare which is still low compared to other rice growing countries in the region. Productivity in upland and unfavorable rainfed lowland areas (about 1.0 million hectares) averages between 1.0 and 2.0 tons per hectare. Given the rapid increase in population, yields must be increased by an average of at least 1.0 ton per hectare by the year 2000 to meet internal demand.

2. The Livestock Subsector

Another notable feature of Philippine agriculture is the poor development of the livestock subsector. For example, cattle, pig and goat numbers have remained static or declined slightly in the last thirty years. Poultry numbers have increased but the further development of the poultry industry is limited by feed and cost constraints. Backyard production of goats, cattle and pigs is more important to the sector than extensive cattle and other livestock systems.

3. The Policy Environment

A number of government policies on imports, exports, exchange rate, and budgetary allocations adversely affect agriculture and and need review and changes to promote agricultural development. In the long term, government policy should aim to create an economic environment which provides incentives for farmers to invest in their land and increase the sustainable productivity of their farms. The development of more sustainable agricultural systems in the Philippines will be achieved through providing private farmers with incentives which encourage them to adopt such systems. The economic sustainability of ecologically sound agricultural systems relies on strong barangay and municipal level technical and credit support to farmers, availability of efficient infrastructure and a macroeconomic policy environment which is conducive to private investment in sustainable agriculture.

4. Rural Infrastructure: A Critical Constraint

The infrastructure in the rural areas is not conducive to increased investments by farmers or agribusinesses. Farm to market roads are scarce and poorly maintained. The lack of roads results in high cost and often untimely of input supplies. This inadequacy in the road system also makes it costly for farmers to market their products and it discourages greater participation by agribusiness firms in servicing the rural sector. Of course, the lack of roads and transport causes many inefficiencies in the agricultural research and development system. The inadequacy of the rural infrastructure is a major impediment to rural development.

5. The Private Sector

Agricultural production in the Philippines is almost entirely in the hands of the private sector. Some large private sector corporations such as San Miguel, and Best Foods, as well as parastatals such as PICOP actively develop relationships with smallholders to supply products to meet the raw material needs of their agro-industries. Small holder farmers are the largest group of private sector entrepreneurs in the Philippines.

B. Agricultural Research and Development in the Philippines

There have been very few studies in the Philippines on the internal rates of return to research in agriculture. Those that have been carried out on corn, mango and sugar cane show rates of return from 30 to 70 percent. These rates are comparable to those from similar studies in other countries.

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Agricultural research is widely recognized as one of the essential requirements for agricultural development. Unless a country, with a significant part of its resources in agriculture, maintains a strong and relevant agricultural research program it will soon lose its competitive place in the domestic and international market. Increased support for a strong agricultural research and development program is essential if the Philippine agriculture is to feed its growing population and be competitive in the domestic and international market. Studies have shown that The Philippines is already lagging behind other countries in the region in its support for research and this is reflected in its slowing of agricultural growth. At the present time the government's support for agricultural research is only 0.2 percent of gross value added in agriculture. A generally accepted international minimum is 0.5 percent of the gross value added in agriculture and close to 1.0 percent is strongly recommended for developing countries. Developed countries are providing about 3.0 percent of the gross value added in agriculture as support for agricultural research. In its mid-term development plan, the Philippines has as its target to achieve the 1.0 percent level within its present plan period, which ends in 1992, but it has made little or no progress toward this goal.

Along with support for agricultural research, there must be a closely allied technology transfer system and adequate infrastructure to bring about the utilization of the research results. In the Philippines, in many areas, as noted before, an inadequate rural infrastructure restricts rural development.

The Philippines, with external support from USAID and other donors, has developed a comprehensive agricultural research and development network with considerable human resources. It has made very significant contributions to agricultural development in the past and has the potential to do so in the future. At present it has weak funding, a need to more sharply focus its research priorities and to increase its accountability to its clients.

1. <u>The Public Sector Network</u>

The National Agriculture and Resources Research and Development Network is comprised of two basic structures and involves various agencies in the generation, development and verification, transfer and dissemination of technologies for the agriculture, forestry and natural resources sectors. These two structures are:

a) a planning and coordinating body which is the Philippine Agriculture, Forests and Resources Research and Development Agency (PCARRD) which administratively is within the Department of Science and Technology; and,

b) a network of state colleges and universities of agriculture, research centers and stations throughout the country which are administratively responsible to several to several different government departments or autonomous or semi-autonomous agencies.

The present national agricultural and resources research network is composed of four national multi-commodity research centers, seven national single commodity centers, nine regional centers, 67 cooperating stations, and 8 specialized agencies. Within this network there are 29 state colleges and universities of agriculture, 15 other institutions and a few private research agencies engaged in research and development (R&D).

The network probably has more stations and facilities than are needed or that can be maintained by the system. A rationalization of these facilities is needed and this has been noted by many representatives of institutions in the system.

While there is a well defined network, there is a question as to how cohesive the network is and the degree to which members of the network are now being "coordinated" by PCARRD. With reduced funding and with a need for a more sharply focused set of priorities for the system, PCARRD has lost some of its ability to coordinate and direct the system.

PCARRD has had a great deal of success in the past in developing and coordinating the network. There still is active participation in program planning throughout the system and PCARRD has had considerable success in attracting external support and in developing collaborative linkages with national and international research and development institutions. However, coordinating councils, such as PCARRD, are only as effective as the administrative weight and authority they have and the resources at their disposal. Based on experience as reported by a senior staff member of the International Service for National Agricultural Research (ISNAR), a coordinating council should have about 20% of the research funds for a research system at its disposal to fulfill its coordinating role and have a real impact on the research direction of the system. PCARRD, in recent times has only had about 5% of the system's funds for this purpose.

The system is highly dependent upon the human resources located in the state colleges and universities throughout the country for the generation of technologies as may be seen in the summary on the distribution of trained manpower in table E-1 in Section I. While not all of the MSc and PhD level staff in the colleges and universities (80 percent of those holding a research level degree - MSc & PhD) are engaged in research, the system will continue to be heavily dependent upon the human resources in the state colleges and universities.

Agricultural research and development in the public sector has provided Philippine farmers with improved technology to sustain an agricultural growth rate of between 4 and 5 percent per annum. While the technology has been generated throughout the agricultural sector the most notable gains have been in the non-traditional crops sector. Crops such as mango, pineapple, rubber and coffee have had the most growth in recent years. At the same time there has been significant support by the private sector for research and development in seeds, pesticides, livestock, plantation crops and processing. The growth rate of agriculture appears to be slowing and in some cases is almost stagnant. Moreover, compared to other Asian countries, crop and livestock productivity is low and basic food and feed commodities often must be imported.

The present research and development system, taking into account its low financial support, is not as effective as it should be. It appears that linkages between researchers and clients are weak and the system is supply-driven rather than demand-driven. There is a very broad set of research priorities rather than a sharply focused set in keeping with resource availability. Further, changes in government in recent years have resulted in changes in institutional organizations without clear guidelines as to responsibilities and accountability. Changes are still taking place and until central government is able to provide a proper institutional environment and enforce accountability for research results, there is little opportunity for donors to provide meaningful broad based assistance. External support needs to be well targeted on limited areas until such time as a more cohesive research and development program is finalized by government and institutional responsibilities are fully clarified.

2. Weaknesses in the Public Sector System

The NARRDN suffers from basic problems common to systems in many countries. These include:

a) Lack of Accountability of the Research and Development Establishments to Their Clients

The NARRDN has an established process through which research priorities and research problems are identified and through which funds are allocated for research. While PCARRD, in collaboration with the institutions and agencies with which it works, has a mandate to define research priorities, a very long list has been approved. This allows institutions and scientists to have a very broad spectrum from which to choose. Once research funds are allocated, accountability does not appear to be an important factor. Agribusiness and the large majority of farmers have not been important participants in determining the utility of the research products - or the non-production of results.

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Research seems to continue so long as public funds are provided, regardless of the level of outputs being produced. At the same time the linkages between research and extension are not strong nor institutionally bound so it is difficult specify accountability in technology transfer.

b) Unarticulated Demand for New Technology by the Private Productive Sector Including Farmers of all Types and Agribusinesses

The ultimate products of agricultural research are to meet the needs of farmers to increase their productivity of land labor and capital in all parts of the farming enterprise - production, harvesting, storage and marketing -and for agribusinesses in some of these factors as well as in processing.

It appears that in determining research priorities the researchers have little direct contact with farmers and agribusinesses to determine the constraints or problems which should have priority for research. The researchers often do not take sufficient note of the agronomic, economic, social, cultural and the infrastructure within which the farmers and agribusinesses must operate. This is due in part to the difficulty producers have in clearly specifying their technological needs as well as the complex set of conditions under which they operate. As to the extension service, there is no single office in the Department of Agriculture that plans and systematizes at the national level these various facets of extension and its linkage to research. The feedback mechanism from extension to research and vice versa suffers from the lack of efficiency and effectiveness. In regard to agribusinesses, it is often said that they are heard, but rarely heeded.

c) Insufficiency of Funds to Carry Out Research and Development Activities

This is a very significant problem in the Philippines which combined with a broad set of priorities complicates the problem. There appear to be funds for segments of research on specific problems but insufficient funds to study problems as they exist in the field, carry out the needed multi-disciplinary research with sufficient testing and verification to assure problem resolution and technology that can be utilized by the appropriate clients. The extension staff have very little support for travel and interaction at the farm level. It is only when there is external funding for special development projects that they are able to travel in their areas on a regular basis.

This insufficiency of funds permeates all phases of the research and development- staff salaries, materials, field testing and verification, maintenance, communications and transport.

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C. A Strategy for USAID'S Support for Agricultural Research and Development in the Philippines.

The strategy will pursue the national goals of accelerated economic growth in agriculture and improved food security through agricultural research and development in a manner that emphasizes;

- more effective management of agricultural technology development/transfer resources to improve food security;
- strengthened private sector role in agribusiness in support of rural and national economic development; and,
- decentralization of priority setting for agricultural research and development priorities to greater participation by farmers, agribusinesses and local government units.

The strategy is to provide support for well defined programs within the government's agricultural sector objectives for four specific goals. These are:

- To increase productivity and production in priority areas in support of national goals;
- To work with the research and development system to help it significantly increase farmer and agribusiness participation in determining research priorities to develop a research and development agenda so the system becomes demand-driven rather than continuing its supply-driven nature and to increase its accountability;
- To support programs which will increase the efficiency and sustainability of the national research and development system; and,
- To help increase the financial resources for the national research and development system through a well targeted program.

USAID has several program options it can consider for support for agricultural research and development to achieve the specific objectives noted above. In addition to the program options, there are some fundamental issues concerning policy, infrastructure and the research and development system that should be considered. Whatever support is to be provided, a follow-up for program preparation in cooperation with the appropriate Filipino institutions/agencies will be necessary.

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Program support should be emphasized which assures increased ability of the Government of the Philippines institutions and agencies to sustain a viable research and development system which effectively serves the needs of the country. There is a need to increase national support for agricultural research and development. Many countries have found that successful programs which result in significant increases production or benefits to farmers not only attract attention but they also usually lead to increased support for research and technology. The Philippines needs such a program to attract more support to agriculture. Program support which leads to a more effective research and development system must be the objective, not project support that is time and location bound, and which, based upon past experience, will probably be discontinued after donor support is completed.

1. Addressing Fundamental Issues

a. Policies

In the long term, government policy should aim to create an economic environment which provides incentives for farmers to invest in their land and increase the sustainable productivity of their farms. Such policies need to be accompanied by appropriate infrastructure, markets and support services to optimize the changes in farm productivity.

The development of more sustainable agricultural systems in the Philippines will be achieved through providing private farmers and agribusinesses with a better infrastructure of roads and transport and incentives which encourage them to adopt such systems. The economic sustainability of ecologically sound agricultural systems relies on strong barangay and municipal level technical and credit support to farmers, availability of efficient infrastructure and a macroeconomic policy environment which is conducive to private investment in sustainable agriculture.

Policy reforms on the issues and support for policy changes where needed should be a fundamental part of USAID's support for agricultural research and development.

b. Infrastructure

Production is being constrained by lack of an adequate infrastructure to move inputs to farmers at reasonable costs and in a timely manner, and to move products out to markets at reasonable cost. Inadequate farm to market roads and lack of transport at a reasonable price have been consistently noted by farmers, research scientists and extension staff as major constraints on increased production.

(11)

The lack of an adequate infrastructure is seen as a major reason that the agribusiness sector does not participate more actively in support of rural development. A basic infrastructure of farm to market roads is essential for agribusiness to take inputs to farmers and to take products out at reasonable rates for processing and marketing.

Support for rural road development and maintenance to link existing roads, to open new growth areas, to enable increased interface between farmers/extension staff/researchers and to stimulate greater participation by agribusiness in the development of the rural economy should be given high priority.

c. The Research and Development System

The Philippines, with considerable USAID support, has developed a national agricultural research and development system which is, by national law, coordinated by the Philippine Council for Agricultural, Forestry and Natural Resources Research and Development (PCARRD).

The system is made up of:

- four national multi-commodity research centers;
- seven national single commodity research centers;
- nine regional research centers;
- 67 cooperating stations;
- 8 specialized agencies;
- 29 state colleges and universities of agriculture;
- 15 other institutions; and,
- A few private research institutions.

The members of the "system" have accepted it as a system and participate in its planning, monitoring and review process that is well structured and gives good recognition to the views, strengths and weaknesses of each institution or agency participant. This is an achievement that has been beyond the reach of many countries. In spite of its success, the "system" is not achieving the output it should in terms of research products or packages of technology being used by clients to bring about increased productivity and production. It now has weak funding, a need to more sharply focus its research priorities and to increase its accountability to its clients.

PCARRD was the subject of a review by an external panel in 1984 with support by USAID. At that time, PCARRD was given fairly high marks for its achievements, but a number of recommendations were made to assure sustainability and increase performance. Now, five years later, it would be timely for another external review to examine PCARRD and the research and development system.

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An international center has been established, the International Service for National Agricultural Research (ISNAR), as a part of the Consultative Group for International Agricultural Research (CGIAR), which has as a central part of its mandate to collaborate with national programs in reviews of their research and development systems. It would be appropriate, if agreeable by the Government of the Philippines, to request ISNAR to carry out an independent study of PCARRD and the national R & D system, to comment on them, and if necessary, to make recommendations for improvements and/or changes in the system.

2. Program Possibilities

a. A Commodity Approach to Food Security

A promising approach, in the short run, is to concentrate on narrowly focused research and development support on a national or regional commodity specific basis. In the Philippines, such an approach is possible for a well designed program for the two commodities with the most important role in food security: rice and corn.

Rice is the staple food in the diet and self sufficiency in rice production is a key political goal. It is not a commodity where, at present, there are options in the public sector to be satisfied with less than self sufficiency. Even in extreme cases of reduced production caused by drought, typhoons or other natural disasters, the government comes under strong criticism if rice is imported.

Production at the present barely meets the internal demand in good years and given population growth projections there must be a very significant increase in rice production to meet internal demand in the 1990s and beyond. Rice yields are low by comparison with other rice growing countries in the region and , on average, yields need to be increased by at least 1.0 ton per hectare to meet internal demand by the year 2000. The present average yield of irrigated rice of 3.5 tons per hectare is with varieties and on soils that should yield close to 5.0 tons per hectare with recommended inputs and management.

A World Bank projection on rice supply for 1985-2000 (low yield case which closely corresponds with information obtained on an informal basis from other sources) is summarized in table E-2. These figures indicate the degree of the problem and the need for greater attention to this basic food commodity.

Increased financial support alone for research and development in rice will not solve the problem. However, it is one input that is required and as can be seen by the following table the support has been decreasing in real terms in recent years. For the period 1985-1989, as reported by PCARRD in current pesos,

Table E-2. Projected Rice Supply, 1985 - 2000

		1986	1990	1995	2000
Area (-000 ha)					
Irrigated:	Wet Season	1,141	1,335	1,596	1,665
	Dry Season	772	895	1,050	1,123
Lowland Rainfed		1,264	1,070	850	740
Upland Rainfed		156	156	156	156
Yield (MT/ha)					
Irrigated	Wet Season	3.3	3.4	3.5	3.6
	Dry Season	3.4	3.5	3.6	3.7
Lowland Rainfed		1.9	2.0	2.1	2.1
Upland Rainfed		1.0	1.1	1.1	1.2
Production (-000 MT)		8,959	10,007	11,340	11,884
Less: Seed, feed, waste (10.5%),		941	1,051	1,191	1,248
Palay available for consumption		8,018	8,957	10,149	10,636
Milling recovery ratio		0.66	0.66	0.66	0.67
Total Rice Supply		5,292	5,911	6,698	7,126
Total Rice Demand (Est. from Prev. Source)		5,273	5,917	6,766	7,699
Surplus/Deficit (-000 MT)		19	-6	-68	-543

Source: The World Bank

is summarized in table E-3. Considering inflation during this five year period, the level of public sector support in real terms decreased by a very considerable amount.

Table E-3. Public Sector Expenditures on Rice Research, 1985-1989

YEAR	EXPENDITURES (Current Pesos)
1985	11,025,765
1986	12,305,364
1987	6,279,807
1988	8,853,879
1989	10,015,444

Source: PCAARD

In regard to corn, it is important both as food and feed. The case of corn is not as politically sensitive as rice, but it is a commodity that has priority by the government since it is a primary ingredient in feed for both poultry and swine. There is a rapidly increasing demand for meat from both poultry and swine. Corn is seen as the engine that drives the development of the livestock industry and its increased production is given high priority by government.

Table E-4 provides information on the area, yield and total production of corn during the period 1980/81 to 1985/86. As can be seen, the yield levels are very low and have remained almost constant. In 1989/90 field interviews with Department of Agriculture extension staff in three regions in Mindanao and University of the Philippines, Los Banos, Central Mindanao University, and Southern Mindanao University staff indicated that in 1988/89 and 1989/1990 there has been a very significant increase in productivity and production. This is attributed to higher price for corn and a special program (Accelerated Agricultural Production Program - AAPP) which has provided support for on-farm demonstrations, a seed exchange program, increased use of hybrid seeds, availability of fertilizers at con-trolled prices and transport for field staff. However, if one takes the best estimates of yields in these two years they will still be well below those of Thailand and other major corn producing countries in the region. Good progress is being made but there is still room for significant increases in production and productivity.

Table E-4. Corn Production, 1980 - 1985

YEAR	AREA (-000 HA)	AVERAGE YIELD (MT/HA)	PRODUCTION (-000 MT)
1980/81	3.2	0.96	3.1
1981/82	3.3	0.97	3.2
1982/83	3.1	0.99	3.1
1983/84	3.2	1.02	3.3
1984/85	3.3	1.03	3.4
1985/86	3.5	NA	3.9

Source: World Bank Sector Strategy Study/ Statistics Division Bureau of Agricultural Economics

In the corn growing regions in Mindanao, while there appears to be a surge in the production due to special project support at the present time, there is little evidence that this can be sustained unless there is continuity in support over an extended period of time. Further, production is being constrained by lack of an adequate infrastructure to move inputs to farmers at reasonable costs and in a timely manner and to move products out

to markets at reasonable cost. Inadequate farm to market roads and lack of transport at a reasonable price were consistently noted by farmers,research scientists and extension staff as major constraints on increased production.

In the corn growing regions in Mindanao, there is a strong need for corn drying equipment and storage facilities which could be operated by agribusinesses either in the villages or in more central locations. This need would quickly be transformed into effective market demand if there is significant improvement in the regional roads and transport system.

Support for research and development in corn for the period 1985 - 1989 as reported by PCARRD in current pesos is summarized in table E-5. Again, as is the case for rice, considering inflation during this five year period, the level of public sector support in real terms decreased by a very considerable amount.

Table E-5. Public Sector Expenditures on Corn Research, 1985-1989

YEAR	EXPENDITURES (Current Pesos)
1985	3,430,925
1986	3,741,537
1987	4,173,520
1988	5,429,567
1989	3,936,107

Source: PCAARD

The program on rice and corn should emphasize collaboration between farmers. research institutions, extension staff and agribusiness groups to shorten the research and development cycle, improve research accountability and stabilize funding for long term, commodity based research programs that have clear economic payoffs. The program should achieve an important goal of government in terms of food security. If well designed and conducted, the program can provide guidelines for greater efficiency and accountability for the Philippine research and development system. It can aid in decentralization through greater participation by farmers at the local level in the decision making process.

The program design should include assured joint Government of the Philippines (GOP) and donor funding as well as provision of adequate staff time by GOP institutions. The program should initially be for five years with increasing support by the GOP each year and decreasing support by the donor.

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In the program design, consideration needs to be given to the total complex of research and development for these two commodities. In looking at existing research and development programs it does not appear that commodity or other research is sufficiently integrated with development programs for specific commodities or regions. In most countries where there have been major breakthroughs in production there has been a well coordinated and integrated research and development program. In such an integrated program there is close cooperation and complementarity between the research institutions and their staff and the extension or development staff. Also, such programs, if successful, are concerned with policy, prices, input availability, credit, transport, storage (both on-farm and central), processing and marketing and not just research and production. All these need to be considered in the program design.

Program components to be considered would include support for the following:

- farmer/agribusiness/extension/research interface at the farm level for planning research and development programs (with support for much greater farmer/agribusiness interaction with researchers than now takes place in such work;
- annual program review and planning meetings for corn and rice in which representatives from research, agribusiness, extension and farmers participate (with support for much greater farmer/agribusiness participation than now takes place in such meetings;
- international contacts to identify promising technologies from outside the country - eg. Thailand, Korea and others;
- policy reforms to ensure efficient price discovery;
- pricing and availability of inputs, including improved seeds, with inputs coming through agribusinesses;
- feeder roads and transport (with roads the agribusiness sector will take care of transport);
- storage and processing (again, a strong interaction with the agribusiness sector);
- downstream research support for technology verification and adaptation;

- establishment of Subject Matter Specialists on rice and corn at the regional level in the Department of Agriculture in those regions where these commodities are of major importance;

- training, vehicles and transport for R & D; and,

- initiatives for agribusiness to enter into contract research with research institutions, agencies, and individuals.

b. A Regional Approach to Technology Generation, Verification and Adaptation

In a recent effort, Bureau of Agricultural Research (BAR) of the Department of Agriculture, in cooperation with PCARRD, has undertaken a "grass roots" effort to develop a National Agricultural Research and Extension Agenda (NAREA). Through a multisectoral and interdisciplinary approach in consultation with farmers, extension workers, local agribusiness representatives and Department of Agriculture officials, a prioritized research and development agenda was developed at four levels:

- priority development zone;

- priority sectors under each development zone;

- priority commodities by sector under each development zone; and,

- priority research areas for each commodity by sector under each development zone.

All activities have been classified in each development zone according to needs -- technology generation (TG), technology adaptation (TA) and technology verification (TV) - and this classification has been published as a guide for R & D. It is an excellent approach and the product represents a comprehensive effort. There is still a need to sharpen priorities even further and to have greater interaction with researchers on technology generation and verification.

Sustainable technologies appropriate to the Philippines are frequently reported to exist which can increase the productivity of existing agricultural systems. However, these "technologies" are not being used by producers. A program is needed for testing these technologies under actual rural conditions matched against the priorities developed in the NAREA and their further study to sharpen their focus. Such a program should lead to an understanding of why "improved technologies" which have been developed

are not being utilized. The program should also identify the modifications in the technology, policy or other constraints which must be corrected in keeping with actual farmer conditions to bring the needed positive impact for rural development. This will involve "downstream" research by state colleges and universities and by the field staff of the Department of Agriculture. There will also be a need to interact with those concerned with "upstream" research on some issues.

An important point is that support can be built into the present national agricultural research and development system to focus on the downstream research and technology transfer with primary attention to the adoption of technology.

The program immediately addresses the issue of decentralization in that the constraints and needs identified in the NAREA have evolved through a decentralized approach to build a national agenda. The program, if supported, will involve policy, infrastructure (roads and transport), credit, inputs, social benefits as well as economic considerations, sustainability, food security and the interaction among farmers, researchers, agribusinesses, and extension specialists. The agenda itself will be carried out on a municipal, provincial and regional basis.

This option, if chosen, will not take a national commodity approach. Rather, it will address priority issues as have been identified in the various development zones which will be different from zone to zone. In some zones rice and corn may be high priority issues while in others the priorities, among others, may be on post harvest technology, livestock, farming systems, hillyland agriculture, non-traditional export crops, vegetables, agroforestry, marketing storage and processing.

The program design should include assured joint Government of the Philippines (GOP) and donor funding as well as provision of adequate staff time by GOP institutions. The program should initially be for five years with increasing support by the GOP each year and decreasing support by the donor.

The design will be required to determine the essential components and support which probably would include:

- determination of phasing of the program by regions or zones;
- working groups to review the priorities in the selected regions as stated in the NAREA and to sharpen the focus of these;

- working groups to review the constraints that have been identified and to match the available technologies to be tested through downstream research determine their viability and what modifications in the technologies or policies are required;

- implement needed modifications in technologies and policies;

- support for "up-stream" research on priority constraints as may be required as seen as an outcome of modified technologies and policies;

- international contacts to identify promising technologies from outside the country - eg. Thailand, Korea and others;

- policy reforms to ensure efficient price discovery;

- feeder roads and transport (with roads the agribusiness sector will take care of transport);

- training, vehicles and transport for R & D; and,

- initiatives for agribusiness to enter into contract research with research institutions, agencies, and individuals.

3. <u>The Ingredients for Future Progress</u>

The Philippines has developed a well recognized agricultural research and development system over the past 15 years and has a good human resource base to build greater strength into the system in the years ahead, given adequate support, sound policies and an improved infrastructure in the rural areas. As has been noted above, the system now suffers from too much of a supply-driven research mode rather than a demand-driven mode.

There has been an excellent recent activity by the Bureau of Agricultural Research (BAR) of the Department of Agriculture and PCARRD to establish a national agenda for research and development which is based on problems identified at the "grass roots". There is now a solid base upon which to build a program that emphasizes close collaboration between the generation and transfer of technology as a team effort. Such a program with good management, improved policies, greater interaction with agribusiness and an improved infrastructure in the rural areas can overcome the past criticisms of lack of accountability, unarticulated demand and insufficient funds.

SECTION III.

A STRATEGY FOR JOINT PUBLIC AND PRIVATE SECTOR PARTICIPATION IN AGRICULTURAL TECHNOLOGY GENERATION AND TRANSFER

A. Conceptual Framework

Given the social and economic importance of the agricultural sector in the Philippines, and the declining rates of increase in food crop production and productivity in recent years, significant efforts have been undertaken to strengthen national technology generation and transfer systems. These efforts have tended to focus on the provision of budget support, training, and infrastructure to the public sector agricultural research and extension institutions in the university system (principally the University of the Philippines at Los Banos) and the Department of Agriculture. PCAARD was designed to coordinate efforts in these areas.

Donor and government investment in agricultural research and extension has been traditionally concentrated on the public sector system. In fact, the public system is only part of a larger TG&T system, which includes other actors who are just as, or more influential, in determining what technological products come out of the system and are taken up by farmers. The following chart (figure E-2) presents a realistic picture of who is involved in what aspects of broader TG&T systems. In the system, there is wide participation of a number of actors, with varying levels of influence as one moves from generation toward transfer and use, and from technology embedded in manufactured inputs (the benefits of which can be captured privately) toward know-how, which is rarely patentable, easily replicable, and is therefore basically a public good.

1. Areas of Strength of the TG&T System

The most functional areas of the TG&T system lie in mechanical and chemical input manufacturing and supply. These functions are basically controlled by private sector commercial enterprise, with the technology embedded in manufactured goods which are sold either directly or through marketing intermediaries to producers. There are also generally strong linkages between suppliers and users. In this technology market, both knowledge of the demand for particular technological products and development costs are high, and the consequences of failure (non adoption) severe. Biological technology systems tend to be strong in areas where benefits are privately capturable, as is the case for the hybrid seed industry. The TG&T system works fairly well when part of the economic benefit of innovation is capturable by inventors and suppliers. Patent and intellectual property laws are crucial to the viability of this system.

Figure E-2. Conceptualization of the Process of Technology Generation and Transfer

<----------TECHNOLOGY CARRIERS---------->

<----------SUPPLY---------->

<----------DEMAND---------->

TYPE	EXAMPLES	PROVIDERS: INNOVATORS	PROVIDERS: SUPPLIERS	TRANSFER AGENTS	USER
Mechanical					
Motor driven	Tractor	Inventors	Agribusiness	---------->	Farmers
Animal driven	Plow	IARCs			Cooperatives
Hand tools	Machete	Agribusiness			Agribusiness
		Universities			
Chemical	Fertilizers	Agribusiness	Agribusiness	---------->	Farmers
	Herbicides	Universities			Cooperatives
	Insecticides				Agribusiness
Biological	Seeds	Universities	Agribusiness	---------->	Farmers
	Org. Fertilizers	IARCs	Public Agencies	---------->	Cooperatives
	Bio. Pest Control	Agribusiness			Agribusiness
		Public Agencies			
Know How	How to Use All of the Above	Universities	---------->	Agribusiness	Farmers
		IARCs	---------->	Public Agencies	Cooperatives
		Agribusiness	---------->	Farmers	Agribusiness
		Public Agencies	---------->	PVOS/NGOS	
		Farmers	---------->		

2. Areas of Weakness of the TG&T System

The weakest areas of the TG&T system tend to be those where the economic benefits of innovation are not privately capturable. Examples are "know-how" types of technology which public goods as soon as they are developed. It is in this area that the public sector tends to concentrate efforts, as well as focusing on disadvantaged social and economic groups such as small or limited-resource farmers. These groups are often unwilling or unable to adopt technology-embedded inputs, and thus rely more heavily on the development of less capital-intensive types of technologies to increase their productivity. They are also found in widely variable production conditions, for which specific adapted technologies must be developed. This situation significantly increases the costs of technology development, as well as limits potential benefits.

B. The Particpants in the Philippines' TG&T System

1. The Public Sector

The public sector technology generation and transfer system, described in Section I of this report, is commonly identified as the National Agricultural Resources Research and Development Network (NARRDN). The system is a network of state colleges and universities of agriculture, research centers and stations throughout the country, under the overall coordination of the Philippine Council for Agriculture, Forests and Resources Research and Development (PCARRD). NARRDN is a mature institution, but it suffers from insufficient funding, inadequate accountability to its clients and weak specification of priorities to support national development goals and address critical agricultural production constraints.

2. The Private Sector

Information about the research activities of the private sector is scarce, while information about the public sector is plentiful. This is in part due to the fact that private research often, if not always, involves product development, the composition of which is withheld from potential competitors until patents are established in order to protect the economic benefits of the research. The second reason is that the private sector is generally not considered part of national agricultural research systems (NARS), so limited effort is expended collecting information about its activities.

Three types of private sector groups undertake agricultural technology generation and transfer in the Philippines, with varying levels of investment and sophistication.

a. National and Multinational Agribusiness Firms

According to Pray (1986), these include approximately 45 firms[1] undertaking research and development activities in seeds, chemicals, agricultural machinery, animal production, and plantation crop production and processing. A brief overview of the activities in each subcomponent follows.

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1. Regarded by Pray as an underestimate, because it did not include activities and expenditures made by several major livestock and food processing companies, a major plantation company which reportedly had 9 expatriate scientists employed in the Philippines, and several pesticide companies.

Seeds

Pray reports that four companies have research programs concentrating on hybrid corn. Pioneer appears to be leading the way, with extensive research facilities in Mindanao, and a budget of US$65 million for the Asia/Pacific region. San Miguel Corporation was a major player in hybrid and synthetic varieties of corn, but reportedly has recently sold its interests to Pioneer. Hybrid corn yields average about one ton per hectare greater than the best open-pollinated varieties, and are being planted on roughly 40 - 50 percent of the Mindanao corn acreage.

Chemicals

Companies conducting research in the Philippines include local subsidiaries of Hoescht, Imperial Chemical, Shell, American Cyanamid, and A.G. Schering. Chevron recently closed its research facility in Calauan. Research activities center around (1) testing existing chemicals for their efficacy under Philippine conditions, (2) modifying formulations and applications methods to meet the demands of local markets, and (3) comply with government requirements for approval for use in the country. Most of the work is concentrated on rice and corn pesticides, as well as some plantation crops, with major demand in the Philippines.

Examples of technological outputs include development of an effective herbicide controlling rottboellia, a major corn pest, development of a seed treatment compound for control of downy mildew in corn, and the discovery that a chemical brought in as a herbicide was an effective plant growth regulator of sugar cane.

Machinery

Research work in the agricultural engineering department at IRRI in the early '70s helped spawn several small rice production machinery manufacturers. The plans for the machinery were made available free of charge, as was limited technical assistance. Machinery produced included tow-wheeled hand tractors, small-scale threshers, irrigation pumps and grain dryers.

Some 75 firms were producing machinery in 1981. While the bulk of the R&D was done by IRRI, most firms developed minor innovations and variations on the basic product which enhanced capacity and/or lowered cost.

Livestock

The technology of commercial poultry production was imported primarily directly from American breeders, feedmillers, pharmaceutical companies and machinery suppliers. San Miguel Corporation has a large research program concentrating on deter-

mining efficient and least cost combinations of poultry production inputs. One major swine operation near Manila has conducted research on least cost feed combinations and waste recycling, including development of biogas plants that generate electricity in excess of the needs of the operation.

Technology involving new breeds and improved management developed or imported by the private sector has greatly increased broiler production efficiency, reducing the period to reach 1 kilogram liveweight from 14 weeks to 6 weeks, and reducing the feed requirement from 8 to 2 kilograms.

Processing and Plantation Crops

Major plantation crops receiving private research attention include bananas, sugar cane, pineapple and tobacco. In most cases, the objectives of the research are to reduce production costs and improve product quality.

Victorias Milling Company has a sugar cane breeding program, while two other mills have modest programs in mechanization and plant nutrition. New varieties developed by VMC have increased cane yields by 10 to 20 percent.

Banana production technology was imported from Latin America by Dole, United Fruit and Del Monte. Research activities focus on plant protection and nutrition, as well as processing. Improved plant protection technology has reportedly reduced unit costs of production by as much as 40 percent.

Dole and Del Monte conduct research on pineapple, mainly plant protection and nutrition, as well as varietal selection. Initial pineapple production technology was brought into the Philippines from Hawaii. Del Monte also has a breeding and selection program for canning-quality tomatoes, while Dole is reportedly producing 250 hectares of asparagus for the Japan fresh market. Some varietal testing and market research was undertaken prior to full production.

Finally, as of 1986, two private tobacco production programs were in progress, conducted by Colombia Tobacco (flue-cured Virginia) and Phillip Morris (Burley). Both programs began in the late 70s.

b. Non-Governmental Organizations

There are an estimated 2000 NGO organizations in the Philippines which work at the local level to improve the quality of life in rural and urban areas. A directory published in 1988 (PHILDHRRA) lists 164 NGOs, 45 of which list as major activities the development and/or transfer of appropriate technology. No known comprehensive analysis has been undertaken regard-

ing their activities in agricultural and natural resources technology generation and transfer. Due to their limited research skills and financial resources, NGOs tend to concentrate close to the transfer end of the generation - transfer continuum. The following is a brief description of a few NGOs which provided information as part of this strategy development exercise.

Center for Rural Technology Development

Located in Calauan, Laguna, CRTD is affiliated with Philippine Business for Social Progress, an umbrella NGO. CRTD began operations in 1979, and has concentrated on identifying, adapting and transferring labor-intensive technologies appropriate to the conditions of local farmers. Technologies adapted and field-tested by CRTD include vegetable gardening, composting methods, azolla and snails as livestock feeds, seed production and processing, green manure production and application, food processing, and grain drying. Recently, CRTD has been devoting increasing attention to training of nascent national and international NGOs in appropriate technology generation and transfer through its Calauan training center.

South Cotabato Foundation, Inc.

With USAID assistance, the Foundation is dedicated to improving the economic situation of upland and marginal farm families through its agrotechnology and farmer development programs. The focus is on the testing and adaptation of sustainable farming practices involving vegetative contour barriers, reforestation, and agro-forest, multi-crop technology. They have established in South Cotabato a demonstration farm and training center to test, adapt, and transfer technologies for integrated upland and lowland agricultural practices.

Philippines Rural Reconstruction Movement

PRRM has a core field program in six provinces, working in technology development and transfer in varied farm systems and diverse ecosystems. With their parent organization, the International Institute of Rural Reconstruction, they have prepared extension materials outlining technologies in agroforestry and regenerative agriculture. It also is involved in rural savings and credit, attempting to establish "peoples banks" in rural areas.

Asian Alliance of Appropriate Technology Practitioners

Founded in 1980, Approtech Asia is an umbrella NGO which, through direct technical assistance and publications, disseminates to its member NGOs information on appropriate technologies in areas related to health care, integrated farming,

micro-ent rprise development, environmental conservation and renewable energy systems. Approtech Asia is an international organization, headquartered in Manila.

Philippine Partnership for the Development of Human Resources in Rural Areas

PHILDHRRA is a network of NGOs located in rural areas, with a national secretariat located in Manila. It has developed a methodology for undertaking participatory research on development problems, and provides methodology training to member NGOs.

c. Individual Farmers and Farmers' Organizations

Farmers are not normally considered to be developers and communicators of new technology by the existing formal TG&T system. In fact, innovations and ideas for innovations come from observing and gaining an understanding of the practices of farmers. When introduced to a new technology or set of technologies, adaptation almost always occurs, resulting in a modified set of practices that are, in effect, new technologies. Almost no documentation of this process is available in the Philippines. The senior author of this report spent 1.5 years talking with and examining the farming systems of Iloilo rainfed lowland rice farmers as part of his dissertation research sponsored by IRRI, and conducting a research project on the technology used by small coffee producers in Costa Rica (Chapman, 1983 and Chapman et. al., 1983). Evidence from both studies supports the notion that farmers are in fact researchers and technology transfer agents, notwithstanding the fact that their methods are quite unsophisticated.

There are a large number of farmer organizations in the Philippines, the majority (if not the totality) organized for political, as opposed to technical, ends. As such, they may have potential to become agents of the technology generation and transfer process, as well as articulators of the demand for technological outputs from research systems.

3. Points of Complementarity and Cooperation Between Public and Private Systems

Private sector capitalizes on the public investment by hiring away the better professionals and graduates, providing them with better salaries and a relatively more stimulating work environment. They use the facilities of public research centers to test their products, providing the products, research guidance, and funding for variable costs, including salary supplements, transportation, etc. The public sector also supports private technology transfer by conducting field days and capitalizing on visits to farmers by extension agents.

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C. Public vs. Private TG&T - Critical Distinguishing Factors

As is evident from the above discussion, the private sector components of the TG&T system have functioned efficiently and effectively relative to the public sector components. The following three critical factors help explain why this is so.

1. Accountability

The public agricultural research agenda is determined mainly by research managers and individual researchers within the publicly-supported research institutions such as the universities and units of the Department of Agriculture. Funds for research enter the system via allocations from the public budget (direct taxation on trade of certain commodities plus general budget allocations) amounting to about 72 percent of total expenditure in 1985, with loans and grants from international donors comprising the remaining 28 percent. Since funds flow in from agents who are not directly affected by system outputs (developed technology), allocations continue independent of the level of output. Those who are directly affected, small farmers and agribusinesses, do not directly support the system and therefore generally do not hold it accountable for providing a return on investment.

The private sector, particularly agribusinesses with direct investments in research, depends on the success of its efforts in developing and promoting technology demanded by producers through direct sales of developed technology, normally embedded in inputs such as machinery, agrochemicals, and hybrid seeds. Agribusiness researchers are held accountable by users, as their funding ultimately stems from profits generated from sale of technology. If they fail to produce technologies that are demanded, they eventually go out of business.

2. Articulation of Demand

The ultimate products of good agricultural research are a continuous flow of new or adapted production techniques which can be readily adopted by farmers to increase the productivity (output per unit of input) of land, labor, and capital.

Researchers in public institutions are often unaware of the real needs of producers for new technology. This is due in part to the difficulty producers, particularly small farmers, have in clearly specifying what their technological needs are. It is also due to the fact that researchers are not held accountable for producing relevant technology, and thus are not under pressure to perform in order to assure future funding.

Private sector research tends to be highly focused on resolving clearly understood problems experienced by producers, usually producers who can "vote" on the results with their pesos. Thus, the demand private sector for research is clearly specified and helps guide and focus the research process.

3. Adequacy of Funding

Relative levels of investment in the public research system in the Philippines are low (0.12% of GDP) compared to those of other Southeast Asian less-developed countries (averaging about 0.24% of GDP)(ADB, 1988). Research priorities are determined via a process of friendly mutual consultation, but the resulting list is long and resources tend to be spread in response to political concerns rather than according to where the needs or potential payoffs are greatest. This results in institutions that are over-staffed in relation to the amount of available research resources. Salaries tend to be evenly distributed and uniformly low, frequently resulting in moonlighting and reduced work performance. Labor laws effectively prohibit removal of employees for poor performance.

Research conducted by private business tends to be well-funded, with salary levels set to support international technicians as well as attract the best local talent. Bureaucracy is minimized, research inputs are plentiful, and successes are well-rewarded.

An indication of relative levels of investment in commodity research investment by the public and private sectors is presented below in table E-6 (Pray, 1986).

Table E-6. Philippine Agricultural Research Investment, 1985

Commodity	Private Sector	Public Sector
	(Millions 1985 Pesos)	
Rice	20	15
Corn	30	6
Sugarcane	3	29
Coconut	2	11
Tobacco	2	19
Fruits/Vegetables	19	3
Other Crops	3	27
Livestock/Poultry	5	17

In 1985, private sector investment amounted to nearly 40 percent of the total, focused largely on crops (rice, corn, fruits and vegetables) where the potential private returns to investment were highest due to size of the market (rice, corn) and value of the product (fruits, vegetables).

The previous discussion somewhat overstates the strength of the private sector research system vis-a-vis the public system. In fact, the public system supports the private system by providing trained personnel and testing grounds for technological products. Furthermore, the private system concentrates on serving the needs of the more economically advantaged producers who can pay for their service, while the public system is left to attempt to serve the poorer segments of the rural population. Clearly, it is not a fair game.

D. A Suggested Strategy

Public agricultural research tends to be supply-driven, responding to the needs and directions of the public bureaucracy and the donors, rather than to the technological needs of producers. Private sector research is demand-driven, seeking to respond to producers needs through the development of profitable technological products. The purpose of a new strategy is to strengthen the TG&T system's ability to better detect farmers' production problems, and hence their demand for new technology, while at the same time maintaining and/or establishing communications with the major suppliers of technology on an international scale. It will involve the mobilization of resources in both the public and private sectors, including the regional and national universities, agribusinesses and NGOs.

The proposed strategy aims at shifting the emphasis from inputs (agricultural research and extension) to outputs/results (technology generation and transfer). A small group of highly-qualified national and international professionals will be assembled and given support to become Technology Transfer Facilitators (TTF), with the objective of capitalizing on the installed capacity of public and private sector organizations either performing or with the potential capacity to perform the functions of research and extension. The TTF will act mainly at the interfaces between the suppliers and demanders of new technology, facilitating communications and interactions between both.

1. Key Objectives

The proposed strategy has four main objectives that are congruent with GOP and USAID development objectives.

a. Performance

The nature of the participation of each of the TG&T institutions would not be determined a priori, but rather would be decided at the regional level on an activity-by-activity basis. The participants at the regional level would be selected based on interest in and ability to carry out critical tasks. Institutional strengthening would occur, not as a result of general grants, but rather as a direct result of the participating organization's demonstrated work performance.

b. Flexibility

In order to be responsive, the TTF would need the ability to allocate resources in a manner which would induce the existing TG&T infrastructure to perform the tasks for which it was designed. This implies direct access to resources to be used for overcoming critical system bottlenecks, such as low salaries and lack of transportation and other logistical support. The TTF would also need the flexibility to establish contracts which clearly specify working relationships and ensure that the resources provided are used only for the purposes agreed upon by the contracting parties.

c. Efficiency

By making better of already existing research capacity, the TTF strategy would avoid needless duplication of effort. This would substantially increase the returns to investments and physical infrastructure made during the previous decade by the GOP and international donors.

d. Sustainability

In order for any project or program activity to produce desired results over the longer term, it must demonstrate that the goods or services being provided are economically and socially necessary. If the generation and transfer of agricultural technology enables users to generate increased net incomes, then the direct beneficiaries should be willing to reinvest part of that benefit in order to ensure further gains in the future. The TTF would be under pressure to demonstrate to producers the usefulness of their efforts, as project funding will be limited in both quantity and timing. Survival of the TTF will depend upon their ability to convince farmers to provide direct financial support, or face suspension of the service.

2. Specific TTF Functions

a. Assessment of Demand for New Technology

In general terms, the Philippines' current TG&T system has only been partially responsive to the demand by producers for new technology. This is due in part to insufficient coverage of the extension service, farmers' inability to clearly articulate their needs, and the difficulty in obtaining ideas for new technology which is not currently developed.

Once a geographical or agro-climatic area, farm type or crop or livestock product is selected, a rapid diagnosis would be made to detect the major production contraints susceptible for technological solution. This would be undertaken by interacting with potential clients (farmers, agribusinesses), via rapid reconnaissance, consisting of intensive discussions with representative farmers or farm groups, perhaps complemented by a few detailed studies and visits to farmers' fields.

The output of the process would be initial specifications for desirable new technologies. Decisions would then need to be taken as to which technologies would likely have the greatest potential impact to the largest number of potential beneficiaries. This would enable prioritization of technological alternatives, and help guide the search for new technology existent either in the Philippines or in other parts of the world.

b. Assessment of Supply of Existing Technology

The second step of the process involves the search for technological alternatives once the various needs at the field level are clearly understood. The TTF would help establish a network of contacts and relationships with researchers in the Philippines, in countries with similar crops, livestock and agro-climatic environments, and with the IARCs which undertake basic and applied research of interest. In most cases, possible technological solutions would be encountered, which must then be tested at experiment stations and farmers' fields in the Philippines.

If no technology is available either nationally or internationally for the solution of priority production problems, then the TTF would assist in the formulation and articulation of the demand to competent technology developers at the IARCs and other qualified research institutions. A benefit to this approach would be the establishment of feedback linkages from farmers to researchers at national and international levels.

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c. Development of Adaptive Research Capability

Potentially useful technology, encountered either in-country or elsewhere, may need to be adapted to local conditions before it can be transferred to producers. The TTF would identify local research institutions, whether public or private, which have the necessary human and physical resources to successfully undertake the required tasks. If no single institution is capable of undertaking the adaptive research, then cooperative agreements among several institutions would be established. As necessary, the TTF, through project funds set aside for this purpose, would also provide partial grant funding for variable research costs, including operating costs such as gasoline, reagents, transportation services, or topping up of inadequate salaries. Resources would be made available through lateral transfers, i.e. directly to researchers to ensure that they are used for the purposes intended.

d. Technology Transfer

Technology encountered and tested either at the national or international levels can be transferred to farmers, with the TTF playing a role similar to the one stated above for adaptive research. Institutions, either public or private, with interest in and capability to undertake extension activities would be identified and contracted. Cooperative agreements would be developed when necessary, and variable operating costs would be covered as needed.

E. Dynamics of the Strategy

1. Composition of the TTF

The TTF would consist initially of four highly qualified professionals. Two of these would be international advisors with strong knowledge of and experience with the TG&T processes occurring at the IARCs and the private sector. Ideally, one would be a socioeconomist, able to understand and deal with social, economic and institutional issues. The other would be a biological scientist, with a broad knowledge of sources and types of available technology as well as a good understanding of specific commodity production and processing techniques.

The other two members would be Philippine nationals who would receive the benefit of the knowledge and experience of the advisors, and because of their understanding of local conditions and issues, would pre-empt many potential implementation problems. These individuals should have the same general background as the advisors (socioeconomics and biological science), as they will become the backbone of the TTF program of the future.

2. Commodity Focus

The TTF would best be organized along commodity lines for the following reasons:

a. Technology, especially biological technology and know-how, tends to be commodity-specific;

b. Many of the major providers of technology, such as the IARCs and national commodity programs, are organized along commodity lines, and thus provide commodity-specific technology; and

c. Most important, the mechanism used to fund the TTF function in the future will likely be some type of check-off system whereby a small voluntary tax is applied each unit of output as it passes through the marketing system.

3. Flow of Activity

During the startup phase of the project, a specific priority commodity would be selected as the focus of activity for the first year. The TTF would be formed as described above, and representative sites (e.g. upland, hillyland, lowland) would be selected to undertake the diagnostic studies in order to determine technology demand. Simultaneously, the TTF would establish a network of contacts and relationships with public and private, national and international technology suppliers.

Once technology demand is identified and priorities are established, the search would begin for existing promising technologies, followed by research, testing and transfer as appropriate. The four steps in the TG&T process outlined above would not always occur in the same order, nor would all steps necessarily need to be covered. For example, in setting up the international network, the TTF may learn of potentially valuable new technology before demand is adequately determined. Similarly, technological solutions for farm problems may already be on the "market", thus eliminating the need for extensive research and testing. The emphasis is on installing capacity to respond to opportunities as they arise, both in terms of TG&T as well as the ability to work with institutions and people in non-traditional ways.

At the end of the first period of full-fledged activity, the performance of the TTF would be evaluated by beneficiaries, including farmers and agribusinesses. If the TTF has been able to expand the universe of adaptable technologies and/or has made the TG&T system more demand-responsive, then beneficiaries would be

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expected to fund part or all of the TTF efforts during the following period. If the evaluation is negative, then the program should be discontinued.

Depending upon time and resource availabilities, the opportunity would exist to move on to other commodities. In such a case, two Philippine nationals would be hired and trained as members of the TTF for the original commodity, and their work would continue. The expatriot advisors would move on to the new commodity and, with two new counterparts, repeat the cycle. The successful end-of-project status would find one or more self-sustaining commodity-specific TTFs continuing to serve the needs of their clients.

F. Contribution of This Component to USIAD's Agriculture and Natural Resources Strategy

The following matrix (figure E-3) outlines the ANR strategy, while the discussion describes the contribution of the TG&T strategy to the overall ANR strategy. The strategy for technology generation and transfer presented above integrates well with the rest of the proposed ANR strategy, as it furthers the attainment of a number of important cross-cutting policy objectives, as well as supports, and is supported, by the other proposed strategic initiatives.

Figure E-3. The Philippines Agriculture and Natural Resource Strategy Matrix

	STRATEGIC INITIATIVES			
CROSS-CUTTING POLICY OBJECTIVES	IMPROVED RURAL INFRASTRUCTURE	EFFECTIVE FOREST RESOURCE MANAGEMENT	ENHANCED AGRIBUSINESS OPPORTUNITIES	RESPONSIVE TECHNOLOGY DEVELOPMENT SYSTEM
DECENTRALIZATION				
PRIVATIZATION				
SUSTAINABILITY				
EFFICIENCY				
DEMOCRATIC PLURALISM				
FOOD SECURITY				

1. Contribution to Cross-Cutting Policy Objectives

Decentralization

The TTF strategy would operate at the regional level as teams directly assess technology needs of producers of specific commodities under various types of agro-climatic conditions. As needs are identified, the TTF would directly contract with local public and/or private agencies, providing them with critical technical guidance and operating support, rather than by having funds introduced and dissipated at the central level.

Privatization

The TTF strategy would indirectly promote the private sector undertaking some previously government functions, especially technology transfer. There are currently about 2000 PVOs and NGOs which work at the grass roots level and can be tapped as effective, unbureaucratic transfer agents of new technology to farmers, as well as providers of feedback to the research system, helping to articulate future technology demand.

Sustainability

After a reasonable period of time, the performance of the TTF would be evaluated by the various beneficiaries, including agribusinesses and producers associations. If, as a result of their efforts, the TTF have effectively promoted the development of demanded new technologies and/or have made the ag research system more responsive to the needs of producers, then the beneficiaries would be expected to fund an increasing share of the TTF efforts in the future. This would assure the sustainability of the TTF effort when successful, as well as its demise when and if it ceases to serve the needs of its client group.

Efficiency

The TTF would achieve efficiency by maintaining a very modest staff, operating independently of institutional constraints, and channeling technology generation and transfer resources to those local organizations which are most ably equipped to accomplish the task at hand without regard to whether it is public or private.

Democratic Pluralism

The TTF would enhance democratic pluralism by helping disadvantaged parts of the population to articulate their need for technology which would increase their productive capacity as well as incomes and family food security. It would also strengthen local organizations (PVOs, NGOs, farmers or-

ganizations) by giving them guidance and funding, as well as a concrete opportunity to provide services needed by the local community.

Food Security

By choosing to work with basic food commodities such as rice and corn, and if it is successful in promoting the generation and adoption of new technology, the TTF could have a major effect on food security since such a large percentage of land and labor is dedicated to the production of these crops.

2. Linkages to Other Strategic Initiatives

Improved Rural Infrastructure

A major barrier to adoption of new and existing technology and increased productivity in rural areas is the lack of critical infrastructure which allows movement of people and products. Foremost here are farm-to-market roads. As increased market opportunities arise, farmers would be better able to adopt new technology as it becomes available. The TTF would provide knowledge of existing technology, and help articulate the demand in new areas as they open up.

Effective Forest Resource Management

Enhancing the ability of marginal farmers to sustain themselves on the land they now work, then the need to seek new forest lands for slash and burn production would diminish, thus slowing the rate of forest destruction.

Enhanced Agribusiness Opportunities

The TTF would enhance agribusiness opportunities in marketing and processing as supplies of basic food commodities increase. By choosing to work on fruit and vegetable crops, the TTF would provide increased opportunities for agribusiness development in the domestic and export market areas of processing, packaging, transportation, and brokering.

G. Design Issues

1. Commodity Selection

No attempt was made in this analysis to predetermine what commodities should receive the TTF effort. This is a rather complex decision that should be based upon discussions held between key Philippine and USAID officials. The following are some important criteria to bear in mind during such discussions:

a. The importance of each commodity to the Philippine food security and economy;

b. The perceived technological gap between current production techniques and what is practically obtainable using known technological innovations; and

c. The nature of the commodity organization (if any) and the strength and stability of potential funding sources, which will determine ability to sustain the TTF function into the future.

2. Institutional Home

Ideally, the TTF would be independent of any existing TG&T institution, for the following reasons:

a. Establishing a program that is supposed to coordinate efforts among competitive and sometimes jealous public and private institutions within one of those institutions could cause the others to refrain from full participation and support of the effort; and

b. Experience has shown that funds transferred to an institution are not always used for the purposes intended, thus causing certain activities to be delayed, not implemented properly, or not implemented at all.

On the other hand, the TTF will need a support mechanism if it is to continue after the first year of activities. Commodity producers may want the service, but may be unwilling or unable to pay the overhead costs of the home institution unless it is theirs. This would tend to support the idea that the TTF be directly linked to commodity producers' associations.

While independence is probably best, it may not be politically or operationally feasible. What is important is that the TTF has access to the resources it needs to be able to accomplish its mission without undue interference. Thus, a major criterion for the selection of an institutional home is the managerial agility of the organization and its genuine commitment to carrying out the activities as agreed upon.

3. Commodities Versus Production Systems

One criticism of the approach outlined above is that it seems to neglect the opportunities for positive change resulting from modifications in crop and animal combinations; e.g. work in the area of farming systems or farm management. The commodity

approach was chosen basically because it offers the path of least resistance to sustainability of the TTF. However, the actual diagnostic work would be done in selected sites to determine the demand for improved technology. At the sites, the farming systems perspective should definitely be taken, as general information about the farms and farm systems will be obtained and used to determine not only demand but also the economic and agronomic feasibility of technology adoption. The point is that the commodity approach need not be as rigid as it seems. The TTF would work directly for the benefit of their clients, the producers, and would need to depend upon them for future political and financial support. Thus, the TTF would have the incentive to respond to the client needs without being overly tied to one specific commodity to the exclusion of all other factors. It is possible to ensure that this attitude will be fostered by carefully selecting advisors with a broad background which includes work in farming systems and farm management, as opposed to a strict single commodity focus.

4. Research Funding Mechanisms

As indicated in the text, the TTF strategy hinges on flexibility with regard to providing modest amounts of financial resources to fund operating costs for key research activities. There is concern that the reporting and management requirements of USAID for this aspect may significantly impede this effort. During the design, this issue should be examined carefully to make sure the system is sufficiently agile to allow this flexibility. If it is not, then the desirability of proceeding with the strategy is doubtful.

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ANNEX F

NATURAL RESOURCE MANAGEMENT FOR SUSTAINABLE DEVELOPMENT: A CRITIQUE

by

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A. Resource Augmented Economic Development

Current forecasts reveal a precarious imbalance between population growth and the depletion of natural resources in the Philippines. There is a high risk that the pressure of high birth rates on rapidly dwindling resources will only be relieved by increased poverty, disease, malnutrition and starvation. The only way out of the impending Malthusian trap is through dramatic increases in resource productivity.

1. The Role of Resource Scarcity in the Optimum Development Path

The villain of the piece is sometimes mistakenly identified as resource depletion. But resource depletion can play an important role in producing a healthy pattern of economic development. "Resource augmented" economic development refers to the case of an economy that is blessed with an initial abundance of natural resources relative to its initial population. In the initial resource-using stage of development, the growth in per capita real income is fueled largely by increasing cultivated land and the depletion of resource stocks faster than the rate of population growth.

Eventually, the land frontier begins to close and resource depletion causes the quantity and quality of resources that can be extracted for a given quality of labor to diminish. This "soft" resource constraint gives rise to the labor-using stage of development, characterized by increasing labor intensity of production and increasing resource productivity. Growth in per capita income during this state is fueled by specialization afforded by the division of labor. This is accompanied by the rapid growth of manufacturing. Technological change is driven primarily by learning-by-doing and the development of labor-augmenting tools of production.

The division of labor increases the demand for labor-augmenting tools and equipment which are financed from the increased savings per capita afforded by higher per capita income. In this capital-using stage of development, industrialization emerges and the economy evolves to a balanced growth path wherein the rate of capital formation eventually slows to the rate of population growth. Once capital stops growing faster than labor, further increases in per capita income and wages are fueled by technological progress and improvements in industrial organization. Resource scarcity in this sustainable growth path is held in check by the natural growth of biological resources, technological progress in the extraction of mineral resources, and a resource transition involving the increasing capital intensity of resource use and the substitution of sustainable for exhaustible resources.

2. Deviations from the Optimum: The Philippines Experience

The actual pattern of development in an economy such as the Philippines deviates from the optimal trajectory just described due to flaws in the constitutional environment, which lead to inadequate and inappropriate property rights, policy distortions, and failures in collective action. The following stylized characterization of distorted development is suggestive.

In a misguided attempt to modernize its economy, the Philippines induced a premature growth of import-substituting industrialization in the 50's and 60's by foreign exchange controls, import quotas and tariffs. This lead to a cascading structure of protection with the finishing stages of import substitution receiving the highest effective protection rates. As a consequence, industrialization stagnated with insufficient incentives for backward integration into the production of intermediate products or for the production of exportables. Politicians and others with political influence were granted logging and mining concessions at a fraction of their value.

During the Marcos era, artificial subsidies were added to the protectionist structure of trade policy in order to keep industrialization going. With the advent of martial law, the government stepped up infrastructure development and investment in agriculture. This led to an increase in per capita income and an upturn in real wages by the end of the 70's, despite the negative impact of the worldwide energy shocks. The upturn came at the cost, however, of a greatly increased national debt and accelerated depletion of resources. Substantial amounts of public spending were diverted into public enterprises and other subsidies. As protectionism spread, a dependent but politically powerful elite developed that continued to feed at the federal trough. This eventually led to a collapse in the public trust and the toppling of the Marcos regime.

The present administration has been unable to develop a coherent mission. Despite the sincerity and good intentions of the President and many other government executives, the new government has contributed to the further "Latinization" of the Philippines by pursuing mercantilistic policies that cater to special interests and by simultaneously maintaining the rhetoric of compassion.

Deáfacto monopoly privileges have been granted to favored companies. A "permit" system pervades the economy requiring approval from myriad government agencies in order to engage in ordinary economic activity. Much of public spending goes to support productivity-decreasing subsidies to consumers and farmers. Wasteful depletion of natural resources and deficit spending continue to increase the burden passed on to future generations. The economy is being sustained through large infusions of foreign

capital, especially from the governments of the U.S. and Japan and from private investment, disproportionately so from Hong Kong and Taiwan.

B. Recent Resource Profiles: Overview and Evaluation

Recent studies of the natural resources situation in the Philippines emphasize the rapid depletion and degradation of biological resources (including forestry and coastal resources), land resources, and watersheds. A dismal Malthusian spiral is portrayed with population growth and resource depletion contributing to poverty and human migration to fragile ecosystems. While the portrayal of severe resource "mining" and impending resource crises are undoubtedly accurate, the reports may lead to a misleading impression of the nature and causes of the resource management problem.

In both the optimal and stylized Philippine scenarios described above, resource depletion is an important part of the story. Resource depletion cannot therefore be taken as prima facie evidence of mismanagement. Healthy economic development involves resource depletion and a transition in the nature of resource use. The essence of the Philippine problem is not depletion per se, but extreme waste in the use of natural resources. Resource depletion has not been accompanied by persistently increasing per capita income, real wages and levels-of-living among the lower two-thirds of the population and by a transition to a sustainable modern economy; it has contributed instead to increasing poverty and diminished prospects for future generations.

1. The USAID/Danes and Moore Report

The Danes and Moore report, Sustainable Natural Resources Assessment -- Philippines, contains valuable information about the nature of resource depletion in upland coastal resource systems, especially forestry, agricultural resources, fisheries, and biodiversity, although water resource systems and pollution are relatively neglected. A vicious circle of population growth, resource depletion, and migration is portrayed (see esp. figure 21-1), but the report fails to distinguish between productivity-enhancing depletion and waste.

The policy recommendations emphasize the preservation and conservation of forests, coastal resources, and biodiversity and the information, training and institutional strengthening to support them. The first priority of the report is the "preservation and rehabilitation of the remaining old growth tropical rain forest." This appears to be more the result of the orientation of the assessment team than of substantive analysis. There is no reason to believe that preservation will alleviate the causes of resource misuse, and the report itself expresses substantial pes-

simism about the government's ability to enforce a conservation program. Apparently the team believes that USAID should forego the usual economic criteria because resource conservation is the right thing to do.

2. The World Bank Environment and Natural Resource Management Study

The World Bank Environment and Natural Resources Management Study (formerly FFARM) also provides useful background information on the nature of resource degradation and describes existing and proposed policies and programs. The descriptions of the existing upland resource systems and policies (ch. II), policy alternatives, including experimental technical packages, e.g. for soil erosion control (ch. V), and strategic proposals (ch.VI) are especially informative.

Overall, however, the Bank study does not provide the basis for a coherent resource management policy. The report reflects a compromise of faiths -- faith in preservation, faith in economic incentives, and faith in participatory development. In some parts, for example, the report expresses an unwarranted faith in private property and user fees. In other parts, it treats preservation and community development as moral imperatives. None of these three faiths is well grounded in scientific evidence or reason.

Both reports emphasize the poor quality of data and the need for more thorough and better coordinated planning. There is little in the way of operational guidelines, however, in how to do planning in a way that facilitates feasible implementation. Similarly, while better information systems are likely to have a positive impact on resource productivity, the mechanisms by which information is likely to be utilized and which should structure information collection and reporting are unclear. There have been many cases in which GIS analysis, presented with map overlays, for example,leads to an incoherent picture of "noise," not a legible prescription for resource use.

C. Policy Issues

1. Stumpage Pricing

A common theme in the forest management literature is the proposition to extract the rents from timber concessions through the imposition of substantial stumpage fees. The Philippine government has responded top these discussions by raising stumpage fees from P30/cu.m. to P350/cu.m. on existing concessions and to P500/cu.m. (Production Sharing Management Fees) on expired concessions where concessionaires have been allowed to continue logging.

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It is alleged that higher stumpage fees will both reduce rent-seeking and promote efficient rates of harvest. This notion reflects an unwarranted belief that two targets can be regulated with one instrument. Resource rents can be extracted by auctioning the concession rights to the highest bidder. In order to guard against the potential misuse of limited term forestry concessions, concessionaires can be held liable for the economic depreciation of the timber reserve, and for off-site damages as well. The depreciation charge could be administered as a large performance bond. Note that the existing reforestation deposits of P10,000/per actively-logged hectare are too low to provide any meaningful incentive for maintenance during the later stages of the lease period. High performance bonds could be required as an alternative to the minimal reforestation deposits. Performance bonds could be facilitated through the establishment of forestry banks, which could provide not only financing but technical assistance in avoiding substantial depreciation. (Depreciation should be reckoned relative to the value of the optimal stock. Therefore a concessionaire would not be able to offset physical depletion against capital gains.)

An alternative instrument to promote efficient utilization rates is to charge the user cost of the quantity extracted from the forest in each production period. It is important to note, however, that since resource stocks are not likely to be at or near optimal levels, user costs are not likely to be approximated by resource rents (royalties). For virgin forests, where selective logging allows young trees to grow at a faster rate, the user cost is likely to be <u>negative</u> and, in any case, much less than the resource rent.

2. <u>Logging Bans</u>

All the reports reviewed, including the <u>Master Plan for Forestry Development</u> (draft form, prepared for DENR with ADB support), recommend banning logging on the remaining mossy forests and virgin dipterocorp forests. This appears to be based on two unwarranted assumptions. One assumption is that the environmental costs due to soil erosion and loss of biodiversity are bound to be greater than the economic benefits of selective logging. This is unlikely to be the case for all areas. The experience of PICOP and Aras-Asian Timber Co. suggest that the economic returns of selected logging can be very high, e.g. when selectively cut lauan is used to complement fast growing species such as <u>Falcata</u> in the production of plywood and blockboard. Moreover, the ecological damage of selective logging can be small when the area is suitable for natural regeneration, especially when "natural" regeneration is helped along by the appropriate cultivation practices. Indeed the aforementioned Master Plan calls for a Sustainable Forestry Management System that flexibly determines which silvicultural system is appropriate for each stand. This appears to be inconsistent with a blanket ban.

The other unwarranted assumption is that a logging ban on the 700,000 has. or more of relatively undisturbed forests could be enforced. The fact that most of these lands are inaccessible by road is not sufficient to guarantee enforcement. Moreover, communities with lease rights or concessionaires who practice non-mechanical methods of selective harvesting may be the best defenders against ecological abuse. The decision in Nepal to declare forest areas as public land and off limits to tree cutting and farming led to a substantial increase in the rate of deforestation.

Another question to be investigated is to what extent a logging ban in designated areas would abrogate the property rights of existing concessionaires. If it does, then concessionaires should be given an opportunity to submit proposals for using forest resources in an ecologically sustainable manner. A logging ban should not be supported on the grounds that most of the virgin forests are inaccessible anyway such that a logging ban would be mostly redundant but would be a cheap way of buying much-needed public support. This philosophy understates the power of ideas in shaping public opinion. Selling public policy on unsound reasoning tends to lower the quality of the policy dialogue and to detract from the environment of transparency in public decision-making.

The current ban on log exports also appears to be based on the unwarranted assumption that such a ban can be enforced. Publicly available statistics show that large quantities of Philippine logs are being imported into Japan.

In general, removing bans provides the public with a "free lunch." The government can replace the ban with a substantial export tax (e.g. 35% with a reasonably high minimum tax to avoid undervaluation and harvesting trees of low commercial value), use part of the revenue to increase anti-smuggling efforts such that the quantity of logs is less than under a ban, and still have tax revenue left over (e.g. for enforcement of other logging operations).

3. Tenure of Public Forest Lands

Another policy controversy surrounds the proposal to grant titles to public lands containing forest resources. Many public lands in upland areas that were classified as alienable and disposable still have not been granted clear titles. Some of these lands contain forest resources. Granting title to these lands will provide increased incentives to engage in sustainable land use, instead of shifting cultivation and consequent soil erosion.

It is likely that clarifying property rights on A & D lands will burden administrative capability to the extent that additional titling of forestry lands will not be feasible in the near future. Instead, future titling efforts should focus on resolving land use conflicts and recognizing legitimate land use (e.g. under the provisions of homestead laws). The practice of politically influential "upland landlords" of contracting with tenants to cultivate upland areas for a share of the harvest should be examined. It may be found that the alleged landlords do not have legitimate aims under existing laws and that land titles should be granted to the actual cultivators. While implementation of such a program could be handled within the existing CARP administration, the program does not require confiscation and compensation according to agrarian reform laws.

Property rights on forestry lands can be secured by implementation of the government's program for certificates of stewardship contracts. Existing programs specify twenty-five year leases which are renewable for an additional twenty-five years. Tenure security could be further enhanced by making clear that conditions for renewal will not be excessively stringent and that using land for more than fifty years is not automatically precluded.

This leads to a more general point about the relationship of CARP and natural resources management. CARP could easily become a "black hole" for foreign aid. Not only are enormous public resources required to effect an orderly transfer of ownership, but in many cases property will be transferred to lower productivity uses implying the need for public subsidies in order to fully compensate existing owners.

In light of this, foreign assistance to the land reform program should place priority on aspects of the program that increase productivity of resource use. Similar reasoning could be applied to implementation of other regulations such as minimum wage laws which in some areas threaten to undermine existing productivity and to inhibit new investment. Initial implementation of these regulations should focus on those sectors where resource productivity can also be enhanced. For example, it may be found that large ranching operations make use of pasturing practices which undermine future resource productivity. Implementing land reform and minimum wage legislation in these socially unprofitable enterprises may be an effective way to shift those resources into more productive uses.

One of the most important constraints to implementation of the stewardship program is the determination of profitable, ecologically sound, and environmentally specific practices combining wood and food production and the development of nurseries

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to make appropriate planting materials available. The demands on public funding and management capability for such programs may be excessive, however.

In general, the development of economically viable and sustainable production practices, management systems, and institutions and the additional requirement of ecological stability for critical watersheds and other designated resource zones poses an enormous challenge. Public policy should focus on facilitating the evolution of a wide diversity of production systems and institutions. This is best done by developing property rights and the technical and institutional infrastructure for harnessing individual incentives. Technical assistance and the promulgation of promising species should be focused on providing communities and individual households with a menu of promising practices. However, government attempts to "pick the winner" among alternative technologies and to subsidize particular practices is anti-evolutionary and will tend to subvert the dynamic increase in resource productivity.

In support of the evolutionary approach, government should also support a diversity of institutional arrangements. There are many promising models. One program, recently approved on a pilot basis, grants 1000 ha. of forest lands that have been illegally logged, or logged by concessionaires who have had their permits revoked, to communities of forest occupants. The communities are granted 25 year leases, renewable for an additional 25 years, and also given reforestation contracts. With the assistance of technical specialists, the communities will develop management plans for logging the remaining forests, reforesting designated areas and developing sustainable agriculture in other areas. The current program also calls for initial loans and subsidies. It remains to be seen whether these communities will be economically viable or whether the residents will migrate once the subsidies run out.

Perhaps the most promising model for sustainable forestry is that of the industrial tree plantation. Even for fast growing species, the relatively long payoff period for investing in trees renders sustainable forestry uncompetitive in comparison to high rates of return that are available on financial assets. It is similarly unattractive to small holders who have high rates of time preference. For large operations, however, the rate of return can be made more attractive by locating economic sized processing facilities close to the source of raw materials.

In addition, the management problems of commercial forestry are extremely complex. First there is the issue of classifying lands into areas suitable for natural regeneration and those that are not. Then there are the questions of the timing and frequency of selective logging. Next one must decide on the types of fast growing species suitable for different areas and the cul-

tural practices appropriate for each. Next, the whole production system must be coordinated with the needs of the processing facility. Finally the production of processed products must be coordinated with marketing opportunities. In order to accomplish all of the necessary coordination, one must start with the market opportunities and work backwards. That is, the management plan must be end-use oriented.

The complexity of the required management, the grading, and the reliable delivery needed to fetch good market prices is beyond the capability of government planning and cooperative management of small holders. The private plantation model, however, provides the scale to support the specialized management that is needed. The central plantation can also serve as the nucleus of a larger estate, with small holders supplying intermediate products to the industrial processing facility. This allows small holders to access high quality and low cost management so that their resources can be employed in higher productivity uses than would otherwise be the case.

4. The Role of Decentralization

In general, public policy towards natural resource management should be designed so as to align individual incentives with social objectives. The nuclear estate approach discussed above is one institutional vehicle for this kind of incentive compatibility. Another is decentralization within DENR and devolution of authority to local government units. The key to making decentralization work is enabling local government units to facilitate win-win collective agreements among groups of individuals. The particular form of decentralization chosen should contain safeguards against local government power being used to dictate what people can and cannot do or to simply transfer rent-seeking subsidy programs from national to local agencies. Specific decentralization issues include the following:

- the problem of matching or phasing capability development and transfer of authority or power;
- the balance of power between officials of the bureaucracy and local politicians (for example, will a RED be as able as a secretary of Cabinet rank to resist or meet head-on any "illegal" demands of local politicians such as governors or congressmen;
- the lack of clear guidelines and procedures for making critical decisions at local levels (to prevent arbitrary and subjective decisionmaking and to assist officials in resisting the requests of those seeking to use influence or political clout);

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- the absence of clear and comprehensive "ecoprofiles" and comprehensive ENR management plans, from the strategic to the operational levels, to guide local decisionmaking;

- the devolution of authority will generate transfers of funds from central to regional to provinces and communities, creating a need for improved accounting and auditing procedures;

- decentralization in DENR should move in conjunction with decentralization in other units of government;

- decentralization, especially in the initial stages when confusion reigns and the system is most susceptible to abuse, should be accompanied by a comprehensive system of checks and balances and a monitoring and evaluation system that do not add additional layers to the bureaucracy or hinder decision-making;
- decentralization also requires a complement of honest, mission-oriented and capable bureaucrats with very strong leadership abilities, which raises the challenges of recruitment and weeding-out of the unqualified permanent staff and political appointees; and

- how can increased concession charges be best directed to the local level instead of being lost in the general funds at the national level.

5. Natural Resource Research and Development

Perhaps the most important outstanding policy issue is how to organize the research and development, extension, and the provision of planting materials in a way that supports sustainable, ecologically sound, and commercially viable enterprises for managing the uplands, forest lands, and other natural resources. Large companies such as PICOP are able to finance some research and development but it is clear that such research is inadequate given the needs of selecting and maintaining appropriate species, maintaining adequate pest and disease control systems, and developing minimally destructive methods of harvesting. Additional research and development systems are needed for the support of both large commercial enterprises and smaller community-based systems. The model used in Northwest Thailand for working with indigenous minority groups to develop suitable horticultural practices may be informative for the latter. Support is also needed for designing and evaluating alternative institutional and organizational approaches to maintaining commercial viability without sacrificing future productivity.

6. Natural Resource Policy Analysis

There is also a critical need for supporting policy research. The misconceptions alluded to in this report concerning the necessity of "taxing the rents," the popularity of banning practices which are labeled as harmful, and the substitution of moral imperatives for substantive analysis reflect the underdeveloped state of policy analysis not only in the Philippines but in international agencies as well. This current state of affairs reflects the complexity of resource management issues and the rapid increase in their perceived urgency.

D. Additional Policy Questions

The present administration has been described as an administration of transition. The Aquino administration is attempting to follow a different approach and direction from that of the past administration. The new Philippine Constitution mandates different ways of doing things.

1. Shifts Away from Large Users

In the environmental and natural resources sector, there is an effort to shift natural resources management from a bias towards large-scale users to at least a balance between large-scale and small-scale (also indigenous) users. This is by choice and as mandated by the new Constitution. Increasing the access of communities, especially those that are more in need, to natural resources and the benefits of their use is seen as solving two immediate problems: environmental destruction caused by poverty and the need to meet the increasing demands of a rapidly increasing population. It is also seen as a way to recruit what are now considered as liabilities to become assets for natural resources conservation and environmental protection. Upland communities, for example, when given the right to directly benefit from the forest, could become protectors of the forest that they now consider part of them and are the source of sustainable livelihood.

The shifts that are pending are:

- TLAs to CFM (community forest management) including the shift within TLA to TSPA;
- Communal management areas for mangroves;
- The possibility of dividing large pasture leases into smaller parcels for backyard livestock raising and agroforestry; and
- Large-scale mining to "people's mining."

The questions and problems are:

- How can these shifts occur in a manner where production and the economy are not negatively affected by the transition?
- How can big business take a supportive role (i.e. credit sources, marketing support, technical advising) in such shifts?
- How massive and how rapid should such shifts be?
- How can the necessary political will be created? and
- Is there institutional capability to support such shifts?

2. The Role of Non-Government Organizations

NGO participation and support is important. How does one strengthen the NGO's at the level of capability needed without unduly diluting their NGO nature? How can potential NGO performance be judged in order to choose the most effective NGOs to work with? How should bureaucratic requirements (especially accounting and auditing procedures) be balanced with the NGOs "fast-track" approach? How can government bureaucracy deal in a positive manner with criticisms, which would be expected to increase with the strengthening of NGOs (as demonstrated by the success and difficulties experienced by NGO desks of government).

3. Inter-Departmental Cooperation

To be truly integrated, social forestry should include or be coordinated with other basic services (e.g. education, health and other infrastructures). These services are presently the mandate of and under the jurisdiction of other agencies outside DENR. How can integration of projects between DENR and other agencies be improved? Through CARP? Through a financial investment by DENR in educational and health services using easily available funds?

The Department of Agriculture is also setting up an aggressive hillside development program which is actually the same as DENR's upland development programs. Differences in approach and focus (agricultural for DA and tree crops for DENR) of projects which are situated on the same or adjacent sites may cause confusion within the host communities, and the projects may be seen as being in conflict or in competition with each other. How can integration between DENR and DA efforts, which has been initiated, be strengthened? Through joint programs, or a joint upland committee?

4. Watershed Management

The issue of integrated approaches also arises in the operationalization of watersheds. At present DENR activity is limited to the coastal mangrove zone. The coral reef areas, outside of protected areas or park system, are considered to be under the jurisdiction of the DA. Environmental management principles, however, suggest that watershed areas be treated as a single integrated system. This approach is particularly important in view of the archipelagic layout of the country, where many islands are small ecosystems where the mountains and seas are very close. Should BFAR be restored to DENR?

5. The Role of Pasture Land in Forested Areas

A large portion of the upland area is under inefficiently managed pasture lease agreements. With increasing upland population pressure, should these pasture leases be continued? One suggestion is to increase the rent paid for these leases and to use the increased revenue for community development projects within and adjacent to the pasture land. Another is for the lessees to surrender the leases and seek government support to organize the uplanders for backyard livestock projects, wherein the lessee will supply the cattle (through government purchase from the lessee or a co-production agreement with the farmer or the cooperative) and handle the bulk marketing. The feasibility of these ideas should be considered. The DENR has already launched the "Gubat Pampamayanan" program and the "Minahang Bayan" program; how about a "Bakahang Bayan" program?

6. Forestry Training

How should academic institutions teaching forestry shift their programs to meet increasing needs for expertise in upland development and social forestry? Even courses in logging, while maintained, may have to include a strong focus on small-scale community logging. How can DENR stimulate this shift in forestry academic programs? It may also be necessary to expand the foresters' understanding of management to include the whole array of natural resources (just as PENROs and CENROs now handle a broad array of concerns and not just forestry) and place them within the comprehensive framework of environmental management. How can these shifts be accomplished to meet the immediate need?

7. Expanding the Benefits of Timber Leasing Agreements

While TLAs may be necessary to meet local wood demands, how can their operations be modified so that the co-sharing and co-production provisions of the Constitution be truly followed and the distribution of benefits (beyond merely employment) to the communities and adjacent areas be improved?

8. Optimum Use of Protected Areas

What is to be done for communities within park and protected areas? Present legislation prevents any form of social forestry or upland development effort in these areas. How can people and parks/protected areas work together? Once communities are allowed to stay in such areas, how can further encroachment be prevented? The same questions apply to watershed reserves, military reservations, and the like.

E. The Comparative Advantage of USAID

Many international donor and lending agencies are involved in supporting environmental and natural resource management in the Philippines. USAID should organize its efforts in this sector to complement these efforts instead of duplicating them. It may be possible for USAID programs to provide leverage that makes the programs of other donors much more effective. For example, ADB is moving forward on a $125,000,000 loan for replanting deforested areas of the Philippines. The focus of the program is on establishing forest stands and maintaining them over a three-year period. The idea is that after three years the areas would be turned over to communities and commercial concerns for logging on a sustainable basis. This requires a great deal of faith. As discussed above, proper forestry management should be fully integrated with the downstream logging, processing and marketing activities. The best way to do that is to organize for commercial involvement in the first place instead of assuming that the government can efficiently manage replanting and auction off the future maintenance responsibilities and logging rights on a turnkey basis.

1. Research and Development

Research and development inputs are needed to explore what ecologically sound and commercially viable species are appropriate for which specific areas. The scope of R & D efforts should include the technical aspects of species selection and silvicultural practices, downstream processing activities, marketing and institutional arrangements that would support incentive-compatible resource management.

2. R & D Nurseries

R & D should be closely aligned with the functions of extension, training and provision of planting materials. The appropriate organizational focus of such work is not the highly visible and capital intensive national research center, but local nurseries that also support experimentation. These local R & D nurseries should be "menu-oriented." That is, recommendations should be characterized by diversity instead of uniformity. Rather than telling potential entrepreneurs, cultivators and

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stewards what they should do,the stations should concentrate on providing an abundance of opportunities that people can do. These local stations will of course need a substantial amount of technical assistance, much of which can be organized at the national and international levels. USAID could provide critical support in getting such a network established.

3. A Diversified Approach to Resource Management

The current US administration supports "win-win environmentalism," i.e., management of environmental and natural resource systems which preserves future resource productivity without constraining current economic growth and development. The Philippine mission of USAID may wish to align itself with this general philosophy. USAID can effectively act as mediator between both NGOs and US-based businesses that are willing to support sustainable and environmentally viable approaches to resource management in other parts of the world. A diversity of approaches should be welcome. The bottom line criterion to apply to prospective projects and programs is that they increase resource productivity now and in the future. Projects that will have the greatest benefit to the lower income groups are those that increase the productivity of labor resources which those groups control.

F. Summary and Conclusions

The existing descriptions and analyses of the natural resource situation in the Philippines provide useful information. They do not, however, provide a coherent and fundamentally sound basis for forming an environmental and natural resources management strategy. The existing studies also reflect a number of misconceptions about natural resource management and a paucity of end-use based technological research and development.

The principles of economics, biology, forestry, environmental science and public administration do not support blanket preservation policies such as a total ban on logging in the unlogged areas of dipterocarp forests. Economics, forestry and considerations of global atmosphere, for example, support increasing the growth rate of the forests by cutting older trees and stimulating the growth of fast-growing trees by both natural regeneration and replanting with fast-growing species.

Similarly, economics and public administration do not support "taxing the rents" from all logging operations or banning log exports. Loggers should be made liable for the user cost of logging but that cost may be negative if selected logging or replacing old growth forests with faster growing species increases the value of new growth. A separate policy instrument is

needed to charge a fair market value for the logging concession, thus preserving efficient selection of logging companies and horizontal equity and controlling against rent-seeking.

Since policy decisions are being taken in an atmosphere that is not well-informed by appropriate analysis, USAID can make an important contribution by supporting such analysis. There is a constellation of activities which is highly complementary and which are harmonious with the win-win philosophy of the current U.S. administration. These include research on policy alternatives and institutional arrangements, technical research on alternative species and processing and marketing alternatives and training and assessment of the economic value of resource degradation.

Such activities do not require major investments in land and buildings. The technical research that is needed can be focused primarily on relatively small "experimental nurseries" in appropriate locations. Research can also be coordinated through existing institutions. The most effective institutional arrangement for research is likely to be a non-profit-making enterprise (e.g.the Thailand Development Research Institute) that also maintains close links with universities (such that graduate students can provide valuable assistance and at the same time obtain useful training.

USAID can also be instrumental in promoting a more effective partnership between government and business. Many of the challenges facing natural resources management can be faced in a way that benefits commercial concerns as well as future generations of resource users. The concept of a nuclear state with its own (probably subsidized) research and development unit and with small fringe producers receiving management assistance from the nucleus provides one promising model. The natural resource management programs already in the pipeline, such as the ADB replanting scheme, are likely to turn out to be cost-ineffective unless the knowledge and institutional arrangements are developed which facilitate end-use orientation of these projects.

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ANNEX G

A CRITIQUE OF DECENTRALIZATION

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The Government of the Philippines (GOP) has made a firm commitment to decentralize much of its current domestic, non-defense services. The Philippine agricultural and natural resource strategy requires strong support from local government units (LGU's), and therefore will depend upon successful decentralization for much of its own success. The purpose of this annex is to assess the decentralization program, including its implications for the agricultural and natural resource strategy. The assessment draws upon experiences of other country's decentralization programs and considers three prime decentralization questions that are relevant to improving food security and sustained renewable natural resources: (1) what types of decentralization are being implemented and how do they affect food security?; (2) what are some important criteria for assessing decentralization, and how do these criteria relate to food security?; and (3) what are some important decentralization principles that should be considered in developing an agricultural and natural resource strategy?

A. Background

During the early times within what is now known as the Philippines, chieftains and sultans ruled their own territories. Their governments were autonomous and decentralized. When the Spanish colonizers came, they established the concept of central command over a colony and centralization of powers (civil and religious combined). Centralized, authoritarian rule persisted for more than 300 years under the Spanish and strongly influenced all successive governments. The Philippine revolution of 1896 brought forth the concept of an independent nation, but the First Republic was short-lived and, therefore, could not even try devolution of authority. The American rule also preserved a strong central government.

A transition Commonwealth government was formed from 1935 to 1946. The Philippine Government was highly centralized even after regaining independence in 1946. The Philippine Presidents had centralized executive power that could exert strong political leverage with respect to local government executives (Governor and Congressmen). However, there was an early trend towards decentralization. There is greater pressure to decentralize now. It appears that the combined efforts of local governments and the President will induce Congress to pass the law that would implement the constitutional provision on local government autonomy.

There have been a number of measured steps to establish improved local governance. The formation of smaller political units (provinces, cities, municipalities, barangays) has been an on-going process. In many instances, these political units were sub-divided to reduce the span of attention and control in the hope that smaller government units would be easier to manage. In

other cases, insoluble political problems or rivalries have sometimes been the proximate cause for the formation of new political units such as dividing provinces, creating cities and municipalities and barangays.

1. The Regional Approach to Decentralization

Regionalization was formalized in 1973. This became another method of decentralization, but regions have not been recognized as a political subdivision under the Constitution. The region is just another administrative unit in the hierarchy of the Executive Branch.

The Cooperatives Law also encouraged various types of agro-industries to form cooperatives for the common benefit of farmers, producers, sellers, consumers, creditors, and employees. The cooperative movement was designed to help people participate in economic activities under their own management. In spite of promotional efforts, incentives and credit support for these cooperatives, many of them failed due to poor management.

Electric cooperatives and water districts were also set up to serve basic needs under local management. Again, some were successful, but many others failed to collect service charges and could not meet their financial obligations.

The local tax code, the real property tax code and other laws were passed to improve revenue generation of local government units (LGUs). The internal revenue share was defined in a formula and thus made the revenue sharing more automatic. This formula is being reviewed so the local government share could be increased.

The growth of financial institutions in the rural areas has been promoted before, but due to a number of bank failures, licensing of new banks is slowing. On the other hand, institutions guaranteeing farm credit and warehouse receipts, and crop insurance are being strengthened. Branching of commercial banks is being liberalized, although in many instances, these branches hardly get involved in agricultural production credit because of the high cost of lending.

Communal irrigation systems including irrigation associations were established so they could manage and maintain their own water systems. Many of these organizations were successful because irrigation substantially improved their crop productivity.

There have been many programs and attempts to build up rural communities. The programs and projects to build schools, roads, seaports, airports, communications, rural electrification, irrigation, and water supply are all designed to reduce business

handicaps for those locating in rural areas. The development of industrial and export processing zones is part of a national strategy to diversify and disperse industrial activities. There have been a number of integrated area development projects which attempted to maximize the effects of development planning and program implementation. Usually, industries locating in rural areas are given additional fiscal incentives to compensate for inadequate infrastructure. In some places though, security of the personnel and operations is the main consideration.

The election of the barangays, municipal, city, and provincial officials and the creation of the municipal/city/provincial, regional development councils in 1973 assisted the communities in channeling their demands for projects and services which are screened upward from barangays, and eventually, to the regional development council. While many of these requests are cut due to lack of funds, a sense of priority and cooperation with other political units emerge in the process.

This enumeration of what has been done over the years is a sketch, but it is not complete. The process is marked by good beginnings, some successes and a number of failures.

2. Beyond Regionalism: The Shift to Local Governments

In addition to the community development approaches, the development of local governments is being tried at this stage. Decentralization will not be total, but it is expected that there will be significant progress. Overall, the sharing of power and resources between the central and local governments is expected to yield positive results in terms of local governments: being more responsive; increasing their financial efficiency; delivering better civic and political training; and improving participation in local governance and in the selection of the communities' future paths of development.

As the process of development proceeds, it is important to emphasize the cost of development to the people; that people must save to invest and if they borrow resources from others (domestic and foreign), they must pay later for the cost, for the up-keep, and for the services delivered. Up to now, many politicians promise free goods and services from government, which in turn fosters attitudes that weaken efforts to improve sustainability.

B. The Rationale of Decentralization

1. The Expected Benefits

Decentralization will allow people fuller participation in the process of developing their communities. Unlike in a centralized government, decentralization will allow people much more opportunity for consultation on decisions affecting their futures.

LGU's, if provided with adequate resources, can be more responsive in serving their respective constituencies as, compared with field personnel of Departments or Bureaus. The lines of communication within an LGU are much shorter than in the case of Departments.

Implementation of programs/projects could have been faster or more efficient, in contrast with the performance of the Departments/Bureaus during the past three years. Increased awareness of the people in the locality could also deter graft and corruption in the implementation and award of contracts.

Local government officials are more knowledgeable about their problems and the priorities of their respective constituencies. The officials can pay closer attention to these problems and are able to formulate practical solutions faster.

If more functions are transferred to the LGU's, their officials could be trained on the job to handle more responsibilities. If the lower levels of governance have proven capabilities, then the government structure would be more efficient and stable as decision-making is strengthened through increased democratic participation.

2. Some Drawbacks of Decentralization

Several problems will challenge the good intentions of the decentralization program.

a. Parochial Solutions to Regional/National Problems

The local attitudes toward problem situations could be parochial, and therefore lack the appreciation of the problems that could arise in the provincial or national level if local approaches/solutions are adopted.

b. Lack of Uniform Tax Rates Across LGU's

Tax measures adopted by different LGU's may be widely different, thus businessmen might suffer because of lack of uniformity of treatment. Commerce could be hampered, say because of lack of uniformity in setting local fees or local taxes.

c. A Disadvantage of Decentralized Funding

Considering the fact that the National Budget is always in deficit, centralization of fund management is an advantage, since one can shift funds from slow moving projects to more viable projects. If all funds are immediately transferred to LGU treasury accounts, then the National Government will have to borrow more in order to maintain its safe liquidity floor.

d. Legal Conflicts Due to Local Autonomy

If the LGU's become more autonomous, it may be more difficult for them to follow new restrictive measures (austerity) that might be required under international agreements signed by the National Government. In which case, deeper cuts will have to be made on the larger national projects in order to compensate for the lack of cooperation.

C. Decentralization to Support Agriculture and Natural Resources

1. The Department of Agriculture's Decentralization Program

The Department of Agriculture (DA) is one of the Departments involved in a five-province pilot decentralization program. There are problems in the negotiations between the provincial governments and the DA with reference to the transfer of extension personnel and their corresponding pay, allowances, and operating expenses. This type of problem will be common to many departments, so this should be resolved soon if large delays in the natural program are to be avoided.

The earlier efforts in decentralizing the operations of the DA should also be considered. For instance, Executive Order 803, entitled "Establishing an Integrated Area Management System for Agricultural Services", was issued in May, 1982. This Executive Order covered a number of agencies that have a bearing on agriculture production. The quick response of the agricultural field personnel and their close supervision are important to the success of the process of decentralization. Furthermore, the DA must provide the products of research to the agricultural workers and at the same time provide broad policy formulation and analysis support.

The improvement of agriculture requires the coordinated efforts of many organizations, both private and governmental. The DA cannot be decentralized alone. All other agencies and organizations must put in their contributions and efforts in the specific areas where the crops are planted and processed and marketed. In other words, the agents of production (road repair/builder; irrigator; agricultural technician; credit; processor; market) must act in concert. These agents must not delay the assistance just because they have to communicate to

headquarters for decision or instructions. By decentralizing, the lines of communication will be shortened so all agents can act in concert and be able to produce more. Food security can be enhanced in different places in the Philippines if the decentralization process can assist in raising food production more in line with the population growth rate.

2. The Department of Environment and Natural Resources' Decentralization Program

In the case of the Department of Environment and Natural Resources (DENR), the department has decentralized by delegating authority to the Regional, Provincial (PENRO) and Community (CENRO) officers of DENR. The Department is not included in the decentralization experiment with the pilot provinces. The Department offered to try to decentralize by transferring complete authority in one of the major provinces, but the Governor declined to accept the delegation at the present time.

One of the most important problems of DENR is securing and enforcing regulations to prevent unsustainable exploitation of timber. If the national government is not able to do it with an organization of forest rangers and guards, it is doubtful the local governments will be any more effective in securing forest resources. LGU's are having difficulty enforcing traffic, garbage disposal, and anti-squatting rules, and therefore would appear to face even more serious problems in protecting forests.

The bill on the integrated national police and the Philippine Constabulary should be resolved. The control and supervision of the police forces should be clearly specified. LGU's cannot be expected to carry out their functions without a police force to enforce the laws of the land.

Implementation of the social forestry program, which was started about 1981, should be hastened. If the police forces cannot be totally effective in preventing intruders or illegal loggers, probably awarding social forestry rights to selected settlers could improve the situation because they could form a barrier against intruders. It is expected that they will protect their own areas because their livelihood would be affected adversely by intruders.

The other factor to consider is that the natural watershed boundaries are not necessarily the political boundaries of LGU's. Therefore, cooperation in the management of the watershed is vital to successful forest/watershed management. Upland areas (with steep slopes) are usually sparsely populated and, therefore, the politicians are not interested to devote a great deal of time to their needs and requirements. The environment is also fragile, there is need for careful handling of materials and young plants. The growth cycle of trees is much longer than cash

crops, therefore, larger areas and higher investments are needed in order to sustain the livelihood of a family. This part of the program could be better handled by NGO's in cooperation with the DENR and LGUs.

The reception of LGU's to the delegation of authority over natural resources will be varied. In areas where timber remains, provincial authorities might want to control logging. But in areas that are logged over, and there is hardly anything of value left, the authorities might hesitate to accept responsibility. These matters will be the subject of negotiation between the Department and the Provincial and Municipal Governments. Under the law, the DENR makes the decision on land classification. If it is classified as forest land, then it cannot be alienated but the land can be awarded for social forestry purposes. If it is classified as agricultural land, then the Department of Agrarian Reform (DAR) will have to administer appropriate land distribution and the DA will provide technology to the farmers.

3. The Need for Inter-Departmental Cooperation

Since area development is being targeted, the functional departments must act together to improve food security and sustained forest production. Otherwise the sequential procedures will lead to duplication of efforts and reduced concurrent implementation of services. That is the reason why the Executive Order in 1982 was designed to program integrated area management of agricultural services.

The unevenness of the decentralization process will not be able to bring about the benefits of deciding all matters at the lowest level possible. In addition to DA and DENR, the agricultural and natural resources subsectors often require the assistance of the Department of Agrarian Reform (DAR), the Department of Public Works and Highways (DPWH), the Department of Science and Technology (DST), the Department of Trade and Industry (DTI), the Department of Transportation and Communication (DTC), and the National Irrigation Authority (NIA, now under DA). For example in any given area, a number of elements may have to be considered over several departments:

- land distribution or ownership (DAR, DA);
- protecting forests from illegal logging (DENR);
- protecting watersheds from logging-related damages (DENR);
- infrastructure - irrigation, roads, drainage, flood control, communications (DPWH, DA, NIA, DTC);
- financing - production, marketing - guarantees and insurances; (DA, DTI)
- transportation and storage - inputs and outputs (DTI, DA, DTC, DPWH);
- processing - drying, processing, packaging, storage (DA,

DTI);

- o managing public agricultural and wood products research institutions to respond quickly to local technology needs (DA, DENR, DST); and
- o pricing policy (DTI, DA, DENR).

D. Opportunities for Further Decentralization

Considering the Constitutional mandate, the preparations made by the National Government, and the pressure exerted by the League of Governors and City Mayors, the Congress will be under considerable pressure to enact the Local Government Code in 1990.

1. The Decentralization Timetable

One of the provisions of the Local Government Code is to set a deadline for implementation within an 18-month period. While this period is set, it may not be considered an absolute deadline with penalties to be applied if it is not met. Even if the deadline is not met, there would be a significant progress in the move to decentralize. In fact, it might be dangerous to rush decentralization because some LGUs may not be able to absorb the functions as fast. It is better to be sure-footed with the decentralization process rather than have many failures due to overloading the LGU's limited capabilities.

2. Financing Decentralization

There will be a substantial increase in transfer of resources to the LGU's in 1990. The improvement of performance controls and audits should go simultaneously with the greater volume of projects implemented and services rendered.

As a further step, the regional budgets for 1991 should be prepared with the full knowledge of the Governors/Mayors and Congressmen/Senators so that the Congressmen should be responsible for its presentation and defense during the appropriation hearings. There could be better cooperation between and among the Governors and Congressmen if they all agree to the budgetary components within their own territories. This feature of the budget process could be further refined in order to secure harmony among the political leaders. 1992 is important because it is an election year. It therefore behooves political leaders to avoid distortions and diversions of budget items that could destabilize the election process.

The funding of LGU activities is a critical factor. For every function transferred to the local government, the current departmental budget should also be transferred. The LGU's also get a share of the internal revenue collections and there are suggestions and moves to increase the share. There are possibilities of still increasing the LGU shares, but at present,

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one cannot determine accurately the realistic percentage because there is no thorough study of the consolidated public sector budget. For example, the obligations to pay the borrowings for rural and local government units are serviced by the National Government; if the LGU's are to be totally responsible, then effort should be exerted to divide the obligations to LGU's so that they would know how difficult it is to finance a project by borrowing. Otherwise, if decentralization is viewed only as revenue sharing, then local government officials are being trained in the wrong approach.

Considering the requirements of the Constitution with reference to tax legislation, strict guidelines are required for purposes of uniformity; otherwise, businesses will suffer. There are suggestions to let LGUs adopt their own tax revenue measures even though they are not uniform. Some will say that reason will eventually prevail so it will be good in the long run. However, there is not enough time to go through all those processes of settling LGU disputed ordinances, even if they are going to be instructive to everybody concerned. Settling protests, appeals, and court cases will just take too much time. If there are good revenue measures that the local governments can propose to be part of the Local Tax Code or the Internal Revenue Code, then they should be considered first in Committees and eventually in Congress. If the tax effect does not cross provincial boundaries, then local legislation will be sufficient because it will not affect national commerce.

If the LGU's enact, impose and collect taxes, then they should also strengthen their tax examiners. There should be harmonization between national and local tax examiners; otherwise, business enterprises will complain about multiple examinations of their records, some of which may be in the head office.

In order to more accurately determine the sharing of revenues, obligations and responsibilities, a thorough study of the public sector finance and budget should be undertaken by the Government of the Philippines, probably with technical assistance. The annual budget does not give a clear picture because there are many instances where projects are deferred or obligations rolled over, just to make both ends meet. A clearer budgetary picture will assist many government administrators in policy and program formulation and execution.

3. Adding More Provinces to the Decentralization Process

In 1990, more provinces should be placed under the decentralization program. Fourteen provinces and cities (one per region) will be selected to be included in the program. It would be appropriate that the LGU's with proven capabilities be selected first, rather than the weaker ones. In the meantime, other LGU's not yet included in the program can be given training

so they can be better prepared. Enhancing the capability of LGUs is an important phase of decentralization. Technical assistance for local government administration is important at this stage.

Under the present scheme of decentralization, Government Departments enter into a Memorandum of Agreement (MOA) with Provincial/City Governments as to what functions and funds will be transferred and on the definition of authority and responsibility. As soon as the experimental period is finished, the Office of the President can then issue Administrative Orders or the Administrative Code and the Local Government Code can be amended to reflect the completed process of decentralization. Alternatively, the Administrative Code could be amended ahead of time, but with a proviso dealing with the transition period. Among those MOAs given, it seems that the Department of Health MOA's with the five provincial governments is the most complete.

4. Key Decentralization Monitoring Issues

The decentralization program is well under way. The President continues to issue policy guidelines and directives to further decentralize the departments and at the same time press for the enactment of the Local Government Code. The President would like the decentralization program to be implemented within an 18 month period prior to the end of the Presidential term in 1992. There will be continued progress in decentralization and the program should be supported as a cross-cutting policy objective to sustain LGU financing of local infrastructure, expand democratic participation and increase rural income and employment through broad expansion of agricultural production, processing and marketing opportunities.

The following items of the decentralization process should be monitored to ensure success of the program:

- the pilot program in five provinces with the Departments of Social Welfare, Health, Agriculture, Public Works and Highways, Budget;
- the implementation of 1990 budget, and improvements in the 1991 budget such as regional budgeting and transfer of funds;
- the training of Local Government officials and staff and the reorganization of Departments;
- the enactment of the Local Government Code and the Integrated National Police;
- the enlargement of the pilot program to 14 provinces and additional departments;

- the monitoring of LGU's with reference to planning, budgeting, program implementation and delivery of services, financing controls, staff recruitment and training or retraining;

- faster reclassification of municipalities, cities and provinces to higher grades if their revenue generation improves; and

- a comprehensive study of the total public sector budget so the sharing of income, obligations and expenditures can be better determined.

E. The Future Course of Decentralization

1. Types of Decentralization

Decentralization is generally defined as the transfer of responsibility for planning, management and fiscal resource allocation from the central government to:

- field units of central government departments or agencies;
- subordinate units or levels of government;
- semiautonomous public authorities or corporations;
- areawide, regional or functional authorities; and/or
- nongovernmental private or voluntary organizations.

A large body of international literature in the fields of political science, public administration and development administration has identified four major types of decentralization:

- Deconcentration -- the transfer of central government authority or responsibility to local offices of the relevant central government departments;

- Delegation -- the transfer of central government authority or responsibility to LGU's;

- Devolution -- the assumption of authority or responsibility by LGU's for delivering services that are substantially outside the control of the central government authority; and

- Privatization -- the transfer of responsibilities for given services and functions to private voluntary organizations, or allowing them to be performed by private sector, profit-seeking firms.

However, the language of the debate over decentralization in the Philippines appears to be restricted almost exclusively to delegation. The DENR decentralization program is essentially a

deconcentration effort, dispersing DENR staff to the local level, but the term, "deconcentration", is not used. The DA program to transfer extension services to five provinces is a genuine delegation effort. No central government department has mentioned "devolution", and "privatization" seems to not be perceived as a decentralization activity. The heavy emphasis on delegation reflects a serious lack of appreciation of the wider opportunities for making decentralization the success the central government earnestly seeks.

The central government's long-term goals for decentralization would appear to be quite limited, if the Department of Local Government's operations are relevant. DLG has enjoyed its role as prime facilitator and central government "angel" for LGU's. The advent of decentralization would seem to spell a sharp reduction in DLG operations after a reasonable transition period where LGU's strengthen their capabilities and assume additional responsibilities for public services. However, DLG appears to feel its mission and size of operations will continue, essentially unchanged, well into the next century.

2. Criteria for Strengthening Decentralization

The standards for evaluating the effectiveness of the decentralization process seem to be vague and exceedingly narrow in scope. Decentralization experiences in several countries strongly suggest that the following criteria would be useful in monitoring the Philippines' decentralization process.

a. Achievement of Broad Political Objectives

It would be useful to ask to what extent the decentralization process is: promoting political stability; mobilizing support and cooperation for the national development policies; and providing heterogeneous regions, interests and communities with a stake in the survival of the political system. Experience to date suggests that there is strong political support for decentralization, but the pace of accomplishment is very slow. The agricultural and natural resource subsectors are and ideal base for pursuing these objectives, but there seems to be only limited progress.

b. Increased Administrative Effectiveness

The decentralization process should promote greater cooperation among units of national government and between them and LGUS's. The recent limited experience with decentralization does not indicate much progress in this area.

c. Increased Economic and Managerial Efficiency

The decentralization process should allow all government units to achieve development goals in a more cost-effective manner. There has been very little progress in this area because LGU's have very limited management capabilities and face major financial constraints imposed by the central government.

d. Increased Government Responsiveness

The decentralization process should meet the needs and demands of various interest groups within society. Decentralization has not been implemented long enough to observe this process. The private sector has a prime opportunity to increase its advocacy for democratic participation. Donors can be useful in this area by providing forums for broad segments of the private sector to interact with LGU's to identify development problems and propose effective solutions.

e. Increased Self-Determination and Self-Reliance

The decentralization process should help subordinate government units or nongovernment organizations in promoting development or meeting highly valued needs within society. Decentralization has not been under way long enough to observe any progress in this area.

f. Appropriateness of the Decentralization Program

Policies and programs should be designed and implemented to achieve decentralization goals. Experience to date indicates that decentralization goals are not very well defined and the existing policies and programs have not been implemented long enough to produce tangible results.

3. Decentralization Principles for Improved Food Security and a Sustainable Natural Resource Base

Decentralization experiences in other countries suggest several principles that can be useful in assisting the GOP in strengthening the agriculture and natural resource sector.

a. Plan Small and Expand Incrementally

Decentralization programs designed for limited impact often generate more positive results than large-scale, sweeping, organizational reforms. In the rural sector, the development problems are so great that interventions must be carefully designed to effectively use limited financial

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resources. Administrative and political complexities also dictate that decentralization programs proceed slowly, within the managerial capabilities of the LGU's.

b. Plan for the Long Term

Decentralization programs should be planned over a sufficient period of time to allow benefits to be realized, rather than raise unrealistic expectations of quick, dramatic results. Given the current rate of decentralization, it is very unlikely that most of the GOP's goals will be met within the next 18 months. In the case of financial sustainability, LGU's will be depending on rapid rural economic growth to build an adequate tax base. It would therefore be realistic to view the decentralization planning horizon in terms of five to ten year blocks.

c. Plan With Heavy Tutorial Inputs

During the initial stages of decentralization, emphasis will be needed on supplying sufficient supervision to teach local staff and citizens how to handle new responsibilities, rather than scheduling sudden transfers of many tasks and responsibilities. LGU's have been neglected in the past and therefore have very limited administrative and managerial capabilities. Massive on-the-job training programs will be needed to cope with the initial strains on LGU staff.

d. Plan for Donor Involvement, With Ultimate Donor Phase-Out

Decentralization programs can make effective use of donor resources to serve as short- and intermediate-term supplements to domestic resources until decentralized functions are self-sustaining. In the agricultural and natural resource sector, there are important opportunities for donors to provide program and budgetary support for rural roads and forest management during the transition.

e. Plan for Training

Decentralization programs should include comprehensive training components to strengthen the capabilities of central administrators, local staff, officials and citizens once the programs are completed. Given the complexity of the decentralization process and the limited capabilities of LGU staff, the current emphasis on public administration training is totally inadequate. To proceed with decentralization without a comprehensive training program for LGU's will create more problems than now exist under a centralized government.

f. Plan for Parity of Financial Authority and Administrative Responsibility

Decentralization programs should transfer adequate financial resources or authority to support regional and local governments' new powers and responsibilities. The current plan to make IRA's a permanent feature of the decentralized government is contrary to the principles of financial sustainability and optimum public sector resource allocation.

4. Decentralization Priorities for Agriculture and Natural Resources

The decentralization process is taking the Philippines into uncharted political territory. In the rural, agricultural and natural resources sector, USAID can assist the GOP in the decentralization process by supporting program initiatives in three mutually supporting areas: rural roads, forest management and fiscal sustainability.

a. Rural Roads

The rural road system is in very poor condition. Donors can assist the GOP in repairing existing roads, building new roads and implementing a sound road maintenance program. However, most rural road investments will be wasted if they are not proceeded by a comprehensive transfer of regional and farm-to-market road and highway responsibilities to LGU's. If LGU's do not have the political and financial capabilities to maintain their road systems, the central government will not have any incentive to improve the situation. As a result of central government control of rural roads, rural road transport costs will remain high; the agribusiness subsector will continue to stagnate; and food security will be further weakened over time.

b. Forest Management

LGU's need the political and financial capability to protect timber from illegal logging; minimize environmental damage during logging; and abate environmental damage caused by past logging practices. As long as the central government doles out significant shares of LGU budgets, the political accountability for effective management of forest and upper watershed resources will be short-circuited.

c. Financial Sustainability

As long as LGU's are dependent on the central government for an internal revenue allotment, they will face serious financial and political constraints. IRA's also act like subsidies in the private sector by distorting the public sector market: the IRA causes the market price to be lower and the

market quantity of public services to be higher than would be the case if the LGU's used only locally generated revenues (taxes) to finance citizen-taxpayer public service needs. Likewise, LGU's need the political and financial capability to make the necessary recurrent cost investments in maintaining roads and other local infrastructure.

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