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December 15, 1982

To Andra Herriot, AID/M/PM/TD/CD

From Roberta van Haeften, Leader USDA/OICD Nutrition Economics Group

Subject Final Report on PASA Number SIB-000-P-AG-2103

Attached is the Final report on our activities and accomplishments in the development, implementation and revision of the training program on Food Production/Consumption Linkages. Included are the revised materials as discussed in the October 1 meeting. All reports and products specified in the Scope of work of the subject PASA are included in the attachments.

cc: Nicolaas Luykx, S&T/N  
John Hyslop, OICD/TA/WWP

- Attachments:
- 1) Complete set of materials consisting of:
    - a) A complete set of materials used in the pilot workshop.
    - b) A complete set of revised materials including 1 policy case, 3 country cases and staged exercises for future workshop program.
  - 2) Revised final workshop design and schedule for trainers.
  - 3) Cost estimate for draft scope of work.
  - 4) Copies of video tapes on Puno and Palawan cases.
  - 5) Copy of video tape taken at pilot workshop.
  - 6) Report of the Pilot Workshop.
  - 7) A list of potential trainers.
  - 8) Final Report
  - 9) Reports of trainers on the pilot workshop.
  - 10) A list of supplies taken to the pilot workshop.



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FINAL REPORT: IN-SERVICE TRAINING PROGRAM ON  
FOOD PRODUCTION/CONSUMPTION LINKAGES

by Charlotte Miller  
with assistance of Jeff Merriam

In accordance with the scope of work on the PASA number STB-0000-P-AG-2103-00 the Nutrition Economics Group was contracted to design a training program and materials, implement a pilot workshop to test materials and evaluate both workshop and materials for possible future use in a more extensive program on food production/consumption linkages. Based on the feedback compiled from both trainers and trainees at the successful pilot workshop, NEG has revised certain course materials.

The activities of NEG in developing the training program beginning during calendar year 81 and conclude in calendar year 82 include the successful completion of the following:

- (1) Drafted scope of work and budget for PASA.
- (2) Scheduled and attended over 20 meetings of advisory committee.
- (3) Drafted cable on workshop idea for all USAIDs.
- (4) Conducted liaison with regional bureau agricultural and nutrition personnel to clear cable and obtain support for program.
- (5) Compiled and analyzed responses from missions.
- (6) Drafted and obtained clearances on reply cable.
- (7) Conducted inquiries into potential projects to be used as basis for case materials.
- (8) Obtained clearances for projects to be used.
- (9) Solicited and obtained background reports and other information on projects.
- (10) Identified contractors to conduct field information collection, wrote cases, wrote training tasks and objectives for them, designed exercises, designed video materials, and conducted/evaluated pilot workshop.
- (11) Conducted meetings to consult with other international organizations on their input, training materials and approaches to design.
- (12) Conducted site visits to the projects to photograph and evaluate progress to date on projects.
- (13) Reviewed and collected biodatas and qualifications of trainers for possible implementation availability.

- (14) Completed, selected and negotiated terms of sub-contracts for field information collection, case-writing, exercise-development, video design and workshop staff.
- (15) Wrote and obtained necessary approvals for sub-contracts and travel authorizations for training staff.
- (16) Consulted with contractors on progress to date and final products.
- (17) Reviewed and approved vouchers and requests for contract payments.
- (18) Distributed materials as available for comments and feedback.
- (19) Scheduled and conducted pre-workshop training staff meetings.
- (20) Reviewed, rewrote and edited materials developed.
- (21) Obtained and assembled notebooks, flip charts, supplies, name tags and other necessities.
- (22) Procured rental of video equipment for use in pilot workshop.
- (23) Drafted and obtained clearances on training nomination cable.
- (24) Compiled (together with P/PM/TD/CD) nomination response cables.
- (25) Drafted AID training circular.
- (26) Transported materials, equipment and supplies to workshop site.
- (27) Coordinated activities of contractors and advised them on training program.
- (28) Conducted, attended and evaluated pilot workshop.
- (29) Conducted post-workshop training team evaluation meetings and briefing for M/PM/TD/CD on October 1, 1982.
- (30) Briefed other donor agencies on pilot.
- (31) Drafted and sent out letters of thanks to all trainees' supervisors.
- (32) Compiled and sent out 2 follow-up packages of materials to each participant.
- (33) Prepared interim report.
- (34) Prepared cost estimate of future workshops.
- (35) Prepared suggested scope of work based on pilot experience.

- (36) Prepared list of trainers with qualifications and availability information.
- (37) Drafted letter to accompany pre-workshop package.
- (38) Identified and procured contractors for revision of materials.
- (39) Solicited comments on Puno and Palawan case studies including meeting with Washington-based World Bank's Puno project manager.
- (40) Reviewed all revised material and solicited and incorporated comments.
- (41) Prepared draft revisions of Puno, Palawan and Lower Volta.
- (42) Revised reading assignments for workshop.
- (43) Made arrangements for copying of video tapes.
- (44) Explored various strategies for implementation of on going workshop program.
- (45) Prepared final workshop design.

LIST OF MATERIALS FOR PILOT WORKSHOP

20 Participants/8 Resource People

- 1) 4 dozen pencils
- 2) 35 ball point pens
- 3) 9 black magic markers
- 4) 9 red magic markers
- 5) one stapler and box of staples
- 6) one staple remover
- 7) one three hole punch
- 8) 10 flip charts
- 9) 3 flip chart stands
- 10) 35 three hole binders
- 11) 35 packages of materials
- 12) 35 packets of lined paper
- 13) 3 reams of paper for xeroxing
- 14) 4 trainers note pads
- 15) one box of paper clips
- 16) 35 name tag pins
- 17) 35 name cards
- 18) 35 sets of dividers (6 per set)
- 19) 35 paper folders
- 20) 35 copies of Berg's Malnourished People
- 21) 35 copies of USDA Nutrition Labeling
- 22) 35 copies each of USAID policy papers
- 23) one pair of scissors
- 24) one straight edge

- 25) individual certificates for each member and 5 extra
- 26) tape recorder and audio tape
- 27) video equipment: camera; player, TV; 3 tapes (2 pre-recorded, 1 for recording)

Budget for 12 Workshops  
(6 pairs)

Supervisory

Program Coordinator	10 days X 6 pairs @ 180/day	\$ 10,800
Asst. Coordinator	35 days X 6 pairs @ 85/day	17,850
Secretary	Total 100 days @ 55/day	<u>5,500</u>

SUBTOTAL \$ 34,150

Training Staff

Lead Trainer	17 days X 6 pairs @ 221/day	\$ 22,542
Food Economist/Social Science Trainer	17 days X 6 pairs @ 221/day	22,542
AID Programming Trainer	17 days X 6 pairs @ 221/day	<u>22,542</u>

SUBTOTAL \$ 67,626

Video Staff for first 2 workshops

Video expert	12 days @ 125/day	<u>1,500</u>
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TOTAL STAFF \$103,276

Transportation and Per Diem

Travel

7 round trips to Panama or suitable location in Latin America @ \$1,000/round trip	\$ 7,000
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6 round trips to Nairobi or suitable location in Africa @ \$1,600/round trip	9,600
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6 round trips to Manila or suitable location in Asia @ \$2,500/round trip	15,000
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Per Diem

Panama: 6 people X 16 days @ 71/day	6,816
1 person X 12 days @ 71/day	852
(Costa Rica @ 54/day, Honduras @ 68/day)	

Manila: 6 people X 16 days @ 58/day	5,568
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Nairobi: 6 people X 16 days @ 72/day	6,912
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Excess Baggage

Excess baggage and shipping supplies 1,000/pair X 6 pairs	<u>6,000</u>
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TOTAL TRAVEL \$ 57,748

Video Taping

Editing and rescripting from pilot	
Editing and scripting resource video tape	
Editing and scripting project/policy tape	
Produce 2 video tapes	
10 days @ 125/day	\$ 1,250
10 tapes @ 40/tape	400
Equipment rental and insurance for workshops	
42 days @ 92/day	3,864
(12 days for first pair, 6 days each for remaining 5)	
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TOTAL	\$ 5,514

Training Facilities

12 days @ 6 pairs @ 250/day	\$ 18,000
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Supplies and Xeroxing

Typing: 6 pairs @ 100/pair	600
Supplies (60 sets per pair) @ 375/pair	2,250
(Note books, flip charts, markers, pens, pencils, staples, paper, etc.)	
Xeroxing and reproduction	
(60 packets) 6 pairs @ 1,500/pair	<hr/> 9,000
TOTAL	\$ 17,250

GRAND TOTAL           \$201,768

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## PRE-WORKSHOP PACKAGE

Dear Colleague:

We are pleased to learn that you will be joining us in the workshop on Food Production/Consumption Linkages in  $\bar{V}$ . The workshop will give you an opportunity to learn and use the skills in the nutrition/consumption field. The program has been carefully designed to achieve the following goals:

- ° For you to become familiar with the language of food consumption economics and basic nutrition concepts and analysis.
- ° For you to learn to select and apply a variety of analysis tools needed to:
  - a. Ascertain whether a country has a food consumption or general nutrition problem, and if so determine the nature and extent of the problem.
  - b. Ascertain actual and potential linkages between food/agricultural/rural development policies, strategies, programs and projects and food consumption/nutrition levels of target populations.
  - c. Select and design activities or elements of agricultural and/or rural development projects to alleviate known food consumption problems or minimize the likelihood of adversely affecting food consumption patterns of general nutritional levels.
- ° Develop a personal strategy and plan of action for utilizing the knowledge and skills learned in the workshop to influence borrower/grantee policy and program planning and USAID program and project planning, design and implementation and evaluation to ensure that adequate attention is paid to the linkages between agricultural production and food consumption.

Advanced preparation on your part will greatly enhance your ability to apply what you will learn to the unique conditions of your country of assignment. There are three advanced preparation tasks to be accomplished described below. It will require several hours of your time to complete this preparation for the workshop.

The package contains the workshop goals (above),  $\bar{V}$  AID policy papers  $\bar{V}$ ,  $\bar{V}$  and a questionnaire on your host country's nutrition status and programs. This letter contains instructions on the selection of a project for your use at the pilot.

The first task is to prepare yourself for discussion of the AID policy paper. AID policy discussion is an important aspect of the preparation of a strategy in dealing with the linkage between food production and consumption and will be referred to throughout the program. A high level of preparation will stimulate a more productive discussion. It should require no more than one hour to prepare for this discussion.

The second task is to fill out the questionnaire using your current country of assignment as a basis. This will involve some basic research. You are strongly encouraged to meet with an official from the Ministry of Health who may provide you with a good deal of information. This exercise is designed to familiarize you with your host country's particular problems. You will be using this knowledge throughout the workshop. Excluding the time you spend doing research, which should not be more than a few hours, it will take you about 45 minutes to fill out the questionnaire. These questionnaires will be handed in on the first morning of the workshop.

The third task is to choose a real or pending project in your host country for your use during the workshop. Ideally this will be a project on which you are working. The project must have potential for nutrition/consumption effects. As the project will be your model in many workshop exercises it will be necessary that you be familiar not only with the project history, but also with data gathering techniques and the data itself where available. You may wish to assemble and bring with you the project papers for your reference. It is important that you are able to intelligently discuss the project from the first day of the workshop.

We are looking forward to another productive workshop and are looking forward to meeting you at registration at  $\bar{V}$  on  $\bar{V}$ .

Sincerely,

Lead Trainer

Enclosures

QUESTIONNAIRE

In-Service Workshop on Food Production/Consumption Linkages

Participant's Name \_\_\_\_\_ Country \_\_\_\_\_

Part A--Country Data

1. What is the nature of the country's food consumption/nutrition problems, if any?  
 Undernourishment  
 Inadequacy of specific nutrients  
 No serious nutrition problems
  
2. If there is a malnutrition problem, how extensive is it?  
 Virtually countrywide  
 In certain geographic areas, representing about \_\_\_\_\_% of total land area  
 In certain population groups, representing about \_\_\_\_\_% of total population  
  
 Primarily an urban problem  
 Primarily a rural problem  
 Serious in both urban and rural areas
  
3. What is the basis for the foregoing conclusions?  
 A national nutrition survey  
 Extrapolations from sample surveys  
 Conclusions drawn from food balance sheets  
 A combination of survey extrapolations and conclusions from food balance sheets  
 Other: \_\_\_\_\_  
\_\_\_\_\_
  
4. Are nutrition related data reliable?  
 Very reliable                       Fairly reliable                       Largely unreliable
  
5. What type of data are the most (least) reliable?  
Most reliable: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
  
Least reliable: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6. Which of the following are significant causes of undernourishment in your country?  
(1 = critically important; 2 = significant secondary factor)

- insufficient overall food supply
- inadequate access to food
- insufficient purchasing power
- inappropriate demand patterns (due to taste, tradition, perceptions)
- inequitable distribution of food within the country
- inequitable allocation of food to individuals within families
- poor utilization of food
- other: \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

7. Is there a program of nutrition surveillance in your country?  Yes  No  
If so, how would you rate its effectiveness (1 to 5, with 1 = exceptionally effective; 5 = virtually worthless)? \_\_\_\_\_

If rated 3 or worse, what are the principal problems? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

8. Does the country have a nutrition planning or surveillance unit?  Yes  No  
If yes, where is it located in the government? \_\_\_\_\_  
Does it have any influence on formulators of national policy/plans?  Yes  No  
Does it have contact with those designing agricultural programs?  Yes  No

9. What governmental unit has the greatest influence in the formulation of agricultural policy or other policies which determine the effectiveness of agricultural programs?

\_\_\_\_\_

Does this unit consider the nutritional impacts of agricultural policies?  
 Consistently  Occasionally  Almost never

10. How well are agricultural policies implemented?  Well  So-so  Poorly  
What are the principal obstacles to effective implementation? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

11. Are nutritional elements of agricultural policy implemented as effectively as other elements of agricultural policy?

- More effectively
- Less effectively
- About the same

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12. What are the principal constraints to assuring that food consumption and other nutritional considerations are integrated into agricultural policy/programs? (1 = most important; 2 = important, but less critical)

- Lack of usable data
- Inadequate methodological tools
- Insufficient number of trained nutritionists/food economists
- Lack of institutional base for nutritionists/food economists
- Nutrition unit lacks influence on policy makers and program planners
- Agricultural planning unit lacks influence on policy makers and program planners
- Nutrition unit focuses too much on theoretical activities and/or long term studies with little immediate feedback of use to economic planners/policy formulators.
- Agricultural planning unit focuses too much on theoretical activities and/or long term studies with little immediate feedback of use to economic planners/policy formulators.
- Other: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

13. Is the country receiving or expecting to receive AID or other donor assistance for nutrition/food policy planning?  Yes  No

If so, year project initiated? \_\_\_\_\_ Principal donor \_\_\_\_\_  
What was/is the primary objective? \_\_\_\_\_  
\_\_\_\_\_

What has been the principal impact? \_\_\_\_\_  
\_\_\_\_\_

What have been the principal problems encountered? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

14. Is AID or another donor carrying out projects or project components designed to have a significant impact on food consumption?  Yes  No

If so, provide the following information for the two most significant projects/activities.

#1 -- Year project/activity initiated? \_\_\_\_\_ Principal donor \_\_\_\_\_  
What was/is the primary objective? \_\_\_\_\_  
\_\_\_\_\_

What has been the principal impact? \_\_\_\_\_  
\_\_\_\_\_

#2 -- Year project/activity initiated? \_\_\_\_\_ Principal donor \_\_\_\_\_  
What was/is the primary objective? \_\_\_\_\_  
\_\_\_\_\_

What has been the principal impact? \_\_\_\_\_  
\_\_\_\_\_

15. Which of the following types of activities/concerns appear most relevant or most important in designing programs/projects to address food consumption problems in your country? (VR = very relevant; R = relevant; I = irrelevant)

Which are the easiest to design and implement? (VE = very easy; E = easy; D = difficult; VD = very difficult)

<u>Relevance</u>	<u>Design</u>	<u>Implementation</u>	<u>Activity/Concern</u>
___	___	___	Anticipating or monitoring changes in food consumption which accompany changes in cropping patterns.
___	___	___	Anticipating or monitoring impacts on food consumption from changes in agricultural labor requirements (i. e., changes in employment possibilities).
___	___	___	Ascertaining shifts in intrahousehold food allocation patterns resulting from changing opportunities for employment by mothers with small children.
___	___	___	Determining food consumption patterns of at-risk groups and identifying the technological and capital constraints to ensuring adequate food availabilities for such groups.
___	___	___	Including food policy issues and food consumption concerns in curriculum of agricultural education institutions.
___	___	___	Orienting agricultural extension agents and other community outreach workers about food consumption concerns and training them in nutritional "first aid" and referral.
___	___	___	Providing advanced training in nutrition and food policy to development planners, economists, agriculturalists, educators, etc.

16. Have any evaluations of AID-supported agricultural or rural development projects in your country specifically reviewed the impact of the project on food consumption (either in general or of an at-risk group)? \_\_\_ Yes \_\_\_ No

If not, would it be desirable to do so? \_\_\_ Yes \_\_\_ No

If so, what were the principal findings? \_\_\_\_\_

What has been the follow-up action? \_\_\_\_\_

Question  
No. \_\_\_\_\_

Supplemental Comments on Part A

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

If additional space needed, use reverse.

Part B -- General Views

1. Based on your cumulative experience, what do you feel are the greatest constraints to introducing food consumption and other nutrition concerns into agricultural planning in LDCs?  
\_\_\_\_\_  
\_\_\_\_\_
  
2. What are the greatest constraints/problems to integrating food consumption/nutrition concerns in the design of agricultural production and integrated rural development projects?  
\_\_\_\_\_  
\_\_\_\_\_
  
3. What have been the 1 or 2 most successful nutrition-related project activities in an agricultural production or rural development project that you have encountered? (Give type of activity, approximate dates, country, foreign donor if any.)  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  
4. What has been the least successful (greatest failure) you have encountered? (Same information as 3 plus apparent reason for lack of success (failure).)  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  
5. What are the most important institution building needs in LDC countries to ensure the integration of food consumption and basic nutritional concerns in agricultural planning and in the design of agricultural production and rural development projects?  
\_\_\_\_\_  
\_\_\_\_\_
  
6. In what ways might local and U.S. private sectors contribute to the achievement of food consumption/nutrition objectives in LDCs?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Please use the reverse of this page to add any comments on questions in Part B, to comment on the questionnaire itself, or to offer any general comments.

WORKSHOP SCHEDULE FOR TRAINERS  
(not to be handed out to participants)

DAY ONE : SUNDAY

P.M.	Registration: Participants receive notebooks, folders, "Concepts," schedule for Sunday night, reading assignments, staff bibliographies, name tags, welcome letter, Tanzania (A) case.	TT
6:00	Informal Social Dinner: Trainers and participants	
7:30	Introductory Meeting Brief Welcome and Introduction of Staff	LT
7:45	Orientation to Workshop (Clarification of learning objectives and expectations; review of evaluation tools)	LT
8:00	ACTIVITY ONE: Interview exercise * (suggestion: pair off, partners interview each other on their background)	
8:15	* Introduction of partners	
8:45	ACTIVITY TWO: What are my/our expectations of this workshop? * Individual task (Trainers should divide participants into groups blending backgrounds/abilities)	LT TT
9:00	* Small group discussion	
9:15	* Report out of small group (Trainers take down expectations on flip chart)	LT
9:30	* Brief comparison of results with workshop objectives	

BREAK

DAY TWO : MONDAY

A.M.		
8:00	Administration: Tasks for the day (Brief flip chart presentation of days events and other administrative matters)	LT
8:15	ACTIVITY THREE: AID policy discussion (overview and key points)	AP
8:30	* small group discussion	
9:30	COFFEE BREAK	
9:45	* Report-out by small group * Discussion	
10:30	ACTIVITY FOUR: Tanzania Policy Case * Case A, Set Up * Individual preparation	LT
11:00	* Small group task	

DAY TWO: CONTINUED

12:00 \* Report-out by small groups  
\* Discussion

P.M.

12:30 LUNCH (B) Case preparation)

2:00 Tanzania Policy Case (B)  
\* Small group task

2:30 \* Report-out and discussion

3:00 ACTIVITY FIVE: Policy Implications on Back Home Projects: AP  
(an opportunity to apply policy discussion to participant's  
experience)  
\* Set Up: What impact will AID and host government policies  
have on your project?

3:05 \* Small group discussion

4:05 \* Report-out and discussion

5:00 BREAK

DAY THREE (See Attached)

9

TUESDAY

GOALS AND OBJECTIVES

ACTIVITIES

COMMENTS

30

- 45 1) Identify key problems in food and nutrition with respect to development.

Administrative: Tasks for day: set up for first task  
Activity 6: Small Group discussion on Readings: Berg, Flueret, Flueret supplement and Burk flow chart and explanation

activity 6 Use the Flueret Article as a starting point as it probably will create some strong opinions. A key question is how do the Flueret and Berg articles fit in with your own project experience. Encourage participants to discuss the material critically and frankly and to ask questions. Briefly walk through Burk flow chart (no more than 5 minutes not including discussion and Q&A).

- 00 2) Stimulate discussion, and thought, on scope of author's hypotheses and concepts used and their relation to participants own experience.  
15 3) Orient participants with food and nutrition terminology through its use in discussion.  
4) Clarify of general questions through discussion and interaction.

- A) Small group discussions with facilitator (1 hour)  
B) Report out of small groups (15 minutes)

- 00 1) Acquaint participants with concepts, their uses, utilization and limitations.  
2) Identify different techniques of measurement.  
3) Define "an acceptable compromise" in measurement.  
4) Familiarize participants with methods of analyzing data from measurement.

Activity 7: Lecturette: How well fed are people? issues involved in measurement of consumption and nutrition (15 minutes) What do you need to know?

activity 7 Handout on Food Balance sheet compared with Food Survey Data: Lecturette should be no longer than 15 minutes: Emphasis on definition, limitations and comparison of techniques: See Materials for Instructors.

- 15 1) Give participants hands-on experience with measurement issues.  
2) Strengthen lessons of Activity 7.

Activity 8: Small Group Task: comparison, discussion and application of Food Balance Sheets and Food Consumption Survey Data.

activity 8 Focus activity on emphasis of Activity 5. Highlight points covered by Materials for Instructors.

- A) (30 minutes including juice and coffee break - during which time talk can be informal.)  
B) Report out (15 minutes)

- 30  
45  
00 1) Give participants hands-on experience with 24 hour recall as interviewer and interviewee.  
2) Clarify 24 hour recall method uses and limitations.  
3) Show the dramatic differences in data.  
4) Heighten critical analysis ability of participants.

Activity 9: 24 hour recall exercise and discussion  
A) Set up (10 minutes)  
B) Exercise (20 minutes)  
C) Group discussion (15-30 minutes)

activity 9 Make clear to participants that such activity would normally take 6-8 hours. Participants should pair off. Take a maximum of twenty minutes for the exercise. Point out uses of USDA's Nutrition Labeling as a tool in "set up." Bring out pros and cons of technique in ensuing discussion.

00

2:30

- 2:00 1) Make participants familiar with Rapid Reconnaissance methods.  
2) Set stage for upcoming activities.

- 2:15 1) Give participants hands-on experience in using Sampling and Survey techniques in real world setting.  
2) Give participants feel for setting up survey.  
3) Help participants understand limitations and constraints of methods.

- 3:15 1) Acquaint participants with problems in getting representative data.  
2) Point out the problems caused by a bad sample.  
3) Familiarize participants with a method for ensuring representative data.

- 4:00 Through application of day's lesson to real world project.  
1) Solicit unanswered questions.  
2) Prove real world applicability.

Handout Activities 9 and 10 and independent reading and preparation: Lunch

Activity 10: Lecturette; Rapid Reconnaissance Methods (15 minutes)

Activity 11: Sampling and Survey Case: QUALITI Method using Tanzania or own project

- A) Plenary: questions and answers, discussion of material (15 minutes)  
B) Small group analysis of case or own projects (30 minutes)  
C) Report out (15 minutes)

Activity 12: Sample Selection

- A) Instructions (5 minutes)  
B) Work through problem (25 minutes)  
C) General discussion including the problem of a bad sample (15 minutes)

Back Home Project Planning

- A) Independent work (1 hour)  
B) Discussion (15 minutes)

Independent readings

See Materials for Instructors: stress basic questions, keep activity to 15 minutes.

See Materials for Instructors: Trainers should actively monitor in group discussion and be prepared to overcome stumbling blocks and encourage discussion of key points. If time permits, trainers may play role of native informant in simulation of survey.

See Materials for Instructors: Give clear instructions. Exercise will be enhanced if trainer walks through the problem with plenary in paired groupings allowing time for discussion in pairings. Pairs should be induced to share their ideas with the group.

Motivate participants to share observations with group.

General:

- 1) Approach tasks for the day from a positive "can do" standpoint. Limitations should be viewed as just that; limitations to imperfect, but effective, techniques.
- 2) Facilitators are encouraged to review "Interviewing Techniques" included in Materials for Instructors to bring out group members opinions and insights.
- 3) "Report out" is an opportunity to share ideas and to ensure that key points are covered.

DAY FOUR : WEDNESDAY

A.M.		
8:00	Administration: tasks for the day	
8:15	Questionnaire feedback: (results of country questionnaire)	SSE
9:00	ACTIVITY 13: Project design case: Lower Volta; Sahelian Vegetable Production Project	TT
	* Set Up	
	* Individual Preparation	
9:45	* Small group task (A) (Coffee may be served at this time)	
10:15	* Report-out	
	* Discussion	
10:45	Case (B)	
	* Individual Preparation	
	* Small group task	
11:45	* Report-out	
	* Discussion	
P.M.		
12:15	Hand out critique and "what happened"	LT
12:30	LUNCH	
2:00	Discussion of handouts	LT
2:30	ACTIVITY 14: Project Implementation Case Puno/Palawan	TT
	* Project Tape	
3:00	* Set Up (A)	
3:10	* Individual preparation (A)	
4:00	* Small group task (A)	
5:00	BREAK	

DAY FIVE : THURSDAY

A.M.		
8:00	Administration: tasks for the day	LT
8:15	Project implementation case continued	TT
	* Report-out	
	* Discussion	
9:15	Case (B)	TT
	* Set Up	
	* Individual preparation	
10:00	* Small group task (B) (Coffee)	
11:00	* Report-out	
	* Discussion	
P.M.		
12:00	Case (C)	
	* Set Up	
	* Individual preparation	

12:30 LUNCH

2:00 Case (C) continued  
\* small group task (C)

2:45 \* Report-out  
\* Discussion and conclusion

3:30 Applications of lessons learned for the case to participants projects LT  
\* Small group discussion

5:00 BREAK

DAY SIX : FRIDAY

A.M.

8:30 Administration: tasks for day

8:45 AID programming and Implementation issues AP  
\* Set Up  
- Integrating nutrition/consumption concerns in mission/bureau activities  
- Re-entry into one's job  
- Training the trainers; how to convince others

9:15 \* Small group discussion

10:00 \* Report-out

11:00 Wrap up/evaluation/presentation of certificates

12:30 LUNCH

Departure

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## NOTES ON WORKSHOP SCHEDULE

TT = Training Team, LT = Lead Trainer, SSE = Social Scientist/  
Economist and AP = AID Programmer

- Trainers may wish to discuss and arrange their individual tasks in concert with their own interests and background.
- Day Three activities are largely the responsibility of the Social Science/Food Economist.
- Schedule time slots are suggestions. Trainers may adjust timing in accordance with abilities and interests of participants.
- Wednesday evening is the logical time to hold topical seminars if requested by participants. These seminars are optional.
- The lunch period is a good time for reading case materials.
- Trainers may wish to carry workshop activities on beyond 5 pm break but are warned to watch for signs of fatigue.
- Trainers may wish to play the role of small group facilitator. Optimally the group numbers will allow for division into 3 small groups with a trainer in each. The role of facilitator is that of observer and guide. Intervention should be limited to keeping conversation on track and if necessary, in encouraging conversation. It is important that facilitators do not "over facilitate".

WORKSHOP SCHEDULE

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Pework Mailed in Advance	AID Policy Dis- cussion  Policy Case Analysis (A)  Small Groups	Small Group Dis- cussion  Readings  Nutrition/Con- sumption Data Sources  24 hour exercise  Small Groups	Questionnaire Feedback  Small Groups  Project Design Case  Small Groups	Presentation and Critique  Project Implemen- tation Case (Con't.)  Small Groups	AID Programming Issues  Small Group Con- sulting/Back- home  Summary Presen- tations  Wrap up  Evaluations  Presentations of Certificates
Lunch	Lunch	Lunch	Lunch	Lunch	Lunch
Informal Social Dinner  Introduction Meeting  Goals  Expectations	Policy Case Analysis (B)  Small Groups  Total Group  Backhome Project Discussion  Readings	Micro-Survey for own projects or Tanzania  Sampling Lectur- ette Discussion  Backhome Project Planning  Readings	Project Imple- mentation Case  Project Tape  Small Groups	Presentation and Critique  AID Resource Tape and Handout  Individual Prep- aration of Back- home Strategy	

Sunday night

Activity 1: Independent Readings and Review

Workshop members are asked to study the following documents prior to the Monday morning session of the workshop. Members are encouraged to write down any questions they may have on the material and to discuss these questions with the training team and other workshop members.

A. Reference document called "Materials for Participants 1A". "Concepts Used in Study of Food and Nutrition Situations for Project Planning" by Marguerite Burk and Charlotte Miller. This document is in your red loose leaf notebooks in the section labeled "Concepts."

This glossary of terms is provided as a background reference piece for workshop members to use as unfamiliar terms are mentioned or used in subsequent activities. These terms have been selected because they are frequently used in the literature relating to food, consumption and nutrition issues and analyses in the context of economic development. There are frequent and sometimes surprising misconceptions about the meaning of various terms contained in the glossary. These definitions are provided to clarify and re-orient such beliefs.

B. Reading Malnourished People; A Policy View, Alan Berg

Chapter 1-3 should be prepared for discussion on Tuesday morning.

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This book has been selected as an important resource in discussing the many complexities of the nutrition problem. We hope it will stimulate you to apply the author's theories and contentions to your own less developed country experience. Keep in mind that the strategies offered here are those of the World Bank and are not necessarily those of AID/W. On Tuesday morning, you should be prepared to discuss the first three chapters in both small groups and plenary format. You should read the article from a critical standpoint drawing on your own project experience. These chapters will help you to gain a better understanding of the nature, costs and consequences of nutritional problems in developing countries. Berg emphasizes the urgency of the problems and the inadequacy of the standard solutions. You may wish to get a head start.

C. Remember that your questionnaire is due in the morning. Please take the time to seek out a member of the training team to assist you should you have any questions.

## Instructions for Monday Night Preparation

### Activity 3: Independent Reading

Workshop members are asked to look at the following documents, prior to the first session of the workshop on the second day: (Number and letter designations are found on the title page of the article.)

9A Reading "Nutrition, Consumption and Agricultural Change" by Patrick Fleuret.

The author presents the thesis that the nutritional status of the poor is often adversely affected by agriculture projects. The article goes on to support this hypothesis by pointing out some of the problems of inducing change in traditional social and economic organization in the societies of developing countries due to unequatable changes in food distribution. Members are encouraged to apply Fleuret's hypothesis to their own projects as a means of testing the validity.

B. Reading Supplement to Fleuret Article

This reading is a case study illustrating some of the conditions under which Fleuret's hypothesis are valid. Again, members are encouraged to seek parallels in their own project. If Fleuret's hypotheses do not hold true, can you identify specific reasons for this?

The Fleuret and Berg articles will provide the basis for the first workshop task on Tuesday morning, it is essential you are well prepared.

C. "General Framework for Analysis of Food and Nutrition Situations by Marguerite Burk.

## Instructions for Tuesday Night Preparation

### Activity 11: Independent Review

Workshop members are asked to read or review (as indicated) the following documents, prior to the first session of the workshop on the third day: (Number and letter designations are found on the title page of the article.)

A. Reading Malnourished People by Alan Berg, Chapters 4 and 5

This selection discusses new types of intervention at the policy level. Read the assignment with the knowledge that these interventions may be applicable to the project cases we will be working with for the next two days. As always, you may want to consider this reading in light of your own project.

B. Independent Reading. (Labeled Activity 1.) DRAFT PROJECT PAPER, Lower Volta, Sahelian Vegetable Production Project.

This reading is preparation required for an activity to be undertaken in a workshop session tomorrow. Lower Volta is a fictitious name for a country in the Sahel region of western Africa. This case is a simulation based only in part on an actual AID project.

C. Reference. Joel M. Teitelbaum, "Nutritional Impacts of Livestock Development Schemes Among Pastoral Peoples."

This reading discusses the food consumption impacts of livestock development and range management projects focussing on implementation problems.

D. Reference. "Development and Food Consumption Patterns in Rural Sierra Leone," by Victor Smith, et al.

This is a report of a study undertaken recently in Sierra Leone (with AID funding) in which extensive sample survey data on agricultural production and household food expenditures were analyzed to determine how changes in prices of foods and incomes of farm households, together with variations on noneconomic household characteristics, influence food choices, farm production levels, and other food prices.

The results of the study provide an example of how farm households make simultaneous decisions on food production and food consumption which then strongly influence what foods enter the market system and what foods are retained for home consumption.

The purpose of this reading is to acquaint workshop members with the notion of why forecasts of food production based exclusively on population trends and production technologies are likely to be seriously in error; equally, the workshop members should note that forecasts of food demand based exclusively on income and price effects which ignore production decisions are also likely to be in error.

Development project managers and programmers in AID missions, such as the workshop members, can use such information as that presented in this study, as well as the inferences drawn from the study, to better plan and manage their responsibilities through an awareness of better forecasting methods and through better understanding of ultimate impacts of project and program inputs on food consumption/production decisions and beneficiary well being.

Probing Techniques in Conducting Interviews

by Robert Werge, OICD/IT

An interview is a structured form of communication in which one of the participants, the interviewer, has an information objective and the other, the informant, has information resources. The types of questions which the interviewer asks, as well as the type of climate which is set, the kind of expectations which are shared, and the degree of trust which is established, have great bearing on the extent to which the interview will be "successful." A "successful" interview is one in which information and opinion are freely shared by the informant.

Once a proper climate has been established for an interview, the interviewer normally begins to ask questions. Questioning should be an active process, however, one in which there is "give and take" between the interviewer and the informant. Nothing kills an interview quicker than an interviewer asking a series of questions, one after another, and the informant giving answers. This pattern tires both participants and leads to the informant giving short and haphazard response.

Probing techniques can be utilized to obtain further followup information on a questions or to ask the informant to think more deeply (and, hopefully, clearly) about a question. Probing techniques can also be utilized to ask an informant to expand on previous statements of other informants or contradictions between what the informant says and what the interviewer has observed.

Among the different types of probing techniques are the following:

Technique

1) SILENCE

Description: After the informant has said something, do nothing more except look and wait for more.

Example: Informant: "In this town, we are all one, big family, everyone knows one another."  
Interviewer: Looks with blank stare.  
Informant: "I mean, we all get along well, though every family has fights, I mean..."  
Interviewer: Continues to look and stare.  
Informant: "Of course, not everyone gets along as well as they might, just the other day there was a fight down on Main Street..."

2) REPETITION OF PHRASE

Description: After the informant has said something, repeat the last few words and wait...look questioningly...

Example: Informant: "...and after the land was cleared, old man Martin began to plant an apple orchard.  
Interviewer: "plant an apple orchard...???"  
Informant: "Sure, plant an orchard because it was just a big crop just coming in then..."

3) PARAPHRASING

Description: Repeat what the informant has said, but in your own words.

Example: Informant: "I like farm work."  
Interviewer: "You mean that you like to make things grow?"  
-----  
Informant: "This town has a very low rate of unemployment."  
Interviewer: "You mean everyone has a full-time, year-round job?"

4) CONFRONTATION

Description: Directly confront the validity of a statement.

Example: Informant: "I think that private enterprise is the best way to carry out agricultural production."  
Interviewer: "I don't think so at all, what makes you say that."

5) INDIRECT CONFRONTATION

Description: Question a statement by mentioning that another informant said just the opposite or by citing some of your own observations.

Example: Informant: "Everyone in the valley has access to irrigation water."  
Interviewer: "Hmm, but I was just talking to someone yesterday who said that last year he was unable to harvest a good crop because all the large land-owners had used up the water."  
-----  
Informant: "This is one of the prettiest rural areas in the mountains."  
Interviewer: "It does look that way, but I seemed to notice a lot of smog around town."

6) EMPATHY

Description: Put yourself in the informant's place and relate some of your own experience to theirs.

Example: Informant: "I have been looking for work for a long time."  
Interviewer: "I know what you mean, I was once looking for a job for six months and it was terrible."

7) LEADING

Description: Encourage the other person to keep talking and explain more.

Example: Interviewer: "That sounds really interesting, could you tell me how you did that?"

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Interviewer: "I'd like to know more about the way you choose the date for planting corn each year."

8) EXPRESS IGNORANCE

Description: Make a statement concerning your lack of knowledge in the area under discussion and ask for help.

Example: Informant: "Then Barker go his farm zoned A-3 for an industrial park and..."  
Interviewer: "I must admit that I really don't know what A-3 zoning is, could you explain it a bit?"

9) EXPRESS FEELINGS

Description: Express your own feelings so that the informant will feel comfortable expressing his/her own.

Example: Informant: "The folks in Washington sure don't understand the problems of farmers."  
Interviewer: "That must make you feel angry..."  
Informant: "Well, it does in a way, but I really feel more alienated than anything."

## INTRODUCTION FOR THE GENERAL FRAMEWORK FOR ANALYSIS OF FOOD AND NUTRITION SITUATIONS

The General Framework is a diagram depicting key sets of concepts entering into food and nutrition situations and interrelationships among them. Many of the meanings of the concepts are rather obvious; all are defined in the Concepts handout. But a few examples may be helpful at this point. Among the socio-economic and political institutions likely to affect food consumption are government organizations and regulations, tribal groups and customs, and economic arrangements controlling employment, wages and land tenure. Let us consider commercial food supplies in terms of their flows in a given time period, e.g., a year, from producers or foreign sources through marketing channels to ultimate consumers. Subsistence food supplies are those produced or gathered for own household use.

The objectives of such a framework are to indicate how to envision the complexity of food situations and food patterns in developing countries; to identify major factors affecting food preferences, food demand, and actual intakes both from the supply side and the demand side; and to suggest how factors other than price and income may affect food consumption and complicate the calculations and interpretation of conventional price and income elasticities.

Analysts formulate such frameworks by examining earlier research on concepts, their indicators, and relationships among them. The General Framework presented here reflects the author's hypotheses regarding factors

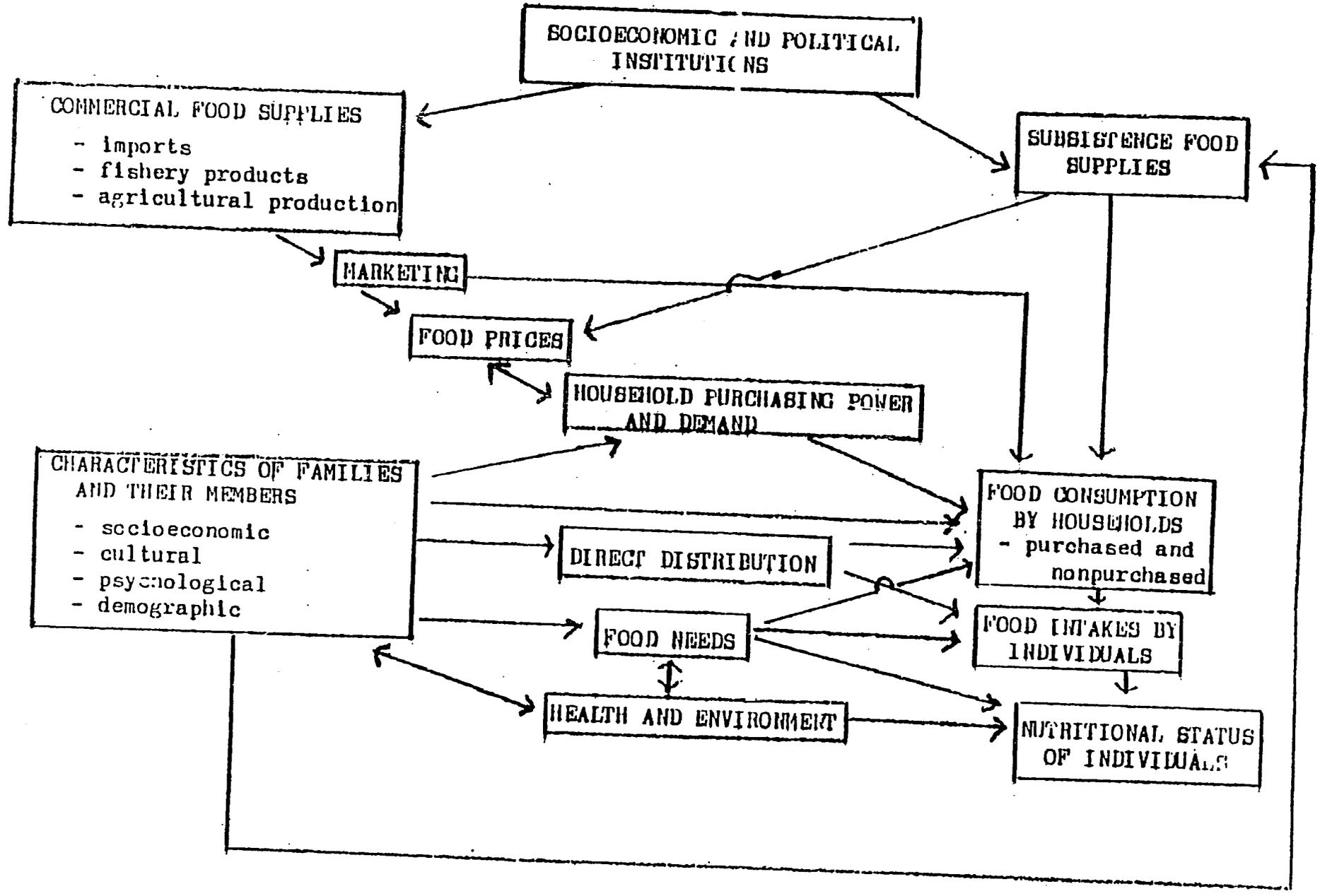
generally affecting food consumption and nutrition as well as findings from a variety of statistical analyses of macro-economic data for the United States and data from large and small scale food surveys in the U.S. and developing countries. Each analyst is expected to lay out his/her own framework to suit the needs for a study of a particular problem.

In practice, an analyst usually limits the study to a particular sector of the General Framework and selects indicators for several major factors affecting food consumption or nutrition measured at whatever levels are most relevant to the problem situation. For example, a feasibility study to determine the facts about food consumption in a project area where undernutrition by some households is believed to be the major food and nutrition problem would investigate variations in amounts consumed per household, their sources and prices paid for any purchased major staples among households, differing in socio-economic and family characteristics. The characteristics indicating underlying socio-economic factors might well be size, tenure, and location of land holdings, type of housing, extent and types of off-farm employment of household members, major crops and livestock raised, use of credit. Landholdings and housing have often been used as indicators of purchasing power where it is difficult to measure income adequately. Family characteristics indicating food needs might be household size, sex and age composition, and work activity.

In sum, this General Framework is offered to suggest ways of thinking about the food and nutrition situation in a country and in a particular

project area and to identify the kinds of factual information needed to appraise policies and project plans and implementation with food consumption and nutrition criteria.

# GENERAL FRAMEWORK FOR ANALYSIS OF FOOD AND NUTRITION SITUATIONS



REPORT OF THE PILOT WORKSHOP  
ON FOOD PRODUCTION/CONSUMPTION  
LINKAGES

For AID Agricultural and  
Rural Development Officers

Held September 12-17, 1982  
Easton, Maryland

## Report of Pilot Workshop

on

### FOOD PRODUCTION/CONSUMPTION LINKAGES

in AID Food and Agricultural Programming

An AID pilot workshop on Food Production/Consumption Linkages for Agency agricultural personnel was held September 12-17 in Easton, Maryland. The nineteen participants included ten officers from field missions, eight from AID/W offices, and one observer from the FAO. The large majority were agricultural development officers or rural development officers. A few were posted in program, Food for Peace or similar positions but all were directly involved in Agency food and agricultural program design and/or implementation work.

The Training Team was led by William LeClere, assisted by consumption economist, Marguerite Burk, and former Mission Director, James Roush. Their skills were centered, respectively, around practical knowledge of the learning process, food intake analysis and consumer responses to economic forces, and the requirements of AID procedures.

The pilot Workshop was sponsored jointly by the Office of Nutrition of the Bureau for Science and Technology (S&T/N) and the Career Development branch of the Training and Development Division of the Office of Personnel (M/PM/TD/CD) within AID. It was implemented under a PASA arrangement with the Nutrition Economics Group (NEG) in the U.S. Department of Agriculture's

Office of International Cooperation and Development (OICD). Individual USAID missions funded the travel costs of the personnel who came to the workshop from the field.

The general objective of the workshop was to enhance the project design and management skills of Agency personnel directly responsible for its work in food and agriculture. This was carried out in the following areas:

1. Understanding and use of the terminology and language of consumption and nutrition analysis;
2. Selection, analysis and use of data, including identification of data sources, assessing data quality, understanding data processing techniques and understanding how indicators are derived and used for production, supply, consumption, demand and price purposes;
3. The use of consumption/nutrition information to enhance the impact of agricultural and rural development projects and programs;
4. The derivation and analysis of inferences from available indicators, especially in:
  - a. the impact of host country and AID food and agricultural policies;

1. the setting of criteria for agricultural programs and projects; and
2. the application of concepts to actual cases, dealing with the implementation of national level and project level issues.

The attached schematic Workshop daily schedule outlines the sequence of topics taken up in the course. Several features of the Workshop format are worth special mention.

Cases, drawn from actual field experience in Tanzania, Mauritania, Peru and the Philippines, were utilized to study (a) the impact of national level policies on producers and consumers; and (b) the range of issues which must be addressed by field project designers, reviewers, implementors and evaluators in promoting production objectives and consumption goals. The participants were provided with written materials on each case. These were usually studied the night before. Small groups were organized for intensive discussion of the questions addressed in each case, facilitated by a training staff member who acted as a neutral chairperson, recorder and resource person. According to the Workshop evaluations, the participants found the sharing of special skills and knowledge which were presented in the backgrounds of the members of the group was particularly useful in capitalizing on the insights brought out in the discussions. The small group sessions were each followed by plenary discussions in order to present the perceptions and interpretations of the smaller groups along with the perceptions of the whole body of participants.

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The sessions devoted to "policy" included not only the field cases demonstrating host country impacts, but also plenary sessions devoted to a discussion of the recently-released AID policy statements on Food and Agricultural Development and Nutrition. The participants observed that many, if not most, field officers were uninformed about current AID and host country policies and other program guidance.

Participants were exposed early on in the Workshop to the kinds of data that are available (or which can be generated) to help them understand nutritional status and consumer behavior in the face of the levels of consumer incomes, food availability, quality and prices, as well as in the face of food customs and consumer knowledge about nutrition. Participants also spent time becoming acquainted with a glossary of technical terms, technical references (such as food balance sheets for specific countries and tables of recommended daily allowances), and techniques for generating and utilizing data from various types of surveys and reconnaissance studies.

Toward the end of the Workshop, the participants developed individual strategies for applying the knowledge gained during the workshop in their current duty posts. This was complemented by a broader-scope "plan" developed by each participant for the possible guidance or use of his employing unit with AID. This prompted a general review of the kinds of institutional and technical support (not to mention funding) an agriculture and rural development officer would require from other AID entities in order fully to utilize the skills and sensitivities acquired during the workshop.

Although the time of the workshop was fully scheduled and reading materials made extensive claim on un-scheduled time, there was nonetheless sufficient time still available to hold ad hoc discussions of topics (such as PL 480) that were of interest to a majority of the participants.

The participants evaluated each of the components of the Workshop as they went along, and provided an overall evaluation at its conclusion. These reactions were strongly positive overall. The suggestions for improving, re-organizing or re-ordering the elements of the Workshop are being incorporated into the revisions of training materials and procedures for the approximately twelve such Workshops that are anticipated for sub-regional field locations during FY 1983 and FY 1984.

To ensure that learning will continue beyond the week of the Workshop, a series of follow-up events was identified (mostly having to do with the assembly and distribution of resource and reference materials, and sources of technical assistance) to keep the participants in general touch with the organizations involved with the training.

Training Material for Inservice Workshop  
on Food Production/Consumption Linkages

Preworkshop Letter: definition of preworkshop tasks for participants.  
Includes a statement of workshop goals, the questionnaire on food consumption and nutrition needs and interventions in trainees' host country and selected AID policy papers

Welcoming Letter and brief biographies of training staff

Acknowledgements

Training Methodology: "The Experiential Learning Cycle"

Nutrition Labeling: a USDA publication

Selected readings by Alan Berg, Patrick Fleuret, Joel Teitelbaum, Victor Smith, Marguerite Burk, Robert E. Rhoades, and Johanna Dwyer

Tanzania: Policy Choices and Dilemmas: a policy case

General Framework for Analysis of Food and Nutrition Situations for Project Planning: flow chart and explanatory notes

Concepts Used in Study of Food and Nutrition Situations for Project Planning: a glossary of terms

Fleuret Supplement, by J. Douglas Uzzell: a real world illustration of Fleuret's hypothesis as presented in "Nutrition, Consumption and Agricultural Change" (selected reading)

Bibliography on Food Survey Methods

Sample USDA Food Consumption Tables

Examples of Dietary Intake Forms

Food Balance Sheet: an explanation

Food Balance Sheet for Tanzania

Twenty-Four hour Dietary Recall Exercise

Lecturette: Important Points: rapid nutrition reconnaissance

Sampling and Survey Case and "QUALITI" Interviews exercises

Purposive Sampling: an exercise in rapid sampling techniques

Above exercises include detailed suggestions for instructors

Lower Volta: Sahelian Vegetable Production Project: a project design case

Peru: Puno Integrated Rural Development Project: a training case to integrate production/consumption linkages

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The Philippines: Palawan Integrated Area Development Project: a training case study to integrate production/consumption linkages

"Lessons Learned" from Evaluation Report, Operation Haute Vallee Project, Mali

Project training cases contain detailed suggestions for instructors and exercises for trainees.

Training materials are currently in the process of revision. Until such time as they are in final version, they will not be circulated or distributed.

Materials for Participants Activity 1A

CONCEPTS USED IN STUDY OF FOOD  
AND NUTRITION SITUATIONS  
FOR PROJECT PLANNING

Training Materials  
(Revised)

December, 1982

Training materials prepared for the United States  
Department of Agriculture, Office of International Cooperation  
and Development, Technical Assistance Division, Nutrition  
Economics Group under PASA STB-0000-P-AG-2103, Nutrition  
Strategies Training Program, and RSSA 3-77, Economic Analysis  
of Agricultural Policies, under agreement with the Agency  
for International Development's Training Division (Personnel  
Management) and the Office of Nutrition  
(Bureau for Science and Technology)

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Aggregation: Adding together individual data, components or subsystems to form larger, composite totals or systems; often used with reference to numerical data and socioeconomic models.

Agricultural Economist: An economist specializing in the study and analysis of the production, distribution and consumption of goods and services produced in farming regions, e.g., food crops, livestock, agro-industrial products, rural cooperatives, marketing, and credit.

Anthropologist: A specialist in the study of human beings; socio-cultural anthropologists, in the study and analysis of culture, including human behavior and the origins and interactions of human societies. Other types are linguistic anthropologists, biological (physical) anthropologists, and archaeologists.

Anthropometric measures of nutritional status: Measures of physical growth and development of the individual. The most commonly used measures are weight, height, arm circumference and skinfold thickness. Computations are often made relating two measures to one another, for example, weight-for-height (a measure of "wasting" or acute malnutrition) or height-for-age (a measure of "stunting" or chronic malnutrition). For such measures to be valid, they need to be standardized for a specific population's norms. (See "Gomez classification")

Beta-carotene: One of the carotenoid plant pigments, yellow-orange in color, from which Vitamin A is formed.

Biochemical measures of nutritional status: Biochemical tests to measure the level of a nutrient or metabolite directly or indirectly in blood or urine samples. Examples of such measures are hemoglobin concentration, serum vitamin C, plasma vitamin A, total protein, thiamin and riboflavin. Such tests require technically trained staff and appropriate facilities although some have been adapted to field situations.

Carotene: (See beta-carotene, above.)

Clinical measures of nutritional status: Measures performed in clinical examinations of individuals performed by physicians or medical personnel especially trained for the purpose. Signs of nutritional disorders considered in clinical exams are conditions of skin, hair, lips, eyes, mouth, tongue, musculature, etc. Such measures tend to be nonspecific and may result from causes other than dietary.

Commercial production: Foods produced and sold as opposed to those used in the households of producers.

Conceptual framework: A statistical model, diagram or description of interrelationships among concepts as developed for a particular objective.

Consumption: In economics, the purchase or use of ("final") goods and services by individuals for their utility (or usefulness) such as food, clothing, household effects, etc.

Consumption (Demand) Economist: An economist specializing in the study and analysis of the determinants of the demand for and consumption of goods and services; for example, such determinants under study might be the relationships among prices, incomes, and amounts of goods and services purchased by individuals and groups.

Consumption function: A statistically determined mathematical relationship linking income (either individual or national) with the value of goods and services consumed over a specified period of time (e.g. one year), assuming no changes in relative prices of the goods and services. Such a relationship can be used to project future levels of consumption, with specified changes in incomes; alternatively, consumption functions can be used to determine the levels of income needed to induce desired levels of consumption (e.g. of foods).

Cross price elasticity of demand: The percent change in demand for one commodity for a given percent change in the price of another commodity. The concept is meaningful only if there is a complementary relationship between the commodities (e.g. bread and butter) or a substitution relationship (e.g. apples and pears). An elasticity of zero means that a change in price has no effect on the demand for the commodity. A low elasticity (less than one) means that the change in demand is less than proportional to the change in price. In other words, despite an increase in price, more of the commodity is demanded from the market than would have been expected. A high elasticity (more than one) means that demand changes more than proportional to a change in price. For example, when the price increases, the consumer ceases to buy one commodity at all (perhaps due to the substitution of a cheaper alternative.)

Cross-sectional data: Data on such events as food consumption collected in sample surveys of households (or individuals) which are designed to reflect variations in a cross-section of a whole population during a set period of time.

Cultural factors: Such factors as family, community, regional, tribal, religious or other group membership. In matters relating to food and nutrition, this concept often refers to social, historical, geographic and ecological influences on food preferences, taboos, consumption habits, production systems and social functions of food among different groups.

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Demographic characteristics: Attributes used to classify populations, including such attributes as sex, age, family size, family composition, family organization, urban residence, rural residence, civil status.

Development anthropologist: A social scientist specializing in the analysis and design of intervention strategies relating to the process of socio-cultural change during economic development directed by conscious policy.

Development economist: An economist specializing in the analysis of factors giving rise to growth and changes in the production, distribution and consumption of goods and services under the impact of government policies.

Diet: A specific combination of foods regularly consumed by individuals or groups at specified meals or over prescribed periods of time.

Dietician: A specialist trained in the utilization of the knowledge of nutrient contents of foods for meal preparation and scheduling which provide specific combinations of nutrients.

Disaggregation: The process of taking apart a large body of information, such as in the analysis of the segments of a market or in breaking the total consumption of a food into amounts consumed by each population group.

Disadvantaged groups: Groups defined by a criterion that indicates a relative lack of access to resources, such as low income, unemployment, or limited educational opportunity.

Eating patterns: A term used in a variety of ways to describe combinations of foods eaten together, variations in times and places of eating, social functions of meals (including eating companions), or variations in food consumption among households or individuals. There is no consensus on a single meaning.

Economic anthropologist: A social scientist specializing in the study and analysis of the culture and behavior of human beings, and the growth, development and interaction of human groups in the context of production, exchange, ecological adaptation and consumption of good and services.

Economist: A social scientist chiefly concerned with the analysis of production, distribution and consumption of goods and services.

Effective demand: The portion of total demand actually observed; for example, purchases made of goods or services.

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Environmental factors: Factors external to individual physiological needs which affect food absorption, nutrition, food production, and social arrangements concerning food consumption, such as sanitation, pollution, water quality and availability, fuel availability and cost, housing, communication and transportation facilities, weather, climate and prevalence of disease-bearing organisms in the soil, air and water.

Expenditure elasticity: A proxy for income elasticity when all the data necessary to calculate net income for a population are not available. At low income levels, the total expenditures of a family or individual is theoretically expected to correlate closely with net income. Expenditure elasticity measures the per cent change in expenditure for a given commodity accompanying a specified per cent change in expenditure for all commodities.

Farm gate prices: The prices farmers receive directly for their output, also known as producer prices.

Food balance sheets: Tables showing components of food supplies of a country, for either calendar or crop year, and their disposition. The U. S. Department of Agriculture uses the term "supply and distribution tables." Supplies include beginning stocks (if data are available), agricultural production, imports, and fishery products. Distribution channels are ending stocks, nonfood uses, waste, manufacture, seed, exports, and military activities (if significant). The residual is identified as total civilian consumption. This last total is divided by the civilian population to obtain an average annual per capita consumption. (This is also known as the disappearance method of calculating national consumption.) These data indicate nothing about actual consumption, distribution of food, or effective demand for food. They do indicate quantities of aggregate food supplies.

Food consumption: A general term which may refer to total or average amounts of food consumed by an individual or household in a specified time period. Such amounts may be measured in terms of the farm commodities as the foods are sold at wholesale or retail levels or as the foods are prepared for final consumption. Some surveys of household food consumption obtain data on the food used by the household in a specified time period, measured in the form as purchased. Other surveys subtract out the amounts of food fed to pets, lost or wasted (by trimming, spoilage or plate waste). Food consumption at the household level differs from individual food intake which is usually measured in the forms as actually eaten. (See food intake.)

Food demand: As used by economists, the quantity of food that is or will be purchased from the market at a given price, under given conditions. Such demand is generated by consumer preferences and

tastes, but conditioned by income level. In this sense it differs from those consumer wants, desires or preferences for food which may be unfulfilled because of lack of purchasing power or adequate supplies.

Food distribution: A term used in three principle ways: (1) amounts of food marketed commercially; (2) channels for moving food to ultimate users; or (3) the allocation of household food supplies among individuals. "Direct distribution" usually refers to government distribution directly to consumers in specific categories.

Food energy: Fuel for the body derived from food and measured in calories. The amount consumed affects basal metabolism, physical growth, physical activity, and mental development. Food energy is not considered itself to be a nutrient, but requirements for food energy, like nutrient requirements have been developed by governments and international organizations and used extensively. The serious effect of inadequate intakes due to major shortfalls on work productivity, fertility, fetal and infant development, mental development and resistance to disease have been researched and documented, although measurement of these effects are difficult to carry out.

Food expenditures: Alternative measures, used by survey researchers, of either (1) money outlays for food, or (2) market value of food obtained without direct cash expense, as by gift, in-kind payment or home production. Because the term is used in both ways, interpretation of data requires extreme care, especially when comparing information from different sources and for different time periods, making sure that comparisons are made between like measures.

Food habits: Patterned food behavior of groups or individuals, including the kinds and amounts of foods eaten at various times and the different ways foods are prepared and served to various categories of people. Like "eating patterns", there is no consensus on a single meaning. When they choose to use it, nutritionists and social scientists prefer to specify a particular meaning for the term in a particular analytical context.

Food insecurity: A term referring to the risks of greatly reduced food supplies in a country or a specific region of a country. It is usually used to describe risk conditions resulting from weather such as drought, decrease in expected levels of rainfall, flooding, and insect infestations. It can also result from economic, geographic, political or military conditions which affect degrees of relative isolation, food storage, food production and food distribution.

Food intake: The amounts and kinds of foods consumed by an individual, both at home and away from home. (Dietary intake is a synonym.) It is usually measured in the forms as ingested, excluding plate waste. Intakes of members within a household (but including food consumed away from home) may vary widely because of differences in nutritional requirements, food preferences, customs, access to resources, daily routines and activities of individuals. The related concept of "usual dietary intake" is much more difficult to measure than current or actual intake in a specified period. Selection from alternative methods for measuring current intakes depends on the objectives of the survey and the population surveyed.

Food needs: The amounts and kinds of food required for individual development and good health. The term contrasts with food demand in that it does not refer to effective economic demand for food. Few countries have developed recommended standards for amounts of major food groups by age and sex categories although many have set energy and nutrient standards which can be met by different combinations of foods. (See "Nutrition requirements" below.)

Food patterns: The combinations of foods eaten by individuals or households. These patterns vary from group to group or by time of day and season and are very closely tied to cultural patterns of the people. Knowledge of food patterns of particular populations is useful for forecasting food demand and for planning nutrition education and other intervention programs.

Food preferences: The attributes of particular foods or combinations of foods liked by groups of consumers, but not necessarily purchased or used by them. Preferences are influenced by cultural, demographic, social and economic factors.

Food prices: The prices for food measured at producer, wholesale or retail levels. In many LDC's, data on retail food prices are collected only in the capital city, by government and/or private institutions. Major variations among alternative measures may be found. Big city and rural area prices usually differ considerably because of supply, transport and marketing differences as well as consumer demand.

Food security: The ability of a country or region to be assured of getting enough food in a given time period (See "food insecurity").

Food supplies: A general term referring to available food stuffs in a specific time period. It may refer to total national food supplies for a year or at a specified time. It may refer to

supplies in a particular area or supplies measured for a particular group of households. Food supplies of a country usually include imports and agricultural and fishery production, less non-food use. Measurement of food supplied by subsistence production for home food use is inadequate in every country, including the United States. The measurement problem is especially serious in developing countries where it may amount to as much as a third of the total.

Food survey data: The information resulting from a food survey. The categories of data vary from survey to survey, depending on whether food expenditures (usually underestimated), household food consumption or individual intakes are measured. The choice among alternative measures depends on survey objectives, costs and resources. (See "Household food consumption" below.)

Gomez classification: A classification scheme developed to classify children according to nutritional status as measured by percentage of median weight-for-age. The categories were first developed in 1956 for Mexican children and later for a Boston reference population use the following distinctions: 90% or greater is considered normal; 75 to 90% is considered mild or first degree malnutrition; 61 to 75 % is considered moderate or second degree malnutrition; 60% or less is considered severe or third degree malnutrition.

Health data: Information on incidence of disease, morbidity, mortality rates and other health status factors. It can provide indications of the extent of food and nutrition problems among a particular population, especially information on nutrition-related or nutrition-magnified diseases such as diarrhea, measles and other childhood diseases. Health data are particularly important in nutrition work with infants and young children, not only in identifying nutritional needs, but also in pointing up non-nutritional sources of child health problems.

Home food production or subsistence production: The farm, garden and fishery output produced and used in the household of the producer. Such output is extremely difficult to measure except as part of a survey of household food use. In tropical countries, it is often important to include game, fruits, insects and leaves obtained in forest areas.

Household: A residential unit including a group of people who live and eat together, often related by marriage, blood or ritual kinship, sometimes including servants.

Household food consumption: The total amount of food consumed in the household, excluding that eaten away from home unless carried from

home. It may be measured in terms of quantities and forms brought into the household as recalled or recorded. Inedible and edible wastes and losses may or may not be subtracted. Sometimes, food for each meal may be weighed before or after preparation. Exact precision in measurement is less important for many purposes than consistency in measurements of variations from one household to another. Most nutrition research requires measurement of individual intakes because of wide variations among household member intakes.

Imputed value: A money value applied to goods and/or services not commercially exchanged. For example, the imputed value of food consumed by a farm household which produces that food would be equal to the sum the family would have to pay to purchase the same amount of food in the local marketplace.

Income: Returns for labor and use of capital. In survey research, the term is used in a variety of ways: (1) gross income before taxes; (2) net income after taxes; (3) money income only; and (4) money income plus the value of subsistence food and other goods produced and used by the family or household of the producer.

Income-consumption relationships: The linkages between variations in income and changes in levels of consumption. These relationships may be considered and measured in a static mode, comparing the degree of variation in food consumption with variations in income, preferably per person but often per household. In economic theory, the dynamics of changes in food consumption as income changes are more relevant than the static mode. Both static and dynamic relationships are much more difficult to measure properly than often assumed because of failure to take variations and changes in other factors into account. Sometimes the relationship of consumption to income is measured simply by calculating the value of all food consumed (or food expenditures only) as a percentage of income. This measurement is much simpler to undertake in the field than measurement of actual income, due to respondent resistance.

Income elasticity of food consumption: The ratio of the percentage variation in food consumption (e.g. quantity of a single food or value of all food purchased or consumed) to the percentage variation in income. Problems in calculating income elasticities are touched on in the above definition of income-consumption relationships. It is important to keep in mind the fact that an income elasticity is an average affected by the prevailing conditions and population makeup which are likely to change during the process of economic development. Income elasticities may be useful to predict likely changes in relative rates of consumption of specific commodities as income changes in a specified span of time.

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- Indicators: Proxy measures of phenomena. Factors affecting variations in food consumption are generally measured by indicators such as years of formal schooling (for education and, sometimes, for knowledge), race (for cultural patterns of ethnic groups), percentage of household members 13 years of age or older (for variation in food needs related to age), and total expenditures, usually excluding nonpurchased goods and services, (for income).
- Iron deficiency: A condition related to low dietary intake of iron or organic conditions which deplete body reserves of iron. It often results in anemia, leading to both physical and mental sluggishness which can materially reduce physical performance and productivity.
- Iodine deficiency: A condition related to low dietary intake of iodine. A frequent nutrition problem in developing countries lacking seafood in usual diet, leading to goiter in many individuals, and deaf mutism and cretinism in infants born to iodine deficient women. In areas of the world where foods eaten lack enough iodine to prevent iodine deficiency conditions, iodine deficiency diseases can be overcome by the distribution of iodized salt or another processed food which are widely consumed.
- Kwashiorkor: The physical condition produced by extreme protein deprivation, diagnosed by the following symptoms: lassitude, wasting, edema, scaly skin, reddish hair, and easy pluckability of hair.
- Lipid: A broad term used to describe fats and fatlike substances.
- Macro: A term or prefix relating to large size or numbers. Often, it is used in economics with respect to highly aggregated statistics such as national income or average food consumption in a country. It is at the opposite end of the scale from the concept micro. Economists work with different sets of theory at these two levels.
- Marketing: A general term applied to a wide variety of services involved in moving food from producers to ultimate buyers and consumers. The value of such services is part of retail prices and food expenditures. But such services are not required for foods produced and consumed by the producers and their households.
- Maldistribution of food supplies: A term used to refer to the situation where food supplies are not distributed among households or areas which need them, as well as to the failure to match seasonal variations in food needs with supplies.
- Malnutrition: The condition of the human body resulting from inadequate dietary intake in both quantity and quality. It is often used in a less technical sense to include undernutrition (low food intake) alone. Malnutrition frequently refers to the incidence of severe

deficiencies of particular nutrients such as vitamin A, iron or iodine.

Marasmus: Physical wasting resulting from insufficient calories, or protein/calorie deficiency in the diet.

Micro: A term or prefix relating to small size of numbers. The concept is used in economics to refer to events and characteristics of small groups of people such as households of a specified type in an area and in analysis of food intakes of particular categories of individuals. It contrasts with macro level aggregation (see above).

Model: In the sciences, a conceptual or synthetic representation of a real world system or situation in which only the most important elements and relations among them have been preserved.

Multivariate analysis: The study of the concurrent relationships of several independent variables to the dependent variable. Typical independent variables which are used in consumption economics are income, degree of urbanization, and family size. In consumption studies, the dependent variable may be a household food consumption, food intake or nutritional status measure. Because of the complexity of factors affecting rates of food consumption and nutrition, multivariate analysis is essential for drawing reliable and valid conclusions from food survey data. Regression analysis is one type of multivariate analytical technique.

Nutrient: One of various substances which provide nourishment for the body: energy-producing substances such as fats and sugars, chemical elements and compounds governing the rate of metabolic processes (iron, sodium, potassium), structural elements (protein, calcium), and other substances required for efficient and sustained functioning of the body.

Nutrient absorption: The amount of a nutrient actually used by the body during a specified period of time following a given level of nutrient intake.

Nutrient intake: The quantity of one or more nutrients consumed during a specified period of time from all foods consumed by individuals or groups.

Nutrition advisor: An individual, usually a clinical nutritionist or dietician employed to provide information and counsel to individuals, institutions or nations regarding foods, diets and nutrition. AID often uses this term to refer to any professional (often social scientists with some nutritional training) with responsibilities in the nutrition program area, akin to a nutrition planner.

Nutrition effects: Changes in food consumption patterns and related nutrient intakes resulting from changes in outside factors which directly effect the determinants of food habits and consumption patterns, e.g., policies which influence incomes and/or relative prices of consumer goods, the education of consumers, the sanitary practices of a population, etc.

Nutrition intervention: A program to deal more or less directly with nutritional problems through changes in diets of target groups. Examples of intervention programs include school feeding, supplementary foods for infants and pregnant or lactating women, enrichment of particular foods, direct distribution of some foods to disadvantaged families, the sale of foods at reduced prices to such families, and nutrition education programs.

Nutrition planner: An individual charged with the responsibility for the conception, preparation and/or execution of policies, programs, and/or projects oriented towards influencing the quantities and combinations of foods and nutrients consumed by individuals and groups.

Nutritional anthropologist: A socio-biological or social scientist specializing in the study and analysis of the determinants of human individual and group behavior with respect to food and nutritional status, among which are included: food selection, food taboos, eating habits, food distribution, attitudes and myths about food, cultural influences on human nutritional status.

Nutritional adequacy: A general term referring to the relationship between energy and/or nutrient intake and recommended requirements, dietary allowances or standards.

Nutritional requirements: The amounts of food energy and nutrients needed on the average per day by each specified age and sex category to meet the needs of healthy individuals for normal functioning of the body for work, play and growth. Requirement is a physiological concept. Estimates of nutrition requirements are based on metabolic studies under varying conditions. For many uses, nutritionists urge the use of recommended dietary allowances as standards with safety margins. The setting of nutritional requirements has been a highly controversial, political activity. Thus, the use of established requirements should be undertaken with care. (See "Food needs" above.)

Nutritional standards: Recommended intakes or allowances as estimated by national or international committees of experts based on reviews of clinical, epidemiological, and experimental evidence of

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physiological requirements for nutrients. Except for the energy value derived from nutrients in food, standards for nutrient intakes usually include margins for safety to allow for individual variations.

Nutritional status: The condition of the body resulting from the intake, absorption and utilization of food. It cannot be measured directly. Several anthropometric indicators can be used to make valid and reliable inferences about variations in nutritional status of families, e.g. weights, heights and arm circumferences of young children for specified ages and sex. However, it should be remembered that these data provide direct information about children, not the family unit as a whole.

Nutritional surveillance: A system providing a regular flow of information about the nutritional conditions of a population and factors that influence those conditions.

Operational framework: A diagram or model which incorporates realistic measures or indicators for each concept or subconcept in a conceptual framework.

Policy: A broad statement of intent by governing authorities intended to serve as guidelines for future activities; also a set of activities and behaviors carried out by a government in a particular area of its control.

Population groups or groupings: Categories of people or households by level of one or more characteristics such as area/region, income, degree of urbanization, occupation, sex, age, family size and family type. The objective of using these categories is to classify, for purposes of analysis, people into groups which exhibit like behavior. Analytically speaking, it is ideal to divide data into categories which maximize homogeneity within categories and differences between categories.

Poverty: A general term implying relative deprivation, usually in relation to some standard.

Physiological factors: The body functions which affect food intake and absorption, including sex, age, height, weight, energy requirements for heavy labor, nutrient needs during pregnancy and lactation, and the presence of disease.

Price elasticity of demand: The percentage of variation in the amount of a commodity purchased for a given percentage change in the price of that commodity; i.e. it measures the responsiveness of the quantity of a good or service demanded to changes in its price. Thus, it is a dynamic concept. Price elasticities for major commodities are often computed using historical data (time

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series data) on prices and quantities. Analysts should always make a careful examination of concurrent changes in other socioeconomic factors before assuming that price and quantity data alone can measure this responsiveness, since many intervening variables may and do affect prices and quantities demanded. (Some economists tend to take the "ceteris paribus"--all other things being equal--assumption underlying related economic theory too lightly.) Price elasticities can be used to estimate or predict the effects on consumption of policies or projects which affect relative prices of those commodities. (See "cross-price elasticities" above.)

Protein-energy malnutrition (PEM): A major nutritional problem in developing countries, resulting from insufficient food intake of both protein and food energy. Also known as protein-calorie malnutrition (PCM).

Protein deficiency: A nutritional problem, formerly regarded as the greatest nutritional problem in developing countries. Now, most nutritionists consider insufficient food energy more serious because efficient use of protein depends of adequacy of intake of food energy. However, populations depending heavily on cassava, yams, and plantains as staples do have protein problems because of the low protein content of these staples. In populations depending on cereals, when overall cereal intakes are low, both food energy and protein become deficient. (See protein-energy malnutrition.)

Psychological factors: Psycho-social and individual feelings, mental states, and conditions affecting motivation, cognition and learning which have impact on food and nutrition such as habits, preferences, and attitudes toward food use.

Purchasing power: Ability of consumers to buy goods and services using current income and/or wealth.

Relationships: How one variable changes with variations or changes in one or more other variables, usually measuring different concepts.

Reliability of a measure: The reproducibility or repeatability of the measurement. It is affected by sampling and by any problems of the respondents in answering the survey questions.

Social analysis: A study and description of the social and behavioral factors to be considered in project analysis and design. The objectives, timing and techniques of social analysis are still evolving. Usually, these studies deal with impacts of the project on potential project beneficiaries and non-beneficiaries. Such studies may be conducted as several stages in the project cycle. They can contribute to investigations of the food and nutrition

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situation in a variety of ways, especially by identifying the main features of the social environment and the social, cultural and even economic characteristics of target population groups.

Social characteristics: Characteristics stemming from membership in a society or a subgroup of a society, specifically, for example, kinship and family organization and relationships (status and role behavior). Sometimes the term is used generally to refer to demographic and cultural characteristics.

Socioeconomic factors: Aspects of economic and social organization which influence both economic and social behavior, such as income, occupation, education, land holdings, race, kinship and family relationships and family size.

Sociologist: A social scientist specializing in the study and analysis of the interaction of human groups and societies.

Structure: Relationships among elements or events. Sometimes, in dealing with human behavior, structure is an analytical concept not necessarily recognized by the participants in the behavior, for example, the structure of food consumption by various population groups in an area.

Stunting: A physical condition referring to relative height for age, often resulting from chronic undernutrition. Stunting is believed to be one of the better anthropometric signs for use in economic development planning. Height-for-age, the indicator used for stunting, is considered a more stable indicator of nutritional status than weight-for-age or weight-for-height because it is not as subject to short term variations resulting from seasonal changes in food intake, recent weaning, or acute disease episodes.

Subsistence production: Production of foods or fishery products for own household use (See above "home food production").

Survey method: A set of procedures for collecting and processing data which involves sample and questionnaire design, appropriate data processing, analysis and summarizing data and findings. (It is one of several methods of data collection.)

Survey sample: A subset of the total population from which information is to be obtained about the total population (also known as the "universe") without examining all members of the population. For example, a "representative five percent sample" would be a group comprising no more than five percent numerically of the universe, chosen in such a way that the likelihood that the sample's characteristics matches those of the population is maximized. Well-designed surveys in which the samples are only a small proportion

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of the subject population can provide information nearly as trustworthy as a census (which is a 100% sample) at lower cost in time and money.

Survey sample frame: A systematic organization of the total population to be sampled. Sample frames may consist of lists of all individuals or families living in the region to be sampled, or they may consist of small, roughly equal areas or land ("area sample frames"). In all cases, sample frames facilitate the process of selecting unbiased samples from general populations under study.

Target population: Populations selected for special attention in the design of projects and programs (those for whom principle benefits are intended).

Traditional foods: Foods usually consumed by a population for many years, often including the food crops best adapted and native to the region.

Time series data: An historical series of economic data including statistics such as annual income per capita; annual or monthly series of farm, wholesale or retail prices; annual per capita averages of the consumption of particular foods or overall indexes of food consumption. They usually pertain to large areas such as a country, but price series data may be collected and maintained for only one city (if for retail prices) or one rural area (if for farm prices).

Twenty-four hour recall method: A food intake survey method in which the respondent is asked to provide information on all foods consumed in a specified, recent twenty-four hour period. When undertaken by a skilled interviewer who is able to elicit near accurate quantities and who understands the dietary patterns and food behavior of the respondent, twenty-four hour recall method can provide useful data for program planning. However, since it covers only a twenty-four hour period, interviews must be planned to cover all seasons of the year when food intake varies, and holidays and weekends, when food intakes frequently are dramatically different. It is a method hardest to use in a culture with an eclectic, varied diet, and easiest to use in a culture with a relatively unchanging diet.

Undernutrition: A condition, also referred to as starvation, resulting from low food intakes, and creating short supplies of food energy. It is the most common food problem in developing countries and is particularly relevant to planning development projects. Except when found in infants and young children, undernutrition is seasonal in many developing countries due to the lack of food supplies in preharvest periods or during times of severe weather conditions. For very young children, when food is in short supply, undernutrition is often chronic.

Urbanization: A process of increasing the degree of incidence of social, economic and political factors associated with city life, such as population density, diversity, occupational specialization, institutional complexity, secondary relationships, and central administration. (It also refers to degrees of urbanization.)

Validity of a measure: The appropriateness and accuracy of the measurement in terms of relevance to the concept which the data purports to measure. In other words, does the measure measure what it is supposed to. A valid measure is directly relevant to the concept selected for analysis. A valid measure also serves as an accurate indicator for the concept.

Variance: A measure of the amount by which observations of a particular variable (e.g. the height of individuals) differ from the mean (average) value for that variable in the universe.

Variations: Differences in single variables among different households, people or areas at a particular time or at specified times and places.

Vitamin A deficiency: A nutritional problem common in developing countries due to lack of consumption of fruits and vegetables rich in vitamin A. Lack of sufficient Vitamin A in the body affects growth, the severity of infectious diseases and vision. A serious and continuous deficiency in vitamin A intake can cause total blindness. Vitamin A deficiency is a common cause of blindness in most developing countries, in both rural and urban areas.

Wealth: The cumulative value of goods and services commanded by an individual or group over time. Wealth is sometimes considered to be an important determinant (together with income) of individual and group consumption levels.

Welfare: A branch of economics dealing with measures and determinants of an individual's "well-being," generally defined in terms of utility; in applied social science, welfare is interchangeable with "well-being" in terms of such concepts as ownership of material goods, levels of food consumption, and state of health and nutrition.

Well-fed people: A term referring to a population which has generally adequate food and nutrient supplies (as opposed to undernutrition and malnutrition.)

Weighing method: Instead of asking respondents to report on their food consumption, (as in the twenty-four hour recall method), the weighing method measures foods as they are brought into the household, as they are prepared for eating and as they are served.

Often plate and other waste is weighed also. Some researchers prefer this method, since it measures actual behavior rather than recollections of behavior.

Weighting: A computation often used in processing survey data so that the distribution of the final sample is in proportion to the universe (the whole population). Another type of weighting is used in calculating index numbers such as quantity weights applied to individual commodity prices in deriving an overall price index and price weights to calculate an index of overall food consumption.

The proportions of the population in particular subgroups can be altered to match changes expected during development and combined with food consumption averages for such groups to derive approximations for future overall food averages for the population. This is called a reweighting procedure for projecting food consumption.

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ACTIVITY 11

SAMPLING AND SURVEY CASE

The Situation

The government of Tanzania has decided to encourage increased cotton production by offering a package of incentives. This is expected to affect primarily Tabora, Shinyanga, Mara, and Mwanza. All three regions showed a net deficit in production of preferred grains between 1974 and 1977, but managed a net surplus between 1977 and 1980.

The government would like to increase cotton production without slipping back into a grain production deficit. It is also hoped that reduced food production in local villages will not lead to intolerable levels of nutritional deficiency, as farmers shift from food to cotton, and as local scarcities drive up prices in the informal market.

Of particular concern is Tabora, where in 1969 63% of income went to food and 42% of that food was grain. Tabora is adjacent to grain-rich but remote Rukwa, which currently sells a relatively large percentage of its corn to the NMC because of its remoteness from urban areas. To counter price rises in the informal market for food between Rukwa and Tabora, NMC will offer incentives to local entities to make goods available in rural Tabora.

The food and nutrition situation will vary between uplands and lowlands with cultural groups, with size of landholdings, with major crops, and with market orientation. These factors affect both questionnaire design and sampling. Investigators should determine the type of data needed to prove their hypotheses.

For rural Tabora, then, we would like to know the following:

1. Amount and distribution of primary and secondary foods within the family; (related to time periods and family size and composition);
2. Sources of food; i.e., homegrown, purchased through informal market, purchased through NMC;
3. For purchased food, a comparison of prices on the informal and formal market, and the portion of income going to food;
4. How 1-3 change after the new program is put into effect.

Group Problem

Design an interview schedule that will elicit the desired information and any other information you consider important.

ACTIVITY 11 -- QUESTIONNAIRE DESIGN:

"QUALITI" INTERVIEWS"

What follows is a logical procedure for developing interview schedules. The procedure is broken down into seven steps that form the acronym QUALITI.

Question. The first step is to ask oneself what questions, in the most general sense, need to be answered. Each general question should then be broken down into its component parts and so on until the most concrete level is reached. For example, you might want to know, at the most general level, what a family consumes in an average week. You might break this down for primary and secondary foods, seasonal variations, and intrafamilial variations. Each of those in turn can be further broken down.

Unit. Once the questions are broken down, you must decide the interview unit: Will your interviewer talk to the whole family or a single person? Who should that person be? Is it reasonable to expect that such a person will cooperate with your interviewers?

Answers. Once you know roughly what questions you want answered and the unit or person from whom you will seek the answers, it is time to make a first assay at deciding what kinds of answers you can expect and how you will interpret them. Here you might consider the conditions under which the interview will take place and whether the conditions are likely to influence the answers you will receive.

For example, if you are asking a farmer who has received fertilizer as an incentive for planting a particular crop if he has planted that crop, he is likely to say yes, whether or not he has really done so. This is also the (first) place to question whether the respondent is likely to have the information necessary for answering the question correctly. (Remember the problems raised about 24-hour recall interviews.) If answers are likely to involve non-standard measures, this is the time to begin figuring out how to convert them to standard measures.

Limitations. Usually, we want more information than our respondents have time to give us, or more than we have time to collect and analyze. Here is where we begin to pare the developing interview down to size. The following questions are crucial:

- a. How much time will the interviewer have for each interview?
- b. How much time can we expect the respondent to spend with the interviewer?

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- c. How much time will be absorbed in travel?
- d. How many questions can we ask in that time?
- e. What about call backs?
- f. What are our priorities among the questions? This step will probably have to be repeated later when the actual questions are developed.

Phrasing. This step is most often neglected, but it is extremely important especially since we are talking about interviewing rural residents of developing countries. Language and dialect problems are only the most obvious ones. Also to be considered are such questions as whether the phrasing is embarrassing or meaningless to the respondent.

Wherever possible, a person of the same social category as the anticipated respondents should be called upon to collaborate at this stage. Again, we are talking about more than mere translation of questions already phrased. A general procedure is to explain to the native informant what you are trying to find out and ask the native to rephrase the question to elicit the information.

Trials. In more rigorous circumstances, this step is referred to as a pretest. What we are doing here is simply trying out the interview schedule to see if it works. It is at this stage you will discover that the interview takes too much time, that certain questions are repeatedly not answered or misunderstood, or that the answers to particular questions are so vague as to be useless to you.

Not only should you quiz your interviewer about how the interview went, but also whenever possible you should go over the questions with some of the respondents to see what meaning they gave to the questions and what their answers meant. This is also the time to alter limited option questions so that the options are meaningful and exhaustive.

Interpretation. After you think the schedule is ready to go, inventory the answers you are likely to receive and determine whether they give you enough information to answer the original questions. If not, go back to step one.

ACTIVITY 11

The QUALITI method of questionnaire construction is, of course, not the only possible approach, but it is one that has worked well in the past. If nothing else, it provides a structure; and any structure is probably better than none. Also, the acronym has mnemonic value.

In the exercise, the participants will not be able to take the last three steps (in the absence of native informants). However, if time permits they may simulate the steps with someone playing native informant. It may be useful here to have them recall questionnaires they have tried to respond to in the past that contained meaningless or ambiguous questions or offered alternative answers, none of which actually represented their true response.

This is also a good time to suggest that questions be limited to items with concrete answers -- places, dates, amounts -- rather than opinions, impressions, etc. Open-ended questions can also be discussed at this point.

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ACTIVITY 12 - PURPOSIVE SAMPLING

It will help clarify this section if the participants understand why certain criteria are being used to weight the samples. The point should be made that if we do not know anything to begin with, we need a big enough sample for all possible factors to have a good chance of being represented. However, if we are already reasonably sure that certain factors do have an effect, and we want to know about variations within groups when those factors are held constant, then we make sure that those factors are proportionately represented.

On the other hand, if we know in advance that one ethnic group, for example, is better fed than another, we will want to make sure that those factors are proportionately represented. Otherwise, ethnicity might mask the effects of another factor, such as distance from markets. Also, in a small unstratified sample, sampling error could easily cause one group to be under-represented and thus bias the results.

It may help to give an example of political pollsters who control for party affiliation, occupation, ethnicity, income, etc., based on voting behavior by people in those categories in previous elections. With the information from previous elections, they are able now to get accurate results using small stratified samples.

A simple example might be introduced early on: performance at marble shooting by boys and girls, using for instance agates and steelies.

Participants should be walked through the first exercise as a group with assistance from the instructor where needed. After that exercise is complete, discuss how households should be chosen in each village, based on differences among households and the number of interviews the interviewers can complete in the allotted time.

Discuss ways of discovering intra-village differences among households: key informants, tax records, objective criteria of economic well-being (size and condition of house, appliances, etc.).

There is no single solution to the team exercise (based on the Tanzania case or the participants' own cases). Probably, if the government's hypothesis (see Case Description) is the most important aspect of the survey, the breakdown for non-NMC villages should be 1, 2, and 1. However, this gives 40% representation to a category of villages that represents only 21% of the total. This should inspire some discussion.

The solution to the household selection problem is fairly straightforward: 12, 24, and 4. The bigger issue is how to identify and classify households.

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SAMPLE CASE STUDY - SAMPLE SELECTION PROBLEMS

In this activity, we will select a sample number of sites for field study. We will do this on the basis of what we know about differences among sites and population groups that are likely to be related to variations in food consumption and nutrition. If we knew nothing in advance and wished to draw a statistically useful sample, we would draw a random sample in which each household, village, or other unit had an equal chance of being selected. This would require a much larger sample, which would render the rapid reconnaissance infeasible. Or if we simply drew a small number of villages at random, we could have far less confidence that the villages were representative of villages in the region as a whole.

In this exercise, information is supplied for population size, agro-ecological zones, access to markets, ethnicity, and cultural-economic practices, all of which are felt to affect, directly or indirectly, nutritional status. In actual practice, other factors would probably intervene.

For the sake of this exercise, it is assumed that time and funding constraints limit the project to 8 field workers for 5 weeks. Assume that the interviewers will be divided into teams of 2, and that each team will spend 2 weeks in each of 2 villages, so a total of 8 villages will be surveyed.

The Region

The target populations are small to medium agriculturists with landholdings ranging from 10 to 2 hectares, classified as irrigated, humid, or marginal. They raise some dairy cattle, as well as minor livestock and kitchen gardens.

Ninety percent of the population live in villages ranging from 1,000 to 5,000 population. The mean village population is 1,500. There are 73 villages in the target area, four of which are market centers. Not all of the villages are equally well integrated into the regional market system. Those more distant from market centers and roads consume fewer consumer goods and go less far afield to seek temporary work. Thirty-two of the villages are considered to be integrated into the market system.

Two linguistic/cultural groups are represented, Group A and Group B. There are 23 Group B and 50 Group A villages. Notice that this characteristic cuts across other characteristics.

The ecology of the area can be roughly divided into two zones: one relatively flat with some annual flooding and a high water table; the other hilly to mountainous. Both areas produce grains and legumes, but in different proportions; and average annual yield differs between the two areas.

Fifty of the villages are in the lowlands and 23 are in the highlands. Of the highlands villages, 17 are Group B and 6 are Group A. Of the lowland villages, 44 are Group A and 6 are Group B. All four of the market centers are in the lowlands and are dominated by Group A. Of the integrated villages, all are Group A.

### Choosing a Sample

Step 1. Determine how many sites are to be selected based on time and the number of field workers available. The number of sites in this exercise is eight.

(Time Out)

Beginning in the next step, there is more than one way of reaching the same goal. One way is to calculate the weighting for each characteristic and multiply the weightings to get the single weighting for the villages having all those characteristics. For example, take the group of villages in the sample that are lowland, Group A, integrated, and non-market. Fifty of the 73 villages, or 68%, are in the lowlands. Forty-four of the 50 lowland villages (88%) are Group A. Thirty-two of the 44 lowland Group A villages (72.7%) are integrated into the cash economy, and 28 of these 32 (87.5%) are not market towns and match the other criteria of the group.

Multiplying these percentages gives 38.1% for the proportion of villages that are in the category formed by three characteristics -- lowland, Group A, non-market. Multiplying that by eight (number of villages in the sample) gives us a figure of 3.05, which is the number of villages in this category that should be in the sample.

A general formula for this procedure is as follows:

$$\frac{(C_1 C_2 \dots C_m) nS}{N nC_2 nC_3 \dots nC_m},$$

where:

$C_i$  is a characteristic of the population;

$nS$  is the number in the sample;

$m$  is the number of the last characteristic considered;

$N$  is the number in the population; and

$nC_i$  is the total number of cases exhibiting the  $i$ th characteristic.

BUT THERE IS AN EASIER WAY!

Step 2. All you need to do is count the actual number of villages that fall into each category and list them. The total of the villages in the categories should equal the total number of villages in the population.

Step 3. Now figure the percentage of the total number of villages each represents, and multiply that figure by the total sample =8. This is done in the table below.

<u>Site Type</u>	<u># of Sites</u>	<u>% of Total</u>	<u>Sample Size</u>
Lowland, integrated, Group A, market center	4	5.48	0.44
Lowland, integrated, Group A, non-market	28	38.36	3.07
Lowland, non-integrated, Group A	12	16.44	1.32
Lowland, non-integrated, Group B	6	8.22	0.66
Highland, Group A	6	8.22	0.66
Highland, Group B	17	23.29	1.86
	<u>73</u>	<u>100.01</u>	<u>8.01</u>

Step 4. Now come the judgement calls! The obvious problem is that we cannot survey 0.44 villages. If we simply rounded off, the first category of villages would not be represented in the sample. To avoid that, you might take one sample village away from the second category and give it to the first. That would do some violence to our proportional sampling, but no category would be left out. But, again, that is a judgement call and would have to be based on more information than we have here.

One "solution" to the problem: Now we know how many sites of each category we may want to select for research.

## Final site selection:

Site Type	Total	Sample	%
Lowland, integrated, Group A, market center	4	1	25
Lowland, integrated, Group B, non-market	28	2	7
Lowland, non-integrated, Group A	12	1	8
Lowland, non-integrated, Group B	6	1	17
Highland, Group A	6	1	17
Highland, Group B	17	2	12
TOTALS:	73	8	11

Next, we number the sites in each category from 1 to N (the total number in the category). Then, using a table of random numbers, we select the sites for each category. While we are at it, we should select one or two alternative sites for each category in case it should become impossible to work in one of the first choices. This is an important step. Should we choose the site casually, even after this degree of stratification, it would likely be on the basis of accessibility, having a contact in the village, or some other factor that could bring hidden biases to the sample.

This sample, although a great improvement over a simple random sample, should still not be considered as the basis for complex statistical inferences about the population as a whole. That would require a great deal more prior information and considerably more confirmation of our assumptions about causes of nutritional status.

HANDOUT No.

SAMPLE USDA FOOD COMPOSITION TABLES

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**TABLE 1.—COMPOSITION OF FOODS, 100 GRAMS, EDIBLE PORTION—Continued**

[Numbers in parentheses denote values imputed—usually from another form of the food or from a similar food. Zero in parentheses indicates that the amount of a constituent probably is none or is too small to measure. Dashes denote lack of reliable data for a constituent believed to be present in measurable amount. Calculated values, as those based on a recipe, are not in parentheses.]

Item No.	Food and description	Water	Food energy	Protein	Fat	Carbohydrate		Ash	Calcium	Phosphorus	Iron	Sodium	Potassium	Vitamin A value	Thiamine	Riboflavin	Nicotin	Ascorbic acid
						Total	Fiber											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
	Beef—Continued	Pound	Calories	Grams	Grams	Grams	Grams	Grams	Milligrams	Milligrams	Milligrams	Milligrams	Milligrams	International units	Milligrams	Milligrams	Milligrams	Milligrams
	Retail cuts trimmed to retail level—Continued																	
	Flank steak:																	
	Choice grade:																	
	Total edible:																	
243	Raw (100% lean).....	71.7	144	21.4	6.7	0	0	1.0	12	201	2.2			10	0.00	0.19	6.2	
244	Cooked, braised (100% lean).....	61.6	164	24.8	7.3	0	0	0.8	14	154	2.2			16	0.06	0.23	4.6	
	Good grade:																	
	Total edible:																	
245	Raw (100% lean).....	72.1	139	21.8	6.1	0	0	1.0	12	201	2.2			10	0.00	0.19	6.2	
246	Cooked, braised (100% lean).....	61.6	161	24.8	6.6	0	0	0.8	14	151	2.0			16	0.06	0.23	4.7	
	Mind-bank:																	
	Choice grade:																	
	Total edible:																	
247	Raw (87% lean, 13% fat).....	67.9	209	18.2	23.4	0	0	0	11	168	2.3			60	0.04	0.16	4.4	
248	Cooked, simmered (84% lean, 16% fat).....	64.2	261	22.1	28.1	0	0	0.7	11	125	2.2			60	0.04	0.18	3.8	
	Separable lean:																	
249	Raw.....	72.7	184	21.7	4.6	0	0	1.0	12	202	2.3			10	0.00	0.19	6.2	
250	Cooked, simmered.....	62.6	184	24.7	6.9	0	0	0.8	14	161	2.0			16	0.06	0.23	4.7	
	Separable fat:																	
251	Raw.....	27.0	602	11.1	61.8	0	0	0	6	100	1.7			120	0.03	0.10	2.7	
	Good grade:																	
	Total edible:																	
252	Raw (71% lean, 29% fat).....	62.2	229	18.7	17.2	0	0	0	12	182	2.0			20	0.04	0.17	4.7	
253	Cooked, simmered (70% lean, 30% fat).....	61.0	267	27.2	21.7	0	0	0.7	12	134	2.6			60	0.04	0.21	6.2	
	Separable lean:																	
254	Raw.....	71.5	124	21.0	2.7	0	0	1.0	12	202	2.2			10	0.00	0.19	6.2	
255	Cooked, simmered.....	62.4	178	21.0	4.9	0	0	0.8	14	161	2.0			16	0.06	0.23	4.7	
	Separable fat:																	
256	Raw.....	24.6	617	14.5	60.4	0	0	0	8	122	2.2			100	0.04	0.12	3.4	
	Loin or short loin:																	
	Prime-house steak:																	
	Choice grade:																	
	Total edible:																	
257	Raw (82% lean, 18% fat).....	48.2	290	14.0	24.2	0	0	0.7	8	128	2.2			70	0.04	0.12	3.6	
258	Cooked, broiled (87% lean, 13% fat).....	37.2	445	19.7	42.2	0	0	0	8	148	2.6			70	0.04	0.14	4.2	
	Separable lean:																	
259	Raw.....	68.7	184	21.1	4.2	0	0	1.0	12	194	2.2			20	0.00	0.19	6.1	
260	Cooked, broiled.....	57.0	224	24.2	16.8	0	0	1.4	12	242	2.7			20	0.06	0.25	6.8	
	Separable fat:																	
261	Raw.....	11.5	777	4.2	64.1	0	0	0	2	22	0			170	0.02	0.04	1.0	
	Good grade:																	
	Total edible:																	
262	Raw (84% lean, 16% fat).....	60.2	270	15.2	22.0	0	0	0.7	8	148	2.2			70	0.04	0.14	3.7	
263	Cooked, broiled (84% lean, 16% fat).....	36.0	416	20.6	26.7	0	0	1.0	8	179	2.6			78	0.04	0.17	4.2	
	Separable lean:																	
264	Raw.....	72.0	141	21.5	4.5	0	0	1.0	12	200	2.2			10	0.00	0.19	6.2	
265	Cooked, broiled.....	64.2	197	21.1	7.1	0	0	1.4	12	247	2.7			16	0.06	0.24	6.0	
	Separable fat:																	
266	Raw.....	11.6	774	4.2	62.0	0	0	0	2	24	0			170	0.02	0.04	1.0	
	T-bone steak:																	
	Choice grade:																	
	Total edible:																	
267	Raw (82% lean, 18% fat).....	47.5	297	14.7	27.1	0	0	0.7	8	124	2.2			70	0.04	0.12	3.6	
268	Cooked, broiled (84% lean, 16% fat).....	34.4	472	18.5	42.2	0	0	0	8	148	2.6			80	0.04	0.16	4.1	
	Separable lean:																	
269	Raw.....	69.7	164	21.2	4.1	0	0	1.0	12	197	2.2			20	0.00	0.19	6.1	
270	Cooked, broiled.....	57.0	222	24.0	18.8	0	0	1.4	12	242	2.7			20	0.06	0.23	6.9	
	Separable fat:																	
271	Raw.....	11.7	774	4.2	62.0	0	0	0	2	24	0			170	0.02	0.04	1.0	
	Good grade:																	
	Total edible:																	
272	Raw (84% lean, 16% fat).....	60.6	264	15.4	22.2	0	0	0.7	8	142	2.2			70	0.07	0.14	3.7	
	Separable lean:																	
	Total edible:																	

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HANDOUT: ACTIVITY 7  
EXAMPLES OF DIETARY INTAKE FORMS

Name	Catherine O.	Age	11 years	Date	3-19-63	Interval	3 mos.
Usual meal times	7:30	11:30	5:30	( Sunday 2 meals )			
Between meals	a.m.-0	p.m.-milk - cookies or banana	b.d.-milk or fruit				
Appetite	Good consistantly	Tries to eat even foods she does not like					
Likes	meat - fruit - cookies	Dislikes rice - liverwurst - cottage cheese - butter					
No special attention at meals		Packs lunch to school					
Milk	Whole Vitamin D	Brk. 4 oz. 1x mo.	4 oz. on dry cereal only	Lunch 8 oz. 7 x wk.			
	Dinner 7 oz. 7 x wk.	Mid-p.m. 6 oz. 5 x wk.	b.b. 6 oz. 3 x wk.				
Cream	None of any kind	Pizza — —					
Cheese	Cheddar 9 oz. total	Cottage 1/4 c. total		Cream 1/4 c. total			
Meat	Dinner 3 oz. 6 x wk.	Lunch 2 oz. 3 x wk.	Chic. thigh + leg 1x wk.	P-H 4 oz. 3 x total			
Liver (incl. chic.)	6 oz. total	Hamb. 1/4 - 1/5 lb. 1-2 x wk.		Turkey 3 oz. 2 x only			
Fish	Tuna 1 1/2 c. total	3" Trout 4 x total	1/4 c. perch or sole 4 x total				
Prepared meat	Frk. 3/mo.	L.M. 4 sl. /mo.	S. 7-8 oz. total	Canned — —			
Eggs	3 whole / wk.	6 extra at Easter		Fr. toast 4 sl. total with 2 eggs			
Fruit	Citrus	4 oz. O.J. 2 x wk.	4 oz. P.J. 2 x mo.	4 oz. T.J. 1 x only	1/4 Cant. 1 x only		
	Orange	2/wk. past 6 wks. - prev. 1/wk.		4 oz. Apricot nectar 3 x total			
	Dried	R. 1/2 c. total	4 Prunes total	Olives 10 total	Fr. cock. 1/2 c. 2 x wk.		
	Other	Apple 2/wk.	Banana 2/wk.	Strawb. 1 c. total	Peach 1/2 c. 2 x wk.	Pear 1 c. only	
Vege- tables	Legumes	1 c. S.B. 1 x in 2 wks.		Chili 1 1/2 c. /mo.			
	Potato	2 med. /mo.	Sweet 4 sm. total	Chips 4 c. total		Fritos 1 c. only	
	Cooked	1/2 c. 5 x wk.	Peas 2 x wk.	Gr. B. 1 x wk.	Corn 6 x total	Asp. 2 x only	
	Raw	Tom. 1/2 /wk.	Lat. 2 med. 1 /wk.	Cab. 1 c. total	Avo. 1/4 total	Cel. 8 st. total	
	Leafy - yellow	Sp. 4 L.T. 2 x mo.		Car. 1 med. raw /wk. + with peas 1/2 c. 2 x mo. No other			
Cereal	1/2 c. 6 x wk.	Cheerios or Corn Fl. past 2 wks.		Prev. Mallomeal			
Bread	1/2 dark	Brk. 1 sl. 2-3 x wk.	Neon 1 sl. 5 x wk.	Dinner 1 roll /wk.	Betw. 3 sl. /mo.		
Mac., spag., rice, noodles	1 c. /wk.		Brownies 6 total 2" x 2"				
Crackers	Gr. 4/wk.	Soda 2/wk.	Oyster 1 c. /mo.	Cookies 10/wk. past 3 wks. - Prev. 3/wk.			
Butter or margarine	1 T. Butter /wk.		Bacon 2 sl. /wk.				
Mayon.	1 T. /wk.	Oil Dress. 1 T. /wk.	Gravy 1/4 c. total		Catsup 1 T. /wk.		
Popcorn	2-3 c. total		Nuts — —		Peanut butter 4 L.T. /wk. — gradual increase		
Pudding	— —		Custard — —		Jello 1/2 c. 3 x wk — gradual increase		
Pie	1/6 of 8"	Fruit 2 x + Cream 3 x total		Cake 4 med. pc. total - sheet - 1/2 frosted			
Ice cream	1/2 c. 8 x total	Sherbet 1 c. total		Doughnuts 4 total		Sweet rolls — —	
Candy	5-cent bar 1 x only	6 c. sugar candy total		Gum 1/2 st. 5-7 x wk.			
Sugar	1 1/2 tsp. on cereal	4 T. total on fruit		Jam or jelly 2 L.T. /wk.			
Waffle	4" x 4" 4 sa. /mo.	Pancake 4" diam. 3/wk		Syrup 4 T. 5 x mo.		Honey 3 T. total	
Soup	1 c. Veg. - beef 4 x total		Tea or coffee lead tea 20 oz. total				
Cocoa	2 level tsp. Quik 8 x wk.		Chocolate syrup — —				
Popsicle	6 total		Soft drinks 6 oz. 1 x wk. av.		Koolaid — —		
Supplements	Unicap 3-4 /wk. except none 1 week						

FIG. 1. Form used for recording the nutritional history.

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NUTRITION HISTORY - CHILD RESEARCH COUNCIL

Age \_\_\_\_\_ Date \_\_\_\_\_ Interval \_\_\_\_\_ Months \_\_\_\_\_

\_\_\_\_\_ usual meal times

\_\_\_\_\_ Between meals

\_\_\_\_\_ Appetite

\_\_\_\_\_ Likes \_\_\_\_\_ Dislikes

\_\_\_\_\_ Milk

\_\_\_\_\_ Cream

\_\_\_\_\_ Cheese Cheddar \_\_\_\_\_ Cottage \_\_\_\_\_ Cream

\_\_\_\_\_ Meat, poultry \_\_\_\_\_ P-H

\_\_\_\_\_ Liver (incl. chicken)

\_\_\_\_\_ Fish

\_\_\_\_\_ Prepared meat

\_\_\_\_\_ Eggs

\_\_\_\_\_ Citrus

\_\_\_\_\_ Fruit Dried \_\_\_\_\_

\_\_\_\_\_ Other \_\_\_\_\_

\_\_\_\_\_ Legumes \_\_\_\_\_ Chili

\_\_\_\_\_ Potato \_\_\_\_\_ Sweet \_\_\_\_\_ Chips

\_\_\_\_\_ Vege- \_\_\_\_\_ Cooked \_\_\_\_\_

\_\_\_\_\_ tables \_\_\_\_\_ Raw \_\_\_\_\_

\_\_\_\_\_ Leafy; yellow \_\_\_\_\_

\_\_\_\_\_ Cereal

\_\_\_\_\_ Bread

\_\_\_\_\_ Mac., spag., rice, noodles

\_\_\_\_\_ Crackers \_\_\_\_\_ Cookies

\_\_\_\_\_ Butter or margarine

\_\_\_\_\_ Bacon \_\_\_\_\_ Mayonnaise \_\_\_\_\_ Oil dressing \_\_\_\_\_ Gravy

\_\_\_\_\_ Popcorn \_\_\_\_\_ Nuts \_\_\_\_\_ Peanut butter

\_\_\_\_\_ Fudding \_\_\_\_\_ Custard \_\_\_\_\_ Jello

\_\_\_\_\_ Pie \_\_\_\_\_ Cake \_\_\_\_\_

\_\_\_\_\_ Ice cream \_\_\_\_\_ Doughnuts \_\_\_\_\_ Sweet Rolls

\_\_\_\_\_ Candy

\_\_\_\_\_ Sugar \_\_\_\_\_ Jam or jelly

\_\_\_\_\_ Waffles, pancakes \_\_\_\_\_ Syrup \_\_\_\_\_ Molasses \_\_\_\_\_ Honey

\_\_\_\_\_ Scup \_\_\_\_\_ Tea or coffee

\_\_\_\_\_ Cocoa \_\_\_\_\_ Chocolate syrup

\_\_\_\_\_ Popsicles \_\_\_\_\_ Soft drinks \_\_\_\_\_ Koolaid

\_\_\_\_\_ Concentrates

of Ch?

ID#

Form#

Day

Date

Day

What did \_\_\_\_\_ have to eat or drink yesterday starting from the time he/she  
woke and got up in the morning?

Record amounts in informant's measuring standard

Time

betw. meal-time

Time

betw. meal-time

Time

What foods does he/she like to eat or like?

What foods does he/she refuse to eat?

In your opinion does he eat - too much \_\_\_  
just right amt \_\_\_  
Too little \_\_\_

Has there been a change in his appetite  
these past 2 months? Yes \_\_\_ No \_\_\_

Is this day typical - is it more or less  
than usual? typical \_\_\_  
more \_\_\_

MA

Name of Respondent	
D.S.M.	
Whole-Vit D	
EVAP	
Milk	FR. Stim
	Ice Cream
	Yoghurt
	Cheddar
Cheese	Cottage
	Cream
Eggs	
peanut butter	Dried Peas Beans
	Nuts
	Meat
	Chix
Meat	P.-H.
	Liver (Inc. Chix)
Fish	Hamburg
	Turkey
Poultry	Fish
	Prepared Meat
	Citrus
	Dried
Fruit	Juices
	Canned
	Other
	Potato
	Sweet
Vege-	Cooked
ables	Raw
	Leafy-Yellow

Meals away from Home:

Name of Interviewer	Date
Bread	Wh.
	Dk.
+	Cereal - Ready to eat
Cereals	Ckd.
	Mac, Spagh, Noodles
	Rice
	Crackers
	Waffle, pancakes
Grains	Grits
	Cracked wheat
Sugars	Sugar
	Jam
+	Honey
	Jelly
	Pan syrup
Sweets	Choc. Syrup
	Molasses
Fats	Marg/Butter
	Cream/Substitute
+	Mayonnaise
	Oil Dressing
Oils	Gravy
	Bacon
	Pudding
	Jello
	Custard
	Pie
Desserts	Cake
	Sw. Rolls
	Doughnuts
	Sherbert
	popsicle
	Pot. Chips
	Corn Chips
Snack	Popcorn
Food	Cookies
	Koolaid
	Soft Drinks
	Beverage Mixes
	Candy
	Soup
	Supplementation

1/8



COMPLETE RECORD OF ONE DAY'S FOOD

BREAKFAST: Time \_\_\_\_\_ a.m.

Fruit: Kind \_\_\_\_\_ Amount \_\_\_\_\_

Cereal: Kind \_\_\_\_\_ Amount \_\_\_\_\_

Milk \_\_\_\_\_ oz. Cream \_\_\_\_\_ oz. Sugar \_\_\_\_\_ tsp.

Bread: Kind \_\_\_\_\_ No. slices \_\_\_\_\_

Butter \_\_\_\_\_ tsp.

Other spread: Kind \_\_\_\_\_ Amount \_\_\_\_\_

Egg: Amount \_\_\_\_\_ How cooked \_\_\_\_\_

Bacon: No. slices \_\_\_\_\_ Thin or regular \_\_\_\_\_

Milk: Amount \_\_\_\_\_

Other beverage: Kind \_\_\_\_\_ Amount \_\_\_\_\_

Milk \_\_\_\_\_ oz. Cream \_\_\_\_\_ oz. Sugar \_\_\_\_\_ tsp. Cocoa \_\_\_\_\_ tsp.

Other foods \_\_\_\_\_ Amount \_\_\_\_\_

\_\_\_\_\_ Amount \_\_\_\_\_

\_\_\_\_\_ Amount \_\_\_\_\_

BETWEEN BREAKFAST AND NOON MEAL

Foods eaten \_\_\_\_\_ Amount \_\_\_\_\_

\_\_\_\_\_ Amount \_\_\_\_\_

\_\_\_\_\_ Amount \_\_\_\_\_

Time \_\_\_\_\_ a.m. Regular \_\_\_\_\_ Irregular \_\_\_\_\_

NOON MEAL:

Time \_\_\_\_\_

Soup: Kind \_\_\_\_\_ Amount \_\_\_\_\_

Main dish: Kind \_\_\_\_\_ Amount \_\_\_\_\_

Potato: How cooked \_\_\_\_\_ No. and size \_\_\_\_\_

Vegetables: Kind \_\_\_\_\_ Amount \_\_\_\_\_

and/or sandwich \_\_\_\_\_ Amount \_\_\_\_\_

filling: \_\_\_\_\_ Amount \_\_\_\_\_

Bread: Kind \_\_\_\_\_ No. slices \_\_\_\_\_

Butter (on bread, potato, vegetables) \_\_\_\_\_ tsp.

Gravy \_\_\_\_\_ Tbsp.

Salad dressing: Kind \_\_\_\_\_ Amount \_\_\_\_\_

Milk: Amount \_\_\_\_\_

Other beverage: Kind \_\_\_\_\_ Amount \_\_\_\_\_

Milk \_\_\_\_\_ oz. Cream \_\_\_\_\_ oz. Sugar \_\_\_\_\_ tsp.

Dessert: Kind \_\_\_\_\_ Amount \_\_\_\_\_

Other foods \_\_\_\_\_ Amount \_\_\_\_\_

BETWEEN NOON AND EVENING MEALS

Food eaten \_\_\_\_\_ Amount \_\_\_\_\_

\_\_\_\_\_ Amount \_\_\_\_\_

\_\_\_\_\_ Amount \_\_\_\_\_

Time \_\_\_\_\_ p.m. Regular \_\_\_\_\_ Irregular \_\_\_\_\_

Activity 7 Suggestions for Instructors

- + The concepts and issues involved in measurement of consumption and nutrition status are complex, and our time is limited. The main points to stress:
  - ° Food balance sheets are inadequate sources of information about the consumption/nutrition status of populations.
  - ° Sample surveys are better ways of obtaining data about the distribution of food consumption patterns and some of the elements influencing consumption patterns (e.g., income, prices, cultural tradition).
  - ° But surveys combining information about agricultural production and food consumption in detail are costly.
  - ° Therefore, if data on nutritional status is to be obtained with a frequency useful for planners in resource-poor countries, acceptable compromises need to be made in such things as sample selection and stratification and in questionnaire design.

Measurement of Nutrition and Consumption--Important Points

- ° FOOD BALANCE SHEETS relate total food available (domestic production plus imports minus exports) to a country during a given year to the total estimated population for that year. From these data "average per capita food availabilities" and "average per capita nutrient availabilities" can be calculated.
- ° Food balance sheets DO NOT provide information about:
  - = Actual consumption of food
  - = Actual intake of nutrients and nutrient absorption
  - = Distribution of food supplies
  - = The health/nutrition status of the population
  - = The social and economic costs of malnutrition and related infectious disease resulting from reduced physical and mental capacity, labor hours lost, infant and adult mortality
  - = How the levels and patterns of demand for food are likely to change as incomes rise, relative prices change, and cultural patterns evolve under the impact of development policies and projects
- ° Development planners need to estimate the total food DEMAND for food resulting from population growth and socio-economic change in order to plan for both increases in total VOLUME of food supply and in PATTERNS of crop livestock diversification.

## Income, Price, and Consumption Relationships--Important Points

- INCOMES of consumers and PRICES of all goods and services consumers might want to buy are among the most important VARIABLES determining what consumers are likely to buy at any given time.
- Planners and decision makers would like to be able to FORECAST how much consumers will buy in the future, given estimated levels and rates of change in prices and incomes.
- DEVELOPMENT ASSISTANCE PROGRAMS and PUBLIC POLICY in less developed countries are designed to influence the LEVELS and DISTRIBUTION of incomes and the RELATIVE LEVELS of prices.
- SYSTEMATIC RELATIONSHIPS between (1) incomes and the amounts of consumption goods purchases, and (2) prices and the amounts of consumption goods purchased, can be estimated from data collected through SAMPLE SURVEYS.
- INCOME-CONSUMPTION relationships (called "consumption-functions" by economists) are usually POSITIVE: people with high incomes consume more than people with low incomes; and, as their incomes rise, people in a given group tend to consume more.
- A consumer's income, then, places an upper limit on the amount of TOTAL EXPENDITURE the consumer can make for food; this limit is called the consumer's BUDGET CONSTRAINT.
- In practice, TOTAL CASH EXPENDITURE is often used instead of income when attempts are made to measure consumer behavior through sample surveys.
- PRICE-CONSUMPTION relationships (called "demand schedules" by economists) are usually NEGATIVE: people buy less of a given commodity or service as its price rises relative to other prices.
- As levels of income rise, total food consumption (by individuals or groups) will not necessarily rise at the same rate; the "flattening-out" of food purchases with rising income is called the ENGEL EFFECT.
- Some less preferred (but cheap) foods are actually consumed in smaller amounts as rising incomes permit consumers to buy more expensive (but preferred) foods. The former are called INFERIOR GOODS and the latter are called SUPERIOR GOODS.
- Changes in the price of one food can affect the consumer's purchases of others. If two foods are SUBSTITUTES, then an increase in the price of one food (apples) may lead to an increase in the purchases of another food (pears). If the two foods are COMPLEMENTS then an increase in the price of one food (beer) may lead to a decrease in the purchases of the other (pretzels). These phenomena are called CROSS-PRICE effects in consumption (demand).

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- INCOME ELASTICITIES OF DEMAND and PRICE ELASTICITIES OF DEMAND for both food and other kinds of consumption goods can be estimated from data collected in sample surveys of household expenditures. Both kinds of elasticities permit planners to forecast changes in PATTERNS OF CONSUMPTION EXPENDITURES as development programs influence incomes and prices in predictable ways.
- Elasticity estimates are valid only for given levels of incomes and prices for given groups at a given point of time. Elasticities themselves can be expected to change as development proceeds and social change takes place. Therefore sampling and monitoring of target populations on a continuous basis are important if program and projects are to achieve pre-established goals and targets.
- HIGH income elasticity foods are preferred (but relatively costly) foods which are consumed at rapidly growing rates as incomes rise (example: steak versus hamburger).
- LOW income elasticity foods are less preferred (but relatively cheap) foods which are consumed at declining rates as incomes rise and which are consumed at relatively unchanging rates as incomes fall (example: cassava relative to polished rice).
- HIGH price elasticity foods are generally those regarded by consumers as luxuries (examples: steak, truffles); an increase in the price of such foods leads to a relatively rapid fall in the demand for them.
- LOW price elasticity foods are generally those regarded by consumers as necessities (examples: pasta, beans). Such foods, although they may not be "preferred" relative to other foods, are relatively cheap; therefore low income families will try to maintain their purchases of these foods even at relatively high price levels if no cheaper substitutes are available.

The following KINDS OF INFORMATION are needed by planners in order to incorporate consumption/nutrition concerns into rural and agricultural development projects:

<u>KIND OF INFORMATION</u>	<u>ITEM</u>	<u>USED TO ESTIMATE</u>
Economic	Cash and other forms of <u>INCOME</u> earned by rural households	<u>NET INCOME</u> earned by rural households during a given time
	<u>COSTS</u> of agricultural production and household maintenance	<u>NET INCOME</u> earned by rural households during a given time
	Total household <u>FOOD CONSUMPTION</u> (or <u>EXPENDITURE</u> on food) by food type during a given time	<u>INCOME ELASTICITIES</u> of <u>DEMAND</u> for foods Coefficients for <u>CONSUMPTION FUNCTIONS</u> for food <u>EXPENDITURE</u> elasticities of demand for food

KIND OF INFORMATION	ITEM	USED TO ESTIMATE
Economics (Continued)	Individual FOOD PRICES	PRICE ELASTICITIES of DEMAND for food Expenditure and Price elasticities of demand for food
	Allocation of household LABOR	FOOD ELASTICITIES OF SUPPLY Labor productivity
	Household PRODUCTION of crops/livestock per period of time	Nutrition requirements Labor/land productivity
	Division of household food production between sales and home consumption	Food availability to family Food ELASTICITIES OF SUPPLY
	Household food purchases per period of time	Food availability to family
Family Characteristics	NUMBER of family members by AGE, SEX	Nutrition requirements
	EDUCATION of family members	Source of BELIEFS and KNOWLEDGE about food
	INTRAFAMILY DISTRIBUTION of food	Consumption and nutritional status of individual family members Age/sex biases in meal distribution
	Family FOOD STORAGE, PREPARATION, COOKING practices	Loss/waste of nutrients between acquisition and consumption of food
	SANITARY PRACTICES and availability of POTABLE WATER	Factors which may reduce ABSORPTION of food
Anthropometric	HEIGHT-for-AGE	Long-term malnutrition (STUNTING)
	WEIGHT-for-HEIGHT	Short-term (recent) malnutrition (WASTING)
	WEIGHT-for-AGE	Combination index of nutritional status
Anthropological	Child weaning and feeding practices	Adverse effects upon family nutrition
	Beliefs about food and food taboos	Kinds of educational projects needed to alter food beliefs, practices

° Many other kinds of information about the nutritional status of a population (e.g., biochemical data, clinical tests). However, there is a TRADEOFF between costs of acquiring information and the amount of usefulness obtained from greater detail, given the strict resource limitations in developing countries and the need for flexibility and timeliness in decision making.

Table Q1.1 Food balance sheet for rice and corn, country X, in year Y  
(in hundred thousand metric tons)

Item	Milled rice	Corn
Supplies for year		
Imports	400	20
Domestic production - total	<u>3600</u>	<u>465</u>
Commercially marketed	3150	415
Subsistence output	<u>450</u>	<u>50</u>
Total supplies	<u>4000</u>	<u>485</u>
Distribution or disappearance		
Exports	600	negligible
Domestic nonfood use	300	55
Domestic food (disappearance = residual)	3100	430
Per capita in kilograms (pop. = 30 million)	(36)	(12)

Table Q1.2 Household food survey data on per person consumption  
of rice, corn, wheat products, and cassava, country X, year Y  
(in kilograms as purchased)

Item	Milled rice	Corn	Wheat products	Cassava
National average per person	<u>110</u>	<u>19</u>	<u>4</u>	<u>8</u>
Averages in urban households	<u>96</u>	<u>6</u>	<u>8</u>	<u>2</u>
Lowest socioec. status group	90	8	3	3
Mod. low " " "	108	5	8	2
Mod. high " " "	100	3	15	1
Highest " " "	80	1	25	1
Averages in rural households	<u>115</u>	<u>23</u>	<u>2</u>	<u>10</u>
Lowest socioec. status group	110	30	1	12
Mod. low " " "	120	10	2	6
Mod. high " " "	135	5	6	4
Highest " " "	110	3	10	2

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TANZANIA  
(INFORMATION AVAILABLE AS AT 30/05/78)

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COMMODITY	1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
POPULATION (THOUSANDS)												
	11052	12252	12983	12923	13273	13671	14081	14504	14939	15388	15872	16371
CALORIES (NUMBER PER DAY)												
GRAND TOTAL	1976	2094	2054	2043	2116	2024	2005	2040	2125	2126	2077	2066
VEGETABLE PRODUCTS	1797	1887	1844	1828	1898	1815	1815	1856	1936	1935	1676	1864
ANIMAL PRODUCTS	179	206	208	215	218	209	190	185	189	192	198	202
GRAND TOTAL EXCL ALCOHOL	1909	2028	1989	1975	2044	1960	1937	1962	2062	2055	2013	2006
CEREALS	703	749	724	718	724	744	728	717	782	797	732	724
WHEAT	40	48	50	30	41	50	54	32	64	80	45	45
RICE	67	73	66	78	83	83	68	73	95	81	78	85
MAIZE	465	517	497	479	486	509	500	530	529	520	497	491
MILLET AND SORGHUM	112	110	111	111	114	102	105	83	94	116	111	102
ROOTS AND TUBERS	608	616	614	593	578	528	507	544	566	566	563	560
SUGARS AND HONEY	64	74	76	79	92	104	105	105	92	75	68	74
PULSES	76	94	100	97	97	86	105	98	102	90	97	99
NUTS AND OILSEEDS	46	66	65	41	55	54	49	63	58	61	74	70
VEGETABLES	33	34	34	35	36	35	33	33	32	31	32	32
FRUIT	147	131	110	136	178	134	152	168	168	169	168	167
MEAT AND OFFALS	54	61	60	66	68	64	56	57	58	59	60	60
EGGS	2	2	2	2	2	2	2	3	3	3	3	3
FISH AND SEAFOOD	13	19	22	20	23	23	20	21	21	23	28	32
MILK	90	98	97	103	103	96	87	79	80	80	80	79
OILS AND FATS	66	80	82	83	86	87	89	92	96	97	105	102
VEGETABLE OILS AND FATS	52	59	59	63	68	68	70	71	72	74	81	77
ANIMAL OILS AND FATS	14	21	23	20	18	19	19	21	24	22	24	25
STIMULANTS			1	1	1	1	1		1			
SPICES	3	3	3	2	2	2	2	3	3	3	3	3
ALCOHOLIC BEVERAGES	67	66	65	67	72	66	67	59	63	71	69	62
PROTEIN (GRAMS PER DAY)												
GRAND TOTAL	48.8	48.1	48.1	47.4	48.9	47.1	46.4	46.3	48.6	49.5	49.0	49.0
VEGETABLE PRODUCTS	31.9	30.3	30.2	30.0	33.0	32.6	33.6	33.6	35.7	36.0	34.8	34.2
ANIMAL PRODUCTS	12.0	13.8	14.0	14.5	15.1	14.5	12.8	12.7	12.9	13.5	14.2	14.8
GRAND TOTAL EXCL ALCOHOL	42.9	47.2	47.2	46.5	48.0	46.3	45.3	45.6	47.8	48.6	48.2	48.2
CEREALS	17.2	18.3	17.7	17.4	17.6	18.1	17.9	17.3	19.1	19.7	17.9	17.6
WHEAT	1.2	1.5	1.5	.9	1.2	1.5	1.6	1.0	1.9	2.4	1.4	1.4
RICE	1.3	1.4	1.3	1.5	1.6	1.6	1.3	1.4	1.8	1.6	1.5	1.6
MAIZE	11.5	12.2	11.8	11.8	11.5	12.0	11.8	12.5	12.5	12.3	11.7	11.6
MILLET AND SORGHUM	3.2	3.2	3.2	3.2	3.3	3.0	3.1	2.4	2.8	3.4	3.2	3.0
ROOTS AND TUBERS	3.6	3.7	3.7	3.6	3.5	3.2	3.2	3.5	3.5	3.5	3.5	3.5
SUGARS AND HONEY												
PULSES	4.4	6.0	6.4	6.2	6.1	5.4	6.6	6.2	6.4	5.8	6.2	6.3
NUTS AND OILSEEDS	1.4	1.6	1.9	1.0	1.3	1.3	1.1	1.7	1.8	2.1	2.4	2.0
VEGETABLES	2.0	2.0	2.0	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9
FRUIT	1.7	1.5	1.3	1.6	2.1	1.6	1.8	2.0	2.0	2.0	2.0	2.0
MEAT AND OFFALS	5.1	5.5	5.4	5.9	6.0	5.7	5.0	5.0	5.1	5.3	5.3	5.3
EGGS	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FISH AND SEAFOOD	2.2	3.1	3.5	3.2	3.6	3.8	3.2	3.4	3.4	3.8	4.5	5.1
MILK	4.5	5.0	4.8	5.2	5.2	6.8	4.4	4.0	4.1	4.2	4.1	4.1
OILS AND FATS												
VEGETABLE OILS AND FATS												
ANIMAL OILS AND FATS												
STIMULANTS	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
SPICES	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
ALCOHOLIC BEVERAGES	.9	.9	.9	.9	.9	.9	.9	.7	.8	.9	.8	.8
FAT (GRAMS PER DAY)												
GRAND TOTAL	28.6	31.2	31.1	29.7	31.8	31.1	29.9	30.9	31.2	31.6	33.8	33.3
VEGETABLE PRODUCTS	18.0	18.9	18.5	16.9	18.9	18.7	18.6	19.7	19.6	20.0	21.6	21.0
ANIMAL PRODUCTS	10.7	12.3	12.5	12.8	12.9	12.4	11.3	11.2	11.6	11.6	12.2	12.3
GRAND TOTAL EXCL ALCOHOL	28.6	31.2	31.1	29.7	31.8	31.1	29.9	30.9	31.2	31.6	33.8	33.3
CEREALS	1.0	4.2	4.1	4.0	4.0	4.1	4.1	4.0	4.2	4.4	4.1	4.0
WHEAT	.1	.2	.2	.1	.1	.2	.2	.1	.2	.3	.2	.2
RICE	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
MAIZE	2.8	2.9	2.8	2.8	2.8	2.9	2.9	3.0	3.0	3.0	2.8	2.8
MILLET AND SORGHUM	1.0	1.0	1.0	1.0	1.0	.9	.9	.7	.8	1.0	1.0	.9
ROOTS AND TUBERS	.9	.9	.9	.8	.8	.8	.7	.8	.8	.8	.8	.8
SUGARS AND HONEY												
PULSES	.4	.4	.5	.5	.5	.4	.6	.5	.5	.4	.4	.4
NUTS AND OILSEEDS	4.1	6.0	5.6	3.6	5.0	4.9	4.5	5.6	5.0	5.1	6.3	6.2
VEGETABLES	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3
FRUIT	.4	.4	.4	.4	.5	.4	.5	.5	.5	.5	.5	.5
MEAT AND OFFALS	3.8	4.2	4.1	4.5	4.6	4.4	3.9	3.9	3.9	4.0	4.1	4.1
EGGS	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FISH AND SEAFOOD	.5	.6	.7	.7	.8	.8	.7	.7	.7	.8	1.0	1.1
MILK	4.7	5.0	5.0	5.3	5.2	4.9	4.4	4.0	4.1	4.1	4.2	4.1
OILS AND FATS	7.4	9.0	9.2	9.3	9.7	9.8	10.0	10.4	10.8	10.9	11.9	11.5
VEGETABLE OILS AND FATS	5.8	6.6	6.7	7.1	7.7	7.7	7.9	8.0	8.1	8.4	9.2	8.7
ANIMAL OILS AND FATS	1.6	2.3	2.5	2.2	2.1	2.1	2.2	2.3	2.7	2.5	2.7	2.8
STIMULANTS												
SPICES	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
ALCOHOLIC BEVERAGES												
CALCIUM (MILLIGRAMS PER DAY)												
GRAND TOTAL	425	457	452	462	470	435	420	410	422	429	429	427
VEGETABLE PRODUCTS	262	250	249	247	252	233	237	240	246	250	248	245
ANIMAL PRODUCTS	183	207	203	215	218	200	183	170	173	179	181	182
CEREALS	47	49	48	49	49	48	47	45	48	51	49	48
WHEAT												
RICE												
MAIZE												
MILLET AND SORGHUM												
ROOTS AND TUBERS	99	97	96	93	90	82	79	85	89	89	89	88
PULSES	23	28	30	29	29	26	33	30	31	27	29	29
NUTS AND OILSEEDS	5	5	6	4	5	5	5	6	7	9	9	7
VEGETABLES	44	45	45	46	46	45	44	43	42	41	41	41
FRUIT	22	20	17	21	27	21	23	25	25	25	25	25
MEAT AND OFFALS	3	3	3	4	4	4	3	3	3	3	3	3
EGGS	1	1	1	1	1	1	1	1	1	1	1	1
FISH AND SEAFOOD	8	11	13	12	13	13	12	13	13	14	17	20
MILK	171	191	185	190	198	183	166	152	156	160	159	148





## TANZANIA

(INFORMATION AVAILABLE AS AT 30/05/78)

POPULATION 15077  
(THOUSANDS)WEIGHT (MGT) THOUSAND METRIC TONS  
NUMBERS(NOS) THOUSAND UNITS

YEAR AVERAGE 1975-77

COMMODITY	PRODUCTION		IM- PORTS	STOCK CHANG- ES	EX- PORTS	DOMES- TIC SUPPLY	DOMESTIC UTILIZATION				PER CAPUT SUPPLY						
	INPUT	OUTPUT					FEED	SEED	MANUFACTURE		WASTE	FOOD	KILO- GRAMS /YEAR	PER DAY			
									FOOD USE	NON FOOD USE				GRAMS	CALO- RIES	PRO- TEIN	FAT GRAMS
RANGES		171				170				17	153	9.7	26.5	10	.1		
PINEAPPLES		45				45				5	41	2.6	7.0	2			
DATES			1			1					1		.1				
FRESH TROPICAL FRUIT NES		36				36				4	32	2.0	5.6	2			
FRESH FRUIT NES		165				165				17	149	9.4	25.6	12	.1	.1	
MEAT AND OFFALS																	
CATTLE(NOS)		1323	1		5	1319		1319							99	9.3	4.1
CATTLE(NOS)/BEEF(MGT)	1319	121				120		3			117	7.4	20.2	38	2.9	2.9	
BEEF/CANNED	3	2			1	1					1	.1	.2				
CATTLE(NOS)/OFFALS(MGT)	1319	20				20					20	1.3	3.5	4	.6	.1	
SHEEP(NOS)		761			1	760		760									
SHEEP(NOS)/MUTTON(MGT)	760	11				11					11	.7	2.0	4	.3	.3	
SHEEP(NOS)/OFFALS(MGT)	760	2				2					2	.4	.4				
GOATS(NOS)		1233				1233		1233									
GOATS(NOS)/MEAT(MGT)	1233	19				19					19	1.2	3.2	5	.5	.3	
GOATS(NOS)/OFFALS(MGT)	1233	4				4					4	.2	.6	1	.1		
PIGS(NOS)		5				5		5									
PIGS(NOS)/MEAT(MGT)	5																
CHICKENS(NOS)		22763	1404			24167		24167									
CHICKENS(NOS)/MEAT(MGT)	24167	22				22											
DUCKS(NOS)		1645				1645		1645									
/POULTRY MEAT NES(MGT)		2				2					22	1.4	3.8	9	.5	.3	
HORSES(NOS)											2	.1	.3	1		.1	
/GAME MEAT(MGT)		8				8					8	.5	1.3	1	.2		
EGGS																	
HENS(NOS)/EGGS(MGT)	8667	21				21											
/POULTRY EGGS NES(MGT)		2				2					4						
											1						
											4						
											1						
FISH AND SEAFOOD																	
FRESHWATER DIAPYCN WHOLE		192				192		192							28	4.5	1.0
FRESHWATER/CURED	140	46				46		46			91	3.2	8.9	6	1.0	.2	
GENERAL FRESH WHOLE		20				20		20			46	2.9	8.0	13	2.5	.6	
GENERAL/CURED	4	1	1			3		4			16	1.0	2.8	1	.2		
PELAGIC FRESH WHOLE		14				14		14			3	.2	.5	1	.2		
PELAGIC/CURED	4	1				1		4			10	.6	1.8	2	.7	.1	
PELAGIC/CANNED						1		1			1	.1	.3				
PELAGIC/MEALS						1		1			1	.1	.2				
MARINE NES FRESH WHOLE		15	2			15	2				1	.1	.2				
											15	.9	2.5	2	.3	.1	
MILK																	
COND(NOS)/MILK(MGT)	2083	678				678		69		14	995	37.5	102.7	65	3.2	3.6	
CON MILK/CONDENSED			1			1					1	.1	.2	1			
CON MILK/DRIED																	
SME GOAT(SNOS)/MILK(MGT)	1200	48				48					1	.47	3.0	8.1	7	.3	
CON MILK/CON SKIM MILK	64	61				61					3	3.6	10.0	4	.3	.1	
CON SKIM MILK/CONDENSED						1					1	.1	.1				
CON SKIM MILK/DRIED			4			4					4	.3	.8	3	.3		
COND MILK/CHEESE	5	1				1					1	.1	.1				
OILS AND FATS																	
VEGETABLE OILS AND FATS																	
SOYBEANS/OIL			1			1									101		11.4
SHILLED GROUNDNUTS/OIL	3	1	1			3					1		.1	1		.1	
COPRA/COCONUT OIL	27	16			1	16					3	.2	.5	4		.5	
PALM KERNELS/OIL	7	4				4					16	1.0	2.7	24		2.7	
/PALM OIL		3	4			7					4	.2	.6	6		.6	
CASTOR BEANS/OIL	6	2				2					7	.4	1.2	10		1.2	
SUNFLOWER SEED/OIL	2	1				1			2								
SESAME SEED/OIL	5	3				3							.1	1		.1	
COTTONSEED/OIL	101	14				15					3	.2	.5	5		.5	
/VEGETABLE OILS NES	11	4			1	3			3		13	.8	2.2	19		2.2	
/MARGARINE SHORTENING	3	3				3					3	.2	.6	4		.5	
ANIMAL OILS AND FATS																	
CATTLE(NOS)/FAT(MGT)	1319	3				3									24		2.7
SHEEP(NOS)/FAT(MGT)	760	1				1					3	.2	.6	5		.6	
GOATS(NOS)/FAT(MGT)	1233										1		.1	1		.1	
/TALLOW						8							.1	1		.1	
CON MILK/BUTTER	35	2				3					8	.5	1.4	12		1.4	
CON MILK/CHEE	29	1				1					3	.2	.5	4		.4	
GENERAL FISH/BODY OIL			1			1	1				1	.1	.2	2		.2	
SPICES																	
PIMENTOS		5				5									3	.1	.1
CLOVES WHOLE STEPS		8				8					4	.3	.7	2	.1	.1	
NUTMEG NACE CARDAMONS		1				1					1		.1				
STIMULANTS																	
GREEN COFFEE		55			54	2		1			2	.1	.3				
/COFFEE EXTRACTS	1																
COCOA BEANS		1			1												

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FOOD BALANCE SHEET

TANZANIA

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POPULATION 1977  
(THOUSANDS)

(INFORMATION AVAILABLE AS AT 30/09/78)

YEAR AVERAGE 1975-77

WEIGHT (MGT) THOUSAND METRIC TONS  
NUMBERS(NOS) THOUSAND UNITS

COMMODITY	PRODUCTION		IN- PORTS	STOCK CHANG- ES	EX- PORTS	DOMES- TIC SUPPLY	DOMESTIC UTILIZATION				PER CAPUT SUPPLY					
	INPUT	OUTPUT					FEED	SEED	MANUFACTURE	WASTE	FOOD	KILO- GRAMS /YEAR	PER DAY			
													FOOD USE	NON FOOD USE	GRAMS	CALO RIES NOS
EA		14			12	3				2	.1	.4				
ALCOHOLIC BEVERAGES													65	.8		
BARLEY MALT/BEER	9	67				67				67	4.2	11.6	5	.1		
RICE/BEER	2	10				10				10	.7	1.8	1			
MILLET/BEER	48	318				318				318	20.0	54.9	17	.3		
JAGHUN/BEER	112	540				540				540	35.2	96.4	30	.5		
/FERMENTED BEVERAGES	134	134				134				134	8.7	23.9	11			
/DISTILLED ALCOHOL	4	4				4			15	139	8.7	23.9	11			
										4	.3	.7	2			

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ASSUMPTIONS UNDERLYING PRODUCTION AND UTILIZATION STATISTICS (AGPUS)

TANZANIA

YEAR AVERAGE 1975-2

COMMODITY	EXTRACTION CONVERSION RATE	PROD	WASTE	SEED RATE	COMMODITY	EXTRACTION CONVERSION RATE	PROD	WASTE	SEED RATE
WHEAT									
WHEAT/FLOUR	76		2	100	COCONUTS/COPRA	16			
WHEAT/FLOUR/BRAND	120		1		COPRA/CAKE	15	50		
WHEAT/BRAN	23	27			PALM KERNELS/CAKE	50	100		
PADDY RICE					CASTOR SEEDS				
PADDY RICE/HULLED	45		1	90	SUNFLOWER SEED			3	10
PADDY RICE/BRAN	8	100	5		SUNFLOWER SEED/CAKE			3	10
BARLEY					SESAME SEED	40	100		
BARLEY/MALT	80		2	80	SESAME SEED/CAKE			5	5
RAPE					COTTONSEED	40	100		
RAPE/FLOUR	93	3	4	20	COTTONSEED/CAKE				25
RAPE/BRAN	5		1		OILSEEDS RES		33		
OATS		88			OILSEEDS RES/CAKE			5	
MILLET		100			TOMATOES	50	68		
MILLET/FLOUR	95	2	10	15	DRY ONIONS			10	
MILLET/BRAN	5	100			GARLIC			15	
SORGHUM					GREEN CORN (RAPE)			5	
SORGHUM/FLOUR	95	2	10	15	FRESH VEGETABLES RES			5	
SORGHUM/BRAN	5	100			BANANAS			15	
/CEREALS SEED RES		100			PLANTAINS		2	20	
POTATOES					CITRUS FRUIT RES		2	15	
SWEET POTATOES			10	800	MANGOES			10	
CASSAVA			5		PINEAPPLES			10	
CASSAVA/FLOUR	25	1	15		FRESH TROPICAL FRUIT RES			10	
YAMS					FRESH FRUIT RES			10	
SUGAR CANE			5		/POULTRY EGGS RES (EGG)			10	
/RAW SUGAR	10			2000	SHIELLED CROCODONUTS/OIL	36		50	10
RAW SUGAR/REFINED SUGAR	92				COPRA/COCONUT OIL	60			
CAKE REFT/ROLLERS	3	70			PALM KERNELS/OIL	50			
CAKE/MONOCENTRIF SUGAR	8				CASTOR SEEDS/OIL	40			
DRY BEANS			5	45	SUNFLOWER SEED/OIL	30			
DRY PEAS			5	20	SESAME SEED/OIL	35			
CHICKPEAS			5	20	COTTONSEED/OIL	10			
DRY COMPEAS			5	20	/VEGETABLE OILS RES	38			
FIGEON PEAS			5	20	/MARGARINE SHORTENING	125			
PULSES RES			5	35	PINNETONS			5	
PULSES RES/FLOUR	70				/COFFEE EXTRACTS	33			
CASHEW NUTS			5		TEA			2	
SOYBEANS			5		BARLEY MALT/BRAN	723			
GROUNDNUTS IN SHELL			5	45	RAPE/SEED	504			
GROUNDNUTS/SHIELLED	66		5	45	MILLET/STEE	500			
SHIELLED GROUNDNUTS/CAKE	63	100			SORGHUM/BRAN	500			
COCONUTS					/FERMENTED BEVERAGES	100			
					/DISTILLED ALCOHOL	100		10	

COMMODITY	EXTRACTION CONVERSION RATE	PROD	WASTE	MATCHING RATE	COMMODITY	EXTRACTION CONVERSION RATE	PROD	WASTE	MATCHING RATE
	%	% OF SUPPLY				%	% OF SUPPLY		
DEEP/BEAT EXTRACTS	43				COND (MGS)/MILK (MGT)			2	
DEEP/REFINATIONS	46				SHE GOATS (MGS)/MILK (MGT)			2	
DEEP/CANNED	46				COW MILK/COW SEEM MILK	95		5	
DEEP (MGS)/EGGS (MGT)			20	20	COW MILK/CHEESE	10			
FRESHWATER/CURED	33				COW MILK/BUTTER	5			
DENSEMIL/CURED	40				COW MILK/GHEE	3			
PELAGIC/CURED	40				DENSEMIL FISH/LADY OIL		100		
PELAGIC/SEALS		100							

COMMODITY	OFF-TAKE RATE	CARCASS WEIGHT	OFFALS	SLAUGHTER FAT	COMMODITY	POPULATION PRODUCING	YIELD PER ANIMAL	AGE
	%	KG/ANIMAL				%	KG	
CATTLE (MGS)	9	91	15		COND (MGS)/MILK (MGT)	15	325	
SHEEP (MGS)	26	15	3	3	SHE GOATS (MGS)/MILK (MGT)	26	60	
GOATS (MGS)	26	15	3	1	DEEP (MGS)/EGGS (MGT)	44	2.4	56
PIGS (MGS)	19	41						63
CHICKENS (MGS)	116							
DUCKS (MGS)	70							

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## Handout: Activity 11 Key Questions

II. Kinds of data needed to meet project planning requirements if the food and nutrition problems are to be dealt with.

A. If low food consumption and food energy supplies are indicated for low income or other specific disadvantaged groups and there is evidence of low heights and weights among their children, need to identify and quantify major staples in their food patterns and the principal complementary foods. Questions such as those listed next can be used in family surveys and processed quickly.

1. What is the principal starchy dish eaten by your household? \_\_\_\_\_

How often eaten by the family in day? \_\_\_\_\_ How many are fed? \_\_\_\_\_

2. About how much of this principal starchy dish do you prepare for the day's meals? \_\_\_\_\_

3. Does your household sometimes substitute another kind of food for this principal starchy dish? \_\_\_\_\_ yes \_\_\_\_\_ no

If so, how much is cooked for a day's meals? \_\_\_\_\_

4. What foods or combination of foods do you usually serve with your starchy dish? \_\_\_\_\_

About how much of it do you cook a day? \_\_\_\_\_

Do you vary this side dish or complementary dish from day to day? \_\_\_\_\_ yes \_\_\_\_\_ no

How? \_\_\_\_\_

Do you vary this complement from season to season?

\_\_\_\_\_ yes \_\_\_\_\_ no

How? \_\_\_\_\_

B. If there are reports based on research of deficiencies in certain nutrients in the diets of particular groups, it will be helpful to use questions to ascertain the frequency with which the family consumed foods known to contain substantial amounts of the particular nutrient(s).

C. If there are serious problems in infant feeding, local experts can suggest a few questions for use in identifying contributing factors.

- D. If you want to know whether changes in purchasing power expected from project activities and inputs would help resolve the known food and nutrition problems, consider use of direct questioning instead of more elaborate survey of income and consumption. Examples are;

If your family had (specify) more money for food, which foods would you buy more of? \_\_\_\_\_  
How would you divide the extra money among these foods? \_\_\_\_\_  
\_\_\_\_\_

- E. If you doubt the adequacy of responses regarding incomes, try alternative indicators of socioeconomic status such as key household possessions, type of house, land and livestock holdings, boat ownership, etc.

To get information on home production, which is very difficult to measure, consider use of questions such as the following:

1. Do you produce some of the foods eaten by your household?  
\_\_\_\_ yes \_\_\_\_ no

2. In a homeyard garden? \_\_\_\_ yes \_\_\_\_ no. Size? \_\_\_\_\_

3. Outside the homeyard, as in a field? \_\_\_\_ yes \_\_\_\_ no  
Size of the plot? \_\_\_\_\_

4. Do you get fruit or leaves from trees on your land or communal land? \_\_\_\_ yes \_\_\_\_ no. What kinds? \_\_\_\_\_

About how much in a season for each?

Kind \_\_\_\_\_ amount \_\_\_\_\_ ;: Kind \_\_\_\_\_ amount \_\_\_\_\_

5. Do you produce livestock, poultry or fish for household use?

Kind \_\_\_\_\_ amount ;: Kind \_\_\_\_\_ amount

6. What difficulties do you have in trying to produce more food for family use? \_\_\_\_\_

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Activity 10: Lecturette: Important Points

- o RAPID NUTRITION RECONNAISSANCE methods offer ways of doing this:
  - + Participants will have read the Rhoades article, and there should be no need to enter into detail about the justifications for, and techniques used in "informal surveying"
  - + Nevertheless, later in the week as the specific case studies are discussed, an issue will center on the adequacy of sample selection. Therefore, the Activity 8 lecturette should focus on this aspect of "rapid nutrition reconnaissance." (See Rhoades, p.9).
  - + An example of the "Uzzell-type" is summarized on the next page for use as an in-class participant exercise.
  
- o "Micro-survey" techniques of the kind used for RAPID NUTRITION RECONNAISSANCE provide planners with rough but useable information about the nutritional status and nutrition-related behavior in areas where nutritional problems are believed to exist.
  
- o "BASIC QUESTIONS to ask when information is needed for planning:
  - = Is a survey NECESSARY, or can EXISTING INFORMATION be used?
  - = What GROUPS of people should be surveyed, and how are they DIFFERENTIATED from other groups?
  - = What is the size of the GEOGRAPHIC AREA to be surveyed?
  - = How much TIME is available for the survey?
  - = How large a SAMPLE is needed?
  - = How should the group and/or sample be DIVIDED ("stratified")?
  - = How should the sample be SELECTED in order that it be REPRESENTATIVE?
  - = How many of what kinds of questions should be included in the survey QUESTIONNAIRE in order to obtain the needed information at least cost?
  - = How can BIAS be avoided in sample selection, questionnaire preparation, and survey administration?
  
- o Answering these questions-in detail can be time-consuming and costly. RAPID NUTRITION RECONNAISSANCE techniques minimize time and cost by:
  - = Focusing on relatively small groups and/or regions
  - = Rapid sample selection based upon broad characteristics of groups and sub-groups to be sampled (e.g., ethnic characteristics, agro-climatic zone, large versus small villages, etc.) instead of random sampling (which generally requires relatively large groups)
  - = Attention to methods of field interviewing and survey logistics to minimize resistance by informants and to maximize the amount of useful information obtained in limited time.

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## HANDOUT: Activity 9

### "A Syllabus of Errors in Collecting Dietary Data"

by: Johanna Dwyer

#### The 24 Hour Recall: Its Pros and Cons

Pros - The great advantage of the 24 hour recall accompanied by suitable probes, food models, and a careful protocol is that it is relatively well accepted by most subjects or patients. That is, respondent burden is low, the burden is on the interviewer to help the person to remember. Because respondent burden is relatively low time and effort wise (about 30-40 minutes at maximum) most people will agree to submit to the procedure and it is relatively easy to get a representative sample if in fact one has taken the trouble to draw a probability sample of the population. Because it is possible to meet the requirements for probability sampling the predictive validity of the sample to the total population tends to be quite high. Costs are also quite low, particularly if one can use an interactive computer terminal which "interviews" the subject. Of course, there are some subjects who cannot read or write or who are for some other reason leery of computers. Then the nutritionist or some other highly trained interviewer needs to take the recall, code it, and analyze results, which may be more costly in the end than the more highly mechanized procedure. Another advantage of the 24 hour recall method is that since it is a retrospective method it is somewhat less likely to promote bias introduced by subjects changing their food consumption because they know they are being studied. However, they may still change their responses when being interviewed.

Cons - The difficulty with 24 hour recall stems from the fact that they often do not represent usual food intakes of individuals. If large groups of subjects are studied and only means are used, it is usually assumed that the "highs" reported on one day by one individual will be cancelled out by the "low" day someone else may have reported, and that group averages are in fact reliable. That is, while individuals' intakes would vary, if the group survey were done on a different day, results would be similar. Thus for large groups the 24 hour recall may in fact be sufficiently reliable to be useful.

On the other hand, even very large groups do not allow one to get around the other problem plaguing 24 hour recall data. This is the very real problem of whether the person can really remember the kinds and amounts of all the foods he has eaten over 24 hours. In general, this technique tends to underestimate intake. The most usual reason for this is that sufficient probing is not done to jar the subject's memory. This is a particular problem in dealing with children or the very elderly, who may have poor memories. Mothers' estimates of what their children eat often include only what they themselves feed them, and careful probing is necessary to get at snacks and food eaten outside the home. The forgetting of liquids,

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including alcohol, and underestimates of portion size are also probably contributors to the underestimates of a 24 hour recall.

Even skilled interviewers have trouble concealing signs of approval or disapproval, and applied nutritionists whose usual role is to praise patients whenever compliance is good have even a more difficult time. Even when the interviewer is totally objective, it is hard to imagine that patients who have gotten certain foods or supplements from a clinic for many months are not aware of the fact that the "food study" is likely to have something to do with the foods and advice they have received. Thus positive responses are likely.

When questions are framed in such a way that it is easier to say yes than no, overestimates will also probably occur.

### Conclusion

Twenty-four hour recalls of dietary intake collected on individuals rarely reflect their usual food or nutrient intake patterns in any but the grossest manner. For example, if it is a "usual" day, it may be possible to ascertain that the patient eats a fairly high amount of animal foods and thus probably a fairly high amount of animal protein. Statements of this type are probably safe to make. A statement that the patient ate 82.8 grams of animal protein, on the other hand, would be risky because it implies that the patient usually eats this amount. Caloric intakes are even more subject to error than are protein intakes for reasons which are dealt with at great length elsewhere in this paper. In brief, calorie intakes fluctuate widely from day to day and the food components (such as fats, sweets, alcohol, etc.) are the very ones which are the most difficult for patients to recall accurately. Since only a few calories (e.g., 30 or so) in excess or deficit can at least theoretically place an infant or young child in a dynamic state of weight gain or loss, it is very difficult to pick up such small differences on dietary recall over such a short period of time. The proof of the problem is in the growth chart and skinfolds. The reason for collecting the dietary data clinically is not to ascertain precisely the caloric intake to check it against some standard for the individual but to find out how it will be easiest to instruct the mother (in the case of an infant or child) or the person himself to increase or decrease his caloric intake, whatever it may be, to bring it more in line with energy output, which is also unknown. While the recall may be sufficient to do this, it is insufficiently precise or carefully checked in most cases to provide research quality data on calories.

Twenty-four hour recalls on individuals should similarly be interpreted very cautiously with respect to vitamin and mineral intakes. In view of the enormous variability of foods from one sample to the next in vitamin and mineral content the best and safest statement again one can make is probably that the diet appears to be low, adequate, or high with respect to a particular vitamin such as vitamin A or C, or a nutrient such as iron. But to state that the diet provided 72.2 mg. of ascorbic acid again exceeds the data.

Is it possible, then, to get to nutrient statements if instead of having a single record one has a thousand clinic records? Probably not, unless the original 24 hour recalls were collected with a research purpose in mind and very clear protocols and probes were established in advance.

Assuming that such protocols are established, it makes more sense, at least to this observer, to draw a random or representative sample of patients and to carry out careful 24 hour recalls on them using nutritionists who are specially trained and who are likely to take the care necessary to probe in depth. Thus one may end up with 100 carefully collected records which are worth subjecting to nutrient analysis. The results obtained will provide useful information on the total population. However, if such a study is contemplated the assistance of a research nutritionist and statistician should be enlisted in the planning stages to save needless work and useless types of data analysis. It is often discovered in discussing such research with specialists that the questions which need to be answered do not require this type of data at all, and a few simple items added to usual clinic protocols may come much closer to the mark. For example, take a nutritionist who wants to find out the average age at which whole milk is introduced to infants in the population she sees. The sample question "When did you first start feeding Johnny whole milk?" would be far easier to collect on 1000 women than analysis of 100 charts for 24 hour recalls of what the mother fed the baby

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PARTICIPANT  
MATERIAL

INDEPENDENT READING

DRAFT

PROJECT IDENTIFICATION DOCUMENT

Lower Volta, Sahelian Vegetable Production Project  
(632-7886)

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PROJECT IDENTIFICATION DOCUMENT FACESHEET

TO BE COMPLETED BY ORIGINATING OFFICE



A = ADD  
C = CHANGE  
D = DELETE

PID

DOCUM CODE

3. COUNTRY/ENTITY  
Lower Volta

4. DOCUMENT REVISION NUMBER  
1

5. PROJECT NUMBER (7 DIGITS)  
682-7886

6. BUREAU/OFFICE  
A. SYMBOL AFR B. CODE 08

7. PROJECT TITLE (MAXIMUM 40 CHARACTERS)  
VEGETABLE PRODUCTION

8. PROPOSED NEXT DOCUMENT  
A. 2 = PP B. DATE 10/7/8

10. ESTIMATED COSTS (\$000 OR EQUIVALENT)  
FUNDING SOURCE  
A. AID APPROPRIATED \$1,470  
OTHER U.S. 1. PEACE CORPS 40  
C. HOST COUNTRY  
D. OTHER DONOR(S)

9. ESTIMATED FY OF AUTHORIZATION/OBLIGATION  
a. INITIAL FY 7/8 b. FINAL FY 8/0

TOTAL 1510

11. PROPOSED BUDGET AID APPROPRIATED FUNDS (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. FIRST FY 78		LIFE OF PROJE	
		C. GRANT	D. LOAN	F. GRANT	G. LOAN	H. GRANT	I.
(1) FN	143	075		\$1,000		\$1,470	
(2)							
(3)							
(4)							
TOTAL				\$1,000		1,470	

12. SECONDARY TECHNICAL CODES (maximum six codes of three positions each)  
243 031 312 611 721

13. SPECIAL CONCERNS CODES (MAXIMUM SIX CODES OF FOUR POSITIONS EACH)  
BR BSW COOP LAB NUTR PVOU  
14. SECONDARY PURPOSE CODE 663

15. PROJECT GOAL (MAXIMUM 240 CHARACTERS)  
To promote the development of the rural population of Lower Volta by increasing small farmers incomes, food productivity, and nutritional levels, and by contributing to family food security.

16. PROJECT PURPOSE (MAXIMUM 480 CHARACTERS)  
To determine the feasibility of expanded vegetable production among sedentary rural groups of Lower Volta through applied research and vegetable crop demonstration program.

17. PLANNING RESOURCE REQUIREMENTS (staff/funds)  
Design team consisting of design officer and either a horticulturalist or an agricultural economist for 15 - 21 days TDY

18. ORIGINATING OFFICE CLEARANCE  
Signature: John Hudson  
Title: Country Development Officer  
Date Signed: 10/31/78

19. DATE DOCUMENT RECEIVED AID/W, OR FOR AID/W DATE OF DISTRIBUTION  
MM DD YY

## Background

Since the drought of 1968-1973, Lower Volta has found it increasingly difficult to feed itself. Relying heavily upon the mining sector for revenue, Lower Volta has placed a relatively low priority on the traditional agriculture sector in which 90% of the people are employed. The mines, while providing, directly and indirectly, a major portion of the government's revenue, employ less than 1/2 of 1% of the working population. In the meantime, agricultural production remains at the subsistence level, highly dependent upon the vagaries of weather and the availability of water. Agricultural production -- excluding livestock -- represents less than 3 percent of the GDP.

As a result of the drought that persisted in the countries of the Sahel, AID formed a committee to identify short-term emergency projects for USAID financing. In November of 1978, the committee visited Lower Volta and selected four short-term projects, one of which was the Vegetable Production Project. GOLV initiatives and interest in this project are to be encouraged and supported as success in this realm may lead to new emphasis by the Lower Voltans in the areas of cereals production, fruit and nut production, the rational introduction of new technologies, the increased control of plant diseases, insects, and fire hazards.

The drought disrupted the traditional way of life for the populace of the country, at least temporarily. It resulted in the movement of large numbers of nomads into farming villages, palm grove oases and urban centers. With the near total loss of their traditional means of livelihood

(e.g. goats, sheep, cows), the nomadic populace was faced with unemployment and starvation.

In 1976, the Government of Lower Volta developed an Emergency Assistance Plan to assist the population suffering from the drought. The GOLV requested USAID's assistance in carrying out the Plan, specifically, to increase vegetable and forage production on a family-plot basis by insuring that appropriate attention was given to small farmer participation and by assisting in the creation of family vegetable gardens in several locations throughout the country. Assistance was requested to be in the form of material and financial support for vegetable production around resettlement centers for displaced nomads.

## Description of the Project

### Goal:

The overall goal of the project is to promote the development and welfare of the rural population in Lower Volta by increasing small farmer food productivity and nutrition levels and by contributing to family food security.

### Objective:

The major objective of this project is to assist the people most affected by the drought to establish a means of livelihood, and, as far as possible, their self-sufficiency by assisting them to develop and improve their family garden plots.

### Purpose:

To determine the feasibility of expanded vegetable production among sedentary rural groups of Lower Volta through an applied research and vegetable crop demonstration program. EOPS conditions include: (1) a body of data collected and analyzed concerning vegetable production in Lower Volta, (2) 3,000 farmers instructed in improved production, seed preservation and marketing methods, and (3) 3,000 families trained in optimum food preparation techniques.

### Outputs

Four major outputs are intended: (1) data collection to test the feasibility of vegetable production, (2) establishment of pilot demonstration and field trial areas to carry out agronomic research, (3) analysis of the nutritional impact of project interventions and the training of local populations in vegetable preparation, and (4) training of personnel in vegetable production technologies.

## Inputs

USAID's assistance is to be in the form of a grant for \$1.470 million to be provided for the purchase of water pumps, seeds, fertilizers, garden tools and vehicles. In addition, in order to achieve the project purpose and outputs, AID has been requested to provide the following staff, for 36 months:

A Project Manager/Agricultural Extensionist to be responsible for advising and in-service training of extension agents as well as instructing and supervising extension agents and PCVs in agricultural techniques to be used;

Short-term consultancies of a Soil Scientist and a Water Resource Specialist to be provided early during the project. These consultants will conduct an assessment to determine soil management practices that promote efficient water use, productive potential of the major soil types and potential exploitation of various water sources.

Short-term consultancies of a Nutritionist and an Economist will also be provided. The Nutritionist will be responsible for the design, fielding, and monitoring of a consumption survey in those regions in which the project is to be implemented. In addition the Nutritionist will give technical advise and assistance to Peace Corps volunteers. The Economist will study the marketing potentials and do micro-level studies of the costs of production of vegetables in the different regions in Lower Volta.

AID will also provide commodity support in terms of seeds, fertilizer, pesticides, and tools to carry out pilot demonstrations. These inputs will be provided to the participating farmers free of charge.

### Non-AID Inputs

Peace Corps Volunteers are to be provided, with assistance from the American Embassy, to assist the Government of Lower Volta in several ways. Volunteers will be provided to assist in the establishment and maintenance of pump repair shops, not only for the repairing of water pumps purchased by the projects, but for pumps which existed prior to the conception of the project. Additional volunteers, preferably female will be involved in teaching home preservation, the usage of vegetables, and simple nutrition.

### Beneficiaries

The target beneficiaries of this project are the subsistence cultivators, who may or may not already be millet/sorghum cultivators, but in any case are to be found among the lowest income groups of the economically productive population. Vegetable production in Lower Volta is a relatively recent undertaking. In some cases therefore, the beneficiaries will be traditional grain farmers, in other cases the beneficiaries are or have been date palm cultivators, and, in some cases, notably around the capital, the beneficiaries may be newly sedentary people whose previous occupation was that of nomadic herder. In any case, all of the intended beneficiaries are subsistence cultivators producing vegetables primarily for the consumption of their families and secondarily for sale of the surplus on the local market. Very little inter-regional commercialization of vegetable production is possible at present due to insurmountable transportation problems.

If the consumption effects are considered as well, even larger numbers will be affected. It is not possible at this time to make any estimate of the population that will be affected by increased vegetable consumption,

however, a few statistics can be cited. Lower Voltans probably consume 2 to 5 kilograms of vegetables per capita each year. Many in the nomadic population consume no vegetables whatsoever, and this situation is not expected to change as a result of the project. Consumption of vegetables among the sedentary and urban population should, however, increase significantly. The increased production of vegetables that is expected as a direct result of this project will be roughly 3 to 4 thousand tons per year at the end of three years.

If commercial production and other production by non-participating cultivators increases as well, consumption could increase even more. As a result, the dietary and nutritional effects should be profound. No estimation of these latter effects can be made at this time due to lack of available technical expertise in this field. Some evaluation of these dietary changes should be made during the course of the project.

No modification in the 'values' of the intended beneficiaries is necessary for the success of this project. Some change in tastes both for vegetables as a group and for particular vegetables will occur inevitably among the rural sedentary population as production becomes available. However, there is no program of education or promotion of the use of vegetables at present as the demand for the production is latent and rapidly developing. Where demand for a particular vegetable is not forthcoming, production will be reduced, or at least not increased, through the natural play of supply and demand. The GOLV should consider, however, some program of education in the preservation and storage of various vegetables, and other nutritionally beneficial food items, as part of a campaign to improve the diets in general. Such a program is not absolutely necessary to the success of this project, but should be considered.

## Feasibility

### Technical Considerations

It is apparent that in Lower Volta there is only a limited amount of land capable of sustained crop production and that the annual precipitation is the only reliable source of water, apart from the Fleuve River. The productive land, except for scattered oases already planted with date palms, lies mostly south of the 00th parallel North and is bound by the Fleuve River to the East.

The cultivation of vegetables is not a new idea in this country, but such culture does not currently contribute sufficient support to the endemic population in terms of nutrition or income development.

Soils in the agricultural area generally are sandy, sandy loam, and occasional areas of clay loam. All are fine textured, absorb water quickly, and are suited to the production of vegetable crops. Salinity is a problem chiefly in coastal areas where shallow wells are supplied by infiltration of rain water which forms a layer of fresh water over salt water coming from greater depths. Such wells, if subjected to heavy pumping, will soon supply water which is too salty for most crops. Water pumped from perennial streams or impoundments appears to be suitable for vegetable crops.

Data with respect to the area devoted to vegetable production are limited. The Directorate of Agriculture has estimated that there are approximately 50 hectares of vegetable production at present in the country. A summary of what is known concerning food consumption habits in Lower Volta is included as Annex B.

## Economic Issues

There are three commercial markets in Lower Volta which must be considered in any planning concerning vegetable production in this country. These markets are 1) the mines area at the Western frontier, 2) the seven to thirteen hectare garden area in the Capital and 3) the modern, mechanized 60-70 hectare area near the River for the market in the Capital. In all three areas, however, there is still a very important subsistence market. Some of the production resulting from this project may enter into commercial channels when and where there is a market for it. In general, however, transportation difficulties will make it almost impossible in most areas for the commercial markets listed above to be used as an effective outlet for the cultivators' surplus. At present there apparently is no preservation of vegetables in Lower Volta. This could serve to alleviate many of the market problems which currently exist. It is recommended that a TDY technician be brought out during the early part of the project to recommend an appropriate course of action.

The Directorate of Agriculture and the Ministry of Rural Development, as well as AID, have looked upon this project, at least until now, as essentially an emergency program to provide an alternative for dispossessed herders who have lost everything in the drought. It has also been considered a program to expand vegetable production as a nutritional and income supplement for cultivators in general, and as a means of fostering the cooperative movement. As such, economic and cost considerations have played no role whatsoever. Nearly all planting inputs (seed, tools, fertilizer, insecticides, water pumps, etc.) have been provided free of charge.

In order to reduce progressively the heavy dependence upon outside assistance to which the vegetable cultivator is rapidly becoming accustomed, it has been proposed, and the Directorate of Agriculture appears to have accepted in principle, to establish a revolving fund into which the cooperatives and cultivators would pay for at least some inputs at the time of harvest. These funds would be used as a credit source by other cultivators for the purchase of planting inputs and could be the basis for a general agricultural credit program. The details of this proposal have yet to be worked out by the Directorate.

Given an adequate water supply, there are relatively few limitations on the kinds of vegetable crops that can be grown in Lower Volta. However, only about ten or twelve crops provide most of the production. These are beets, cabbage, carrots, cauliflower, leeks, lettuce, onions, tomatoes, radishes, and potatoes. The relatively high temperature and a day length of 11-13 hours limits the use of a few crops; green peas, head lettuce, and asparagus cannot be grown successfully. Potatoes can be grown, but yields will be low.

## Summary Findings

An analysis of the various findings confirm that the project is viable. Findings reveal that:

1. Farmers are eager and willing to participate in vegetable production providing that information, training, materials, and commodities are supplied.
2. Those farmers who presently grow vegetables eat them, although the proportion of vegetables devoted to auto-consumption, as opposed to sale, cannot be determined and varies widely.
3. For many groups now engaged in vegetable production, vegetables have been a part of their traditional diets. This is especially true for groups living along the river valley who have long prepared millet, sorghum, and rice dishes with sauces topped with or made with vegetable.
4. Field observations reveal that the demand for and consumption of vegetables is increasing in Lower Volta. However, due to lack of data, the magnitude of this increase cannot be measured.
5. Those farmers presently involved in vegetable production view it primarily as a viable means for increasing their incomes and as a means for providing variety to their diets.
6. In order to insure success, the intervention should integrate itself into existing organizational structures and channel its resource support through existing centers for implementation.
7. The GOLV extension capacity must be up-graded if techniques introduced by the project are to be successfully diffused to the target population.

LOGICAL FRAMEWORK  
VEGETABLE PRODUCTION Project

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
<p><b>Goal:</b> To promote the development of the rural population of Lower Volta by increasing small farmers' food productivity, and nutritional levels, and by contributing to family food security.</p>	<p><b>Measures of Goal Achievement:</b></p> <ol style="list-style-type: none"> <li>1. Increased per capita food production</li> <li>2. Increased per capita food consumption</li> </ol>	<ol style="list-style-type: none"> <li>1. Statistics of food production and consumption provided by GOLV in their annual Statistical Abstract.</li> <li>2. Statistics of food production and consumption provided by FAO, World Bank and other donors and interested parties.</li> </ol>	<ol style="list-style-type: none"> <li>1. Continuing and increasing interest and support of GOLV to the agricultural sector.</li> <li>2. Alleviation of general drought conditions over the next several years.</li> <li>3. That GOLV can resolve adequately its internal or external security problems.</li> </ol>
<p><b>Purpose:</b> To determine the feasibility of expanded vegetable production among rural people thru applied research and veg. crop demonstration program.</p>	<p><b>Conditions:</b></p> <ol style="list-style-type: none"> <li>1. The Vegetable Production Service will be a permanent, established division of the Directorate of Agriculture headed by a qualified host country national</li> <li>2. Per capita vegetable production increased significantly</li> <li>3. Per capita vegetable consumption increased</li> <li>4. Revolving fund or other credit device established by Directorate.</li> <li>5. Cooperative movement strengthened qualitatively.</li> </ol>	<ol style="list-style-type: none"> <li>1. Departure of French technical assistant.</li> <li>2. Statistics on vegetable production and consumption in the CIRN annual Statistical Abstract.</li> <li>3. Staff, volunteers and other donors' reports and evaluations.</li> </ol>	<ol style="list-style-type: none"> <li>1. A qualified, trainable and interested L.V. can be identified.</li> <li>2. Sufficient GOLV financial resources are available to support budget.</li> </ol>
<p><b>Outputs:</b></p> <ol style="list-style-type: none"> <li>1. Data collection to test the feasibility of veg. production;</li> <li>2. Establishment of pilot demonstration and field trial areas to carry out agron. research.</li> <li>3. Analysis of the nutritional impact of project intervention and training of local population in veg. preparation.</li> <li>4. Training of GOLV personnel.</li> </ol>	<p><b>Magnitude:</b></p> <ol style="list-style-type: none"> <li>1. Ten new hectares under cultivation in each of ten agricultural regions every year for a total of 300 hectares.</li> <li>2. 3 to 4 thousand tons of vegetables produced and consumed on these plots.</li> <li>3. 6000 cultivators and their families directly involved in vegetable production.</li> <li>4. 1 agriculture agent in each region working full time on vegetable production.</li> <li>5. One L.V. as Chief of Vegetable Production Service.</li> </ol>	<ol style="list-style-type: none"> <li>1. Manager's reports, site visits.</li> <li>2. Directorate's internal production reports.</li> <li>3. GOLV statistical abstracts.</li> <li>4. PCVs or IVS monthly and annual reports.</li> <li>5. AID evaluation after 1st growing season.</li> <li>6. Reports of USAID resident staff.</li> </ol>	<ol style="list-style-type: none"> <li>1. That the rapidly growing supply and demand for vegetables can be kept in reasonable balance.</li> <li>2. That the GOLV can implement a rational scheme of distribution of farm production inputs.</li> <li>3. That sufficient land is available in each region for new vegetable production.</li> <li>4. That vegetable production remains profitable for the majority of cultivators.</li> </ol>
<p><b>Inputs:</b> U.S. - 1. Contract Services 2. Voluntary agency 3. Commodities 4. Vehicles 5. Training GOLV - 1. Personnel 2. Distribution system 3. Counterparts</p>	<p><b>Target:</b> U.S. - 1. One manager/horticulturist plus 18 man of consulting services 2. Nine PCVs or IVS 3. Planting inputs and tools 4. 10 Land Rovers and 2 Ten-ton trucks 5. OJT and 3rd country U.S. participant training GOLV - 1. 10 agricultural agents. 2. Several drivers and mechanics. 3. One individual to head Vegetable Production Service.</p>	<ol style="list-style-type: none"> <li>1. Manager's reports, site visits</li> <li>2. Reactions from Directorate of Agriculture</li> </ol>	<ol style="list-style-type: none"> <li>1. Voluntary agency must receive official request nine months prior to arrival of trainees, i.e., before approval of P.F.</li> </ol>

TABLE I

Crops Grown in Lower Volta  
and Estimates of Total Annual Vegetable Production

<u>CROP</u>	<u>Tons Produced Annually</u>	
	<u>1965-1973</u>	
Beets		
Cabbage		
Carrot	1965	600
Cowpea	1966	700
Eggplant	1967	400
Lettuce	1968	300
Leek	1969	400
Manioc	1970	700
Melon	1971	N.A.
Okra	1972	N.A.
Onion	1973	1400
Pimento		
Potato		
Pumpkin		
Radish		
Sweet Potato		
Tomato		
Turnip		

Vegetables in Capital City Market  
October 2-12, 1978

Beans (snap)  
Carrot  
Leek  
Onion  
Potato (imported)  
Pumpki  
Radish  
Sweet Potato  
Tomato  
Turnip

Also small amounts of mint and parsley

TABLE II

1. Average Retail Prices of Vegetables, 1971-74

<u>CROP</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>
Carrot	24.4	25.0	24	33
Cabbage	24.4	28.2	57	40
Cauliflower	62.0	66.4	80	79
Leek	30.4	27.6	30	32
Lettuce	75.4	85.0	57	113
Onion	10.0	12.4	21	17
Tomato	44.0	39.4	44	71
Turnip	21.6	24.6	32	32

2. Prices on Capital City Market, 1973-74 (average of two markets)

<u>CROP</u>	<u>1973</u>	<u>1974</u>
Beets	85	61.3
Cabbage	49	50.0
Carrot	35	39.8
Eggplant	83	59.6
Lettuce	82	336.3
Onion	23	27.0
Pimento	592	350.5
Potato	20	69.2
Tomato	103	79.6
Turnip	45	46.2

3. Prices Charged in two Capital City Supermarkets - October 1976

<u>CROP</u>	<u>BIDAR</u>	<u>FAOUAS</u>
Carrot	60	55
Cauliflower	100-120	120
Corgette (squash)	--	50
Cucumber	70	50
Eggplant	--	40
Garlic	100	--
Lemon	70	40
Onion (dry)	30	22
Potato	29	25
Tomato	--	100
Turnip	50	50

konec=kpc  
44 = \$1.00

Retail prices are highest in September-December period and are two to three times more than the farmer receives for his produce.

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LOWER VOLTA

GOOD SOURCES OF:

VITAMIN C

VITAMIN A

IRON

PROTEIN

LOWER VOLTA FOODS  
GOOD VITAMIN C SOURCES

<u>FOOD</u>	<u>VIT. C mg/100 gm</u>
Manioc (leaves)	311 mg
"Pain de Singe"	270 mg
Parsley	150 mg
"Pomme de Cayor"	95 mg
Turnip	75 mg
Minty, fresh	70 mg
Sweet Potatoes	70 mg
Cow Pea leaves "Hacco"	60 mg
Cabbage	54 mg
Oranges	48 mg
Pepper, fresh	40 mg
Watermelon	36 mg
"Jujube" (half dry)	35 mg
Dates, fresh	30 mg
Tomatoes	26 mg
Green Onions, leeks	17 mg
"Biscap"	14 mg

DAILY RECOMMENDED INTAKE:

Children 0-14.....	35-50 mg
Males & Females, 15+.....	60 mg
Pregnancy.....	80 mg
Lactation.....	100 mg

General Advice

Try to eat one or more of these foods every day, since Vitamin C is not stored in the body.

Since this vitamin is destroyed by air and heat and lost in water used for washing and cooking,

- store foods in a dark, cool place, covered
- do not soak vegetables in water
- save and use the cooking water
- eat Vitamin C-rich foods raw when possible

SOURCES:

Food and Nutrition Board: Recommended Dietary Allowances, 1980.  
NAS/NRC, Washington, D.C.

Adams, G.P.: Nutritive Value of Foods, Home and Garden Bulletin  
No. 72. USDA, Washington, D.C., 1977.

FAO: COMPOSITION OF FOODS COMMONLY CONSUMED IN AFRICA, 1970.

Fresper, M.S.: MANUEL DE NUTRITION SCOLAIRE, F.A.O.,  
1976.

## GOOD VITAMIN A SOURCES

<u>FOOD</u>	<u>VITAMIN A</u> (Mg $\beta$ carotene Equivalents* per 100 gm)
Palm Oil	40,000
Spinach	14,580
Manioc (leaves)	11,776
Mustard Greens	10,440
Turnip Greens	9,600
Beet Greens	9,185
Sweet Potatoes	5,870
Carrot	5,480
"Lalo" / "taghye"	4,856
Pumpkin Squash	3,565
Cow Pea Leaves "Hacco"	3,240
Lettuce	2,000
Mint	2,000
Parsley	1,500
Rendered butter	650
Tomato	450
Pepper	330
Orange	290
Bissap	285
Sardines in oil	60
Milk, fresh (any) avg.	54

### DAILY RECOMMENDED INTAKE:

	(in $\mu$ g $\beta$ carotene equivalents*)
Children 0-6.....	2,400-3,000
7-10.....	4,200
Males 11+.....	6,000
Females 11+.....	4,800
Pregnancy.....	6,000
Lactation.....	7,200

### General Advice

- 1) Try to eat one dark green or orange vegetable at least twice a week, since Vitamin A can be stored in the body.
- 2) Try to eat two or more vegetables every day, to supply necessary vitamins and minerals and roughage.
- 3) Since Vitamin A is destroyed at high cooking temperatures, cook foods gently.

- 1  $\mu$ g Retinol Equivalents = 6  $\mu$ g  $\beta$  carotene equivalents
- 1 I.U. = 0.3 Mg R.E.

### SOURCES:

Food and Nutrition Board: Recommend Dietary Allowances, 1980, NAS/NRC, Washington, D.C.

Adams, C.P.: Nutritive Value of Foods, Home and Garden Bulletin No. 72, USDA, Washington, D.C., 1977.

FAO: COMPOSITION OF FOODS COMMONLY CONSUMED IN AFRICA, 1970.

Prosper, M.S.: MANUEL DE NUTRITION SCOLAIRE, F.A.O. 1976.

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LOWER VOLTA FOODS

GOOD IRON SOURCES

<u>FOOD</u>	<u>IRON (mg/100 gm)</u>
Baobab leaves, dried ("lalo"; "taghye")	25 mg
Liver/Kidney, Beef	10 mg
Dates, dry	9.4 mg
Melon seeds "berof"	9.3 mg
Cow Pea leaves "Hacco"	9.2 mg
Wheat	7.6 mg
Cow Peas "niebe"	7.6 mg
Manioc	7.6 mg
"Pain de Singe"	7.4 mg
Dried Beef "Tichtar"	7.0 mg
Sweet Potatoes	6.2 mg
Parsley	5.0 mg
Heart, Beef	4.5 mg
Fish, dried	3.5 mg
Beef, mutton, goat, camel	2.4 mg
Spinach	2.2 mg
Beet greens	1.9 mg
Mustard Greens	1.8 mg
Turnip Greens	1.0 mg

DAILY RECOMMENDED INTAKE:

Children 0-10.....	10-15	mg
Males 11-18.....	18	mg
Males 19+.....	10	mg
Females 11+.....	18	mg
Pregnancy, Lactation.....	48-78	mg

General Advice:

Vitamin C enhances iron absorption.

Cooking in iron pots increases the amount of iron in the food, particularly tomato-based recipes.

SOURCES:

Food and Nutrition Board: Recommend Dietary Allowances, 1980.  
NAS/NRC, Washington, D.C.

Adams, C.F.: Nutritive Value of Foods, Home and Garden Bulletin  
No. 72, USDA, Washington, D.C., 1977.

FAO: COMPOSITION OF FOODS COMMONLY CONSUMED IN AFRICA, 1970.

Prosper, M.S.: MANUEL DE NUTRITION SCOLAIRE P.A.O.,  
1976.

## FOOD HABITS IN LOWER VOLTA

The general impression from studies of food habits and the food supply is that the regions of Lower Volta along the river, where agricultural production is concentrated, have a more balanced and varied diet. Wide seasonal fluctuations in food consumption exist, particularly in isolated areas poorly supplied from the outside. Limited supply, storage, preservation and transport of foods makes distribution uneven and prices high. There is a heavy dependence on imported foods, e.g., wheat flour, rice, milk, oil, sugar, etc.

Seventy-five percent of household monetary expenditure is for food in the rural sedentary population, and 85% in the nomad population. Thirteen percent of all consumption by rural sedentary groups and 51% for nomadic groups is non-monetarized, in the form of auto-consumption, gifts and exchanges (barter). Much of this non-monetary consumption may also be foodstuffs.

Limited supplies of cooking fuel, equipment and utensils, and an unpredictable food supply make meal preparation necessarily simple and spontaneous. Wood and charcoal are both used, and cooking pots are cast aluminum. Almost every meal features either a cereal grain or bread. Noon and evening meals are usually one-pot affairs, with the meat or fish and vegetables cooked together, first in a stew or sauce, and served with either rice or couscous. Porridges with milk are often made for breakfast. Milk is usually consumed between meals, rather than with meals. Food is served in large platters or porcelain enamel bowls and eaten with the hands. Men and women often eat separately. People do not dawdle over a meal, or converse while eating, but socialize leisurely afterwards over glasses of sweet tea.

The mean caloric intake is approximately 2,200 calories per person, per day. This level of intake appears to be slightly low by FAO standards, despite that there are few adult males in most households. A survey reported that caloric intake met estimated household requirements 47% of the time in March/April, and 54% of the time in June/July.

### Cereal Grains and Products

Cereals are the staple of the diet. The most commonly eaten foods include the following:

- sorghum - considered by some as food for animals, not people.
- preferred in certain areas. It is said that an acceptable meal can be made from it at lower cost than wheat, which must be accompanied by meat.

- pounded into flour, then rolled into couscous and steamed, served for the evening meal. Sorghum is boiled into porridge often for the morning meal.
- rice - now commonly consumed by all groups at the noon meal, with fish or meat. In high demand.
- wheat - preferred by certain groups and in northern regions, a higher status grain. Growing in popularity over sorghum.
  - made into couscous or porridge.
- bread - consumption depends on presence of bakeries. Often eaten for breakfast.

Mean cereal and cereal-product consumption among the sedentary rural population is 476 gm/person/day, or 173 kg/person/yr, contributing 78% of mean daily calories and 38% of mean daily protein intake.

As total caloric intake increases, the percent of calories from cereals decreases.

Cereal intake is slightly higher in June/July than in March/April, accompanied by a slight decrease in animal protein intake at that time.

Preliminary data indicated that the greatest percentage of monetary expenses of the rural sedentary groups went for cereals, on the average. It was also reported that sorghum consumption is declining in all ethnic groups in favor of rice, which is linked to diminishing sorghum production and increased rice production. Compared to sorghum, rice (particularly white milled rice) is inferior in protein, calcium, iron, thiamine, riboflavin and niacin. Sorghum dishes are prepared from the whole grain. Some traditional sorghum recipes are no longer made now that rice is available.

### Meat

Consumption of meat and fresh milk has declined since the drought, due to reduction in the size of herds (of camels, goats, sheep and cattle), diminishing supply, and rising prices. However, more money is spent on meat than any other single item, accounting for 20% of total purchases, among the rural sedentary. Meat intake varies considerably. Sedentary groups consume 33 kg/person/yr on the average. Dried meat is consumed, particularly during the hot, dry season when herds are moved to greener pastures and meat is scarce.

Commercial milk is fairly widely available canned, dried, and in extended shelf-life cartons. The supply and consumption of fresh milk has dropped since the drought. Average milk consumption in sedentary groups was reported at 20 litres, person/year, (79 gm/person/day), although this varies

widely from household to household. Calcium intake has been judged adequate. Milk intake was found to be higher in June/July than in March/April and is higher among certain groups, and higher in certain regions. Nomadic groups are highly self-sufficient in their milk supply; virtually all the 166 litres consumed per person, per year are from their own herds.

Milk is most often consumed in a special form made from powdered milk, water, sour milk culture, and sugar. This is consumed between meals. Milk is also added to porridges.

### Fish

Fish is not traditionally consumed by groups from certain regions, partly due to lack of availability. City living is changing traditional food habits, however. A study of immigrants in the larger cities found that 85% regularly ate rice and fish at noon.

Fish is widely consumed in the river region. Rural sedentary groups consume an average of 7 kg of fish per person per year. But fish consumption is insignificant or nil in regions away from the river.

### Eggs and Poultry

Eggs are not usually eaten but are allowed to develop into chicks, chickens being more valued. Eggs are seldom fed to young children due to the belief among certain groups that this will prevent them from learning to speak well.

Poultry is scarce and expensive and not usually eaten except on special occasions, when it is served with rice.

Altogether, animal sources provide, on the average, 29% of total protein in the diet. Mean protein intake is 68 gm/person/day, which is adequate. (FAO recommends 53 gm protein/day when the Net Protein Utilization is 70%, as is estimated in the Lower Voltan diet.) Protein intake is the highest in Region X, but this is related to high cereal intake, not meat, in that region. Proteins provide about 12% of total calories consumed, overall, which is quite adequate.

### Fats

Fats provide a variable contribution to the diet. Although certain groups seem to value animal fat, they use very little oil in their diet, compared to others who consume it to excess. The difference is due to the frequent consumption of fish and rice among some ethnic groups, which is prepared with a large amount of peanut oil. Variations in caloric intake among different groups result primarily from the different amounts of oil consumed.

LOWER VOLTA FOODS

GOOD PROTEIN SOURCES

<u>FOOD</u>	<u>PROTEIN (gm/100 gm)</u>
Dried Fish & Beef	55.0 gm
Cowpeas ("Niebe")	23.1 gm
Peanuts	23.2 gm
Sardines in oil, Tuna	20.0 gm
Fresh Fish	19.6 gm
Beef, Camel, Chicken	19.0 gm
Melon Seeds ("Beref")	18.4 gm
Mutton & Goat	15.0 gm
Eggs	13.0 gm*
Wheat	12.7 gm
Sorghum	11.3 gm
Corn	10.0 gm
Millet	8.9 gm
Rice	6.8 gm
Milk - ewe's	5.9 gm
- cow	3.8 gm
- goat	3.4 gm
- camel	2.0 gm

DAILY RECOMMENDED INTAKE:

Children 1-3.....	23 gm
4-6.....	30 gm
7-10.....	34 gm
11-14.....	45 gm
Males 15+.....	56 gm
Females 11-18.....	46 gm
Females 18+.....	44 gm
Pregnancy.....	74 gm
Lactation.....	64 gm

General Advice

Protein from grains, seeds and legumes is lower quality than animal protein sources. However, when eaten in combination with each other, the protein quality is improved. Children must have high quality proteins.

\*NOTE: One egg = 50 gm

SOURCES:

- Food and Nutrition Board: Recommended Dietary Allowances: 1980, NAS/NRC,  
Washington, D.C.  
Adams, C.P., Nutritive Value of Foods, Home and Garden Bulletin No. 72,  
USDA, Washington, D.C., 1977.  
FAO: COMPOSITION OF FOODS COMMONLY CONSUMED IN AFRICA, 1970.  
Prosper, M.O.: MANUEL DE NUTRITION SCOLAIRE, R.A.O., 1976

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### Legumes and Oilseeds

Legumes and oilseeds include cowpeas, watermelon seeds, and peanuts. Peanuts are more common in the diet along the river. They are eaten grilled (often for breakfast), or pounded into meal added to certain dishes. Peanut butter is also used in some dishes. Melon seeds are collected from the melons, dried, and pounded into a meal, which is often cooked in combination with cowpeas and a vegetable and served with rice or couscous. Melon seed consumption was noticeably higher in March/April than in June/July. Dishes involving these foods are considered poor man's food, consumed when other foods are scarce.

### Sugar

Sugar consumption has increased due to the growing popularity of tea, which is imbibed strong and sweet three times a day, three small glasses at a sitting. The elderly population appears to drink more than anyone else, due probably to more leisure time and as a social ritual. Sugar is also added to the sour milk beverage. Average sugar intake by rural sedentary populations surveyed is 13.6 kg/person/year. Nomadic peoples reported a 7 kg per person per year sugar intake.

### Fruits and Vegetables

Vegetable intake has increased along the river, since vegetable production has been encouraged there, and as nomads have become sedentarized and begun to practice agriculture. The most popular vegetables are onions, potatoes, okra, carrots, cabbage and cowpea leaves. Not well liked are the sour and less sweet vegetables including radishes and cucumbers, although these are grown in places and are sometimes discovered cooked in sauces and stews.

Vegetables are not prepared individually as separate dishes, but are incorporated into the main dish. Small quantities of available vegetables are usually boiled in sauce and served with rice or couscous. A meat and potato stew is popular and served with bread. Lettuce salads are known and eaten in some places, but vegetables are rarely eaten raw.

Vegetables are not much appreciated by certain groups, but are liked by other groups. Where consumption is low, availability has usually been limited and thus vegetables and their uses are unfamiliar. Their nutritional importance in the diet is not recognized, even where they are well eaten, but vegetables are appreciated by many for the variety they add to an otherwise monotonous diet. One survey reports an average consumption of fruit and vegetables at 24 kg per person per year, equaling 65.7 gm/person/day by rural sedentary populations and only 5 kg/person/year by nomads, 5 kg of which was fruits, mostly dates and melons. Vegetables still make a very small contribution to the diet.

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Fruits are in very limited supply. Although a variety of imported fruits is available in capital city markets, fruit elsewhere is limited to various melons, dates, bananas in some areas, and wild fruits. For most of these fruits, availability is limited to the season. These are significant sources of Vitamin C in the local diet. Potatoes also add Vitamin C to the diet where they are consumed in significant quantity.

Other plants consumed include hibiscus flowers, also high in Vitamin C, from which a beverage is prepared; baobab leaves, a very good source of Vitamin A and iron, which is added regularly to couscous to improve the "mouth feel;" and water lily seeds and bulbs, whose nutritional value is unclear, which are collected from the marigots and sometimes eaten with fish.

There are several indications that Vitamin C and A in the diet are inadequate. This could readily be corrected if vegetables were more widely and more regularly available and consumed. Vegetables not currently consumed in significant amounts, which should be encouraged for their potential contributions to the diet of primarily Vitamin A, Vitamin C and iron, include the following:

- parsley
- green leaves (mustard greens, turnip greens, spinach, beet greens, swiss chard)
- green peppers
- tomatoes
- turnips
- sweet potatoes
- squash

Initial experiences have shown that these vegetables can be easily adapted to the taste preferences and familiar recipes of different ethnic groups, but must be demonstrated and promoted.

## TEAM TASK 1

### Group A

Your team is a Washington-based PID review team. In reviewing the PID, you are to determine:

- 1) Are project means appropriate to goals?
- 2) Is the project appropriate in this country and regional in context?
- 3) What additional information would you need to determine project viability and technical feasibility?

What changes, if any, would you make in the project?

### Group B

Your team is the mission. You are preparing an in-house review of the PID for presentation in Washington.

- 1) How does this project fit into your host country and mission strategies?
- 2) Are the project means appropriate to the goals?
- 3) Discuss the project's technical feasibility.

Be prepared to lead off the discussion by presenting your case to Washington.

Handout 1

Date: December 10, 1978

Reply to

Attn of: AFR/DR/AG Fred Lowse

Subject: Lower Volta Vegetable Production PID (632-7886)

I have reviewed the PID and have serious reservations. I recognize that the proposed project arises out of an appropriate desire to assist some truly impoverished people living in a difficult environment. However, substantial revisions are needed if this project is to be successful.

There are basic problems with respect to the nutrition rationale or nutrition economics. Basically, will vegetable production fill a high priority nutrition need in rural Lower Volta either through direct consumption or through food (and other) expenditures made possible through income derived from marketing. Supplemental reviews, which are attached, and my own analysis do not support the proposed project from this standpoint.

The prospect of successful marketing is highly doubtful. This judgement is based on a review by USDA and my own experience. The setting involves serious handicaps including small-scale production, short growing season, poor roads, distance between producing and urban areas, limited transport equipment, and limited managerial manpower.

These and other problems raise serious questions about long-term cost effectiveness and economic viability of vegetable production on any significant scale in the area. I doubt that production amounting to the level of the proposed pilot project (200 HA by 3,000 families) will be implanted permanently, much less a higher level probably required to really justify the proposed project activities. Total project costs of \$2,181,000 (all sources) amount to \$727 per family. This level of expenditure for a relatively small-scale activity per family, appears to demand a future spread of the practices.

Statements about project purpose are confusing, as discussed below. If we view this as a production activity, there should be a rather direct demonstration of internal logic and probable technical, economic, and social viability, including in this case a strong showing that the vegetables will satisfy a high priority nutritional need. Even if the intent really is one of experimentation and testing, we should apply logic and available experience to determine a realistic probability of success.

I conclude that the project as described fails to meet adequate requirements even for an experimental undertaking. I recommend that it be revised to incorporate the considerations presented here.

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Efforts to design and implement research, production, or marketing activities related to mixed farming systems, or cereals, or legumes, may be given new priority.

More detailed comments on these and other topics follow.

NUTRITION ECONOMICS/PROBABLE REAL RURAL DEMAND:

Substantial questions must be asked about the nutrition contribution of the proposed project. The PID only deals with this issue by asserting that people of Lower Volta sometimes or in certain locations have produced and eaten vegetables. Otherwise, the topic is dropped by saying data are not available.

There is inadequate discussion of the nutrition issue. I assume there is a calorie deficiency which results from the loss of milk and meat from herd destruction by the drought.

The memo from the Office of Nutrition brings out the low contribution of vegetables to caloric needs. This fact appears to have been overlooked or evaded in the PID. Why make all these inputs and efforts on vegetable vs. more grains and legumes? This topic has not been addressed. Farmers give priority to their millet and sorghum during periods of peak labor requirements. This should tell us something about how the farmers view their needs.

There are several statements in the PID about the lack of familiarity of people with vegetables. This usually is in the context of explaining the need for home economics type of inputs on the utilization of vegetables. This should have drawn our attention further to potentials for expanding output of cereals, beans, peas, etc. At least the cereals require no efforts at familiarization.

Vegetables produced are to be consumed by producers, other rural dwellers, and in urban markets, in some unspecified proportions. I infer that most of the vegetables are expected to be consumed by producers, or certainly in their villages and nearby.

I have tested the hypothesis of auto-consumption with some estimates and data which I located. Recent analysis of expenditure patterns in rural Sierra Leone indicates that persons at comparable income levels spent about 3 percent of that income on fruits and vegetables. One might arbitrarily estimate 2 percent for vegetables. Data for Northern Nigeria, taken in 1970-71, indicated a maximum of 6 percent of income spent for vegetables.

I applied this maximum 6 percent estimate to the estimated income level in the project area of Lower Volta: 3,000 producing families x 5 persons per family x \$70 per capita income yields total income of \$1,050,000. At 6 percent, this represents \$63,000 expenditure for vegetables. The fragmentary price data presented point toward a maximum producer value of perhaps

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\$0.25 per Kg., which would represent 252 tons of vegetables. Available data suggest a yield of perhaps 26 tons per HA. Thus, producers might consume the production from only 9.7 hectares.

If we reduce the estimated value per Kg. or reduce the estimated yield, this of course raises problems about the long-term benefit/cost results of the project. A yield of 10 tons and a value of only \$0.10 would represent the consumption from 63 HA, but at a farm value of only \$1,000, per HA, vs. \$6,500 per HA, with the more "optimistic" assumptions. If we assume 3 months of production and consumption, the range of estimated quantities per person is from 0.18 Kg. to 0.46 Kg. The lower estimate appears much more realistic than the higher. This reasoning about consumption patterns, prices, and yields raises further question about the nutrition economics of the project. It simply does not conform to plausible expenditure/consumption patterns of this extremely low income level.

#### COST EFFECTIVENESS

It is troubling to brush aside cost effectiveness approaches to economic analysis entirely by referring to data limitations. I believe that project approval should require comparison with favorable results in some analogous situation(s) in other countries. The setting includes numerous handicaps: small-scale production, extremely low incomes, doubt about the nutritional relevance, distance between producing and urban areas, poor roads, lack of familiarity among producers and consumers, etc. My "memory search" (not including any search for documents), does not bring back any successes under such conditions.

UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY  
AGENCY FOR INTERNATIONAL DEVELOPMENT  
WASHINGTON D C 20520

DATE: November 23, 1978

FROM: L. Olson, Office of Nutrition

TO: F. Lowse, AFR/DR/AG

SUBJ: Vegetable Production PID

At your request our office took a look at the subject PID. I'm afraid the attached comments were pulled together quickly and are the result of some seat of the pants calculations. I think, however, that any PP that comes out of this PID should address most if not all of the issues raised here. Please use these comments as seems appropriate.

12.1

November 23, 1978

SUBJECT: Project Identification Document for Project (632-7886) Comments on the Nutrition Outputs

This proposed project, Vegetable Production, is expected to upgrade the welfare of the rural population by increasing small farmer's incomes, productivity, and consumption. Further, increased production will result in increased consumption which will improve the nutritional diets of the affected population. Thus, nutritional benefits are expected to be achieved in two ways: (1) through direct use of the vegetable crops produced by the participating farm households and (2) through increased purchasing power resulting from the sale of some of the vegetable crops.

As the PID is presented direct nutritional benefits from the vegetable production project are not likely to be significant, particularly with regard to the major nutritional problem in Lower Volta, that of caloric insufficiency. Information given in the PID does not support the projected increase in farming household incomes, especially after the project period when free inputs will no longer be available. Expected returns are overstated in value terms, costs are understated, and the relationship of increased vegetable production to improved incomes is uncertain.

These points are discussed in more detail below. A number of other issues could be raised, especially regarding integration of the proposed vegetable production into the farming system, labor availability and utilization, and the lack of marketing facilities and services. We assume, however, that others will be addressing these issues and confine the discussion here to the nutrition-related ones.

#### Direct Consumption (Auto-consumption)

Evidence for current consumption of the proposed vegetable crops is qualitative and sketchy. While the traditional diet apparently emphasized the consumption of meat and milk, the 1968-73 drought decreased the cattle population sufficiently to make the components of this diet less available. Vegetable-growing was proposed in 197 as a short-term answer to this decrease. People did apparently eat the vegetables, and this project now proposes to make vegetable production a longer term component of the post-drought diet.

The nutritional reasoning behind the designation of vegetables, especially tomatoes and onions, as substitutes for meat and milk is not clear. Legumes (or pulses), the more obvious substitutes for the protein provided by animals, are not envisioned to be part of this project. While the solution of vegetable production does not contribute significantly to improved protein supplies, it does not provide the answer to the calorie deficiency problem either.

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No dietary information is apparently available on the amounts of meat and milk consumed in an average diet in pre-drought times so the projected consumption of vegetables cannot be compared with that. There is adequate information, however, to project the additional calorie availability if the vegetable project as proposed is 100 percent successful. If every vegetable listed is produced at maximum levels,<sup>1</sup> no production is lost or wasted, and every ounce of production is available for consumption by the target population, each person in the three target regions can be expected to consume nine additional calories per day. This is a small impact indeed when estimated calorie consumption is at least 100 and more likely 200-300 calories below required levels.

As only 3,000 farming households<sup>2</sup> are to be involved in actual production, however, it is probably more realistic to calculate the calorie impact if just these households are assumed to consume all of the output (100 percent auto-consumption). To do this, the target group size can be adjusted down from the total population of the regions involved down to the population of only those households involved. On this basis, assuming that there are approximately five persons per producing household, the per capita availability level for this target group of persons would be about 150 calories per day, a more significant amount. This figure implies, however, that these households will be eating diets composed of fairly large quantities of vegetables--1.8 pound of tomatoes, or a pound of onions, or over three pounds of lettuce per person per day. And since production is expected to be primarily in the December - May period, this would imply daily intake levels of twice these amounts in season. Such excessive quantities of vegetable consumption seem unlikely to appeal to palates accustomed to a grain staple and probably exceeds the amount that small children can physiologically eat. It is unlikely then that the full impact of calorie availability would be translated into calorie intakes by the producing households.

In order to avoid changing the composition of the diet so drastically, it is likely that the producing households will sell some of their produce and buy other foods for consumption. This brings us back to the earlier levels of relatively insignificant calorie impacts and directs us to look at the nutritional benefits brought about by the income effect.

#### Incomes and Nutrition

When farming households' cash incomes are increased, it can be expected that some of the additional money will be spent on food. Just how much "some" is depends on the relative needs for both food and non-food items.

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<sup>1</sup>"Maximum levels" being defined as average U.S. production levels as figures on that were readily available (Appendix Table 1). The only empirical information in the PID or output--for the 5th Region, Tables 4.B. and 2 in Annex B--is somewhat out of line and PP projections of expected output vary from 2,000 tons per year to 4,000.

<sup>2</sup>Original 5,000 figure was revised to 3,000.

As the Lower Voltan population under discussion appears to be undernourished, it is reasonable to expect that a fairly high proportion of additional income, say, 80%, will be devoted to food purchases. If vegetables are relatively high value crops and grains are relatively low (i.e., in terms of cost per 1,000 calories or 100 grams of protein), then it is reasonable to expect that a family's diet will be improved if they sell tomatoes and spend 80 percent of that money to purchase sorghum, for example.

Unfortunately, the PID does not give adequate information on prices to enable the nutritional effects of such an income reallocation to be calculated. It must be taken on faith that by selling some vegetables, an additional amount of nutrients will be purchased by the farming households.

One question bearing on the income effects can be addressed in the context of the economic analysis of the PID. How much of the vegetables production must the farmers sell in order to meet cash costs of production (seed, fertilizer, water) once the period of free inputs is over and how many nutrients (calories and protein) does this leave for auto-consumption?

#### Costs

According to information on costs of seeds, the data on fertilizer, malathion, and rodenticide/insecticide costs, and the cost-of-water estimates, the average farmer should have non-labor costs of \$664 per year. As no labor requirements and no information on labor costs are given, it is impossible to put a value on this input and costs are understated by this amount. Land is also assumed to be free. In short, each household must produce and sell \$664 worth of vegetables on their 0.13 ha. of land in order to supply the costs of production.

#### Profit

These costs must then be tallied against expected output. The quantity of output anticipated (2,000-4,000 tons) can be approximated by applying U.S. average production figures per hectare to the projected number of hectares as was done to get calorie availability above.<sup>3</sup> The evaluation of the output is more difficult to do. The method used to value monetary output expected in the PID is quite crude--4,000 tons of undifferentiated product (expected to be produced in December - May) are valued at a "representative kilo" price based on observations made in the Capital in October, 1979. No estimation of the transport/storage/marketing component of that "representative" price is made to get an estimate of a farmgate price. The problems of seasonal oversupply and dumping of cheap Senegalese vegetables are also not taken into account in this pricing effort.

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<sup>3</sup>On the basis of the sales of the cooperative these production estimates would appear to be exorbitant. See Appendix Table 2.

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The resulting total value of output (and farming household gross incomes) of \$1,573 is likely to be substantially overstated. Only marginal improvements in this very shaky economic assessment can be made given the facts at hand. By applying the average River commodity prices where available to the commodity output list (Appendix Table 1) and filling in with the October Capital commodity prices only when no other prices are available, the value of output from 12 commodities, accounting for 2,572 metric tons of output, is only 70 percent that which would have been projected for this tonnage using the "representative" price. The commodity-based method still does not take into account the marketing margins, storage losses, or the seasonal oversupply problem. It does reduce expected gross value of output per household, however, to \$1,143. The margin between gross value of output and variable costs of inputs drops to \$480, compared to the estimated profit per participant of \$1,425.

#### Adjustment of Estimated "Profit"

If transport, storage, and middleman costs are expected to account for 50 percent of the total value of crops calculated by the retail-price approaches the total value of the participants' benefits is negative, a loss of \$93 per household. This would certainly mean a net nutritional loss as well. By marketing the crop themselves, farming households may be able to increase their incomes by some portion of the marketing margins, but there are still a lot of unknowns to be reckoned with--the possibility that seeds may have to be replanted, inevitable storage losses, rising costs to fuel to transport commodities, and an unstable price situation. The positive nutritional impact of such a tenuous income increase may well be offset by the nutritional stress of the arduousness of transporting water to the garden. If in fact production levels are below the expected, positive nutritional impacts will be even more in doubt.

#### Recommendations from a Nutritional Point of View

It seems unlikely that this project will have any significant positive nutritional impact on the problem of calorie deficiencies either through direct consumption of the vegetables produced by the farming households using free inputs or through increased purchases of food resulting from increased household incomes due to the sale of vegetables produced. Nor does immediate subsidization of the vegetable producing enterprise appear to lead to the development of a viable agricultural enterprise under the conditions given.

If there is still a felt need to find a dietary substitute for meat and milk, activities which result in increased protein availability--such as poultry production or legume production--should be investigated. The increased output of vegetables and grains which are already well-known and widely grown may also be suggested as a focus for research and extension activities.

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Mention is made in the PID of a survey to determine dietary/consumption behavior. This would be difficult to do in a place such as Lower Volta but it is greatly needed and would be extremely useful. In addition, measurement of impact of the project--before and after--is needed.

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## Appendix 1. 4e 1

Commodity	Final Year Hectares	Metric tons per ha. in the U.S.*	Total kg, production	Calories per kg. A.P.	Protein (g) per kg. A.P.**	Price per kg. UM/kg.	Value of output U.S.\$ 45.45 UM=\$1
Onions	20	19.8	396,000	345.4	13.64	36	313,663
Carrots	20	29.9	598,000	246.4	6.38	30	394,719
Tomatoes	20	22.0	440,000	193.6	9.68	20	193,619
Green Beans	10	3.6	36,000	281.6	16.72	--	?
Watermelon	10	7.7	77,000	118.8	2.20	60	101,650
Squash	10	19.9	199,000	354.2	9.90	60	262,706
Turnip	10	11.1	111,000	165.0	5.50	--	-
Spinach	10	6.8	68,000	158.4	19.58	--	-
Beet	10	11.4	114,000	171.6	6.38	100	250,825
Pepper (Dried)	10	2.2	22,000	9,203.2	128.70	90	43,564
Melon (Seed)	10	?	?	?	?	70	?
Cabbage	10	17.5	175,000	189.2	10.34	15	57,756
Eggplant	10	10.9	109,000	202.4	9.68	20	47,965
Leek	5	?	?	?	?	50	?
Swisschard	5	?	?	?	?	--	?
Cucumber	5	8.2	41,000	143.0	8.58	60	54,125
Lettuce	5	13.9	69,500	114.4	8.36	50	76,458
Potato	20	16.6	332,000	613.8	16.94	56	409,065
			<u>2,787,500</u>				

Appendix Table 2:  
Input Estimates

	<u>All 400 ha.</u>	<u>Per Participant</u>
1. Costs - cash:		
Vegetable seed	50,000	
Potato seed	36,000	
Alfalfa seed	4,000	
Fertilizer	80,000	
Rodenticide/Insecticide	9,000	
Malathion	34,000	
Sub-total	<u>\$213,000</u>	\$71.00
2. Costs of water (uncertain as to whether cash or not) @ 10¢/liter at nursery rates for 180 days/year = \$4,447.8/ha	\$1,779,120	\$593.04
3. Labor	?	?
4. Land	?	
5. Machinery	NIL	NIL
TOTAL INPUTS	\$1,992,120	\$664.04
Output Estimates		
Paper, p. 9	2,000 m.t.	667 kg
Paper, p. 2	4,000 m.t.	1,333 kg
Appendix Table 1	2,787.5 m.t.	929 kg
In example p. 24	487.6 m.t.	162.5 kg

Outside Sources for Appendix Table

\*Watt, B.K. and A.L. Merrill. Composition of Foods. Agricultural Handbook No. 8, USDA: Washington, D.C., December 1973

\*\*Mortenson, E. and E.T. Bullard. Handbook of Tropical and Subtropical Horticulture. Department of State: Washington, D.C., 1970.

LOWER VOLTATrainer Notes

The overall purpose of the case study is to help participants to identify weaknesses in goals, means, and ends analysis; and to understand that the inclusion of nutrition concerns in the Project Identification process does not necessarily lead to constructive project design - from a consumer-nutritional focus of concern.

Overview

This case study is organized into two sections. The first section is the main case study itself, and the second section includes two critiques of the preliminary project design as revealed by the information available. The trainer should feel free to exercise personal judgement as to how to set up and use each part of the case study.

The first part of the case presents an actual set of facts from an actual preliminary project design in a West African country. It should be emphasized in introducing the first part of the case that the point of the study and discussion is not to identify which country, or to criticize the people involved for a less than adequate project design. Rather, it is to present a set of real, if limited facts on the basis of which they (the participants) will sometimes be required to take action. During the initial reading, participants should be asked to focus on what they can see in the facts presented, which would cause them to question the feasibility of continuing with project design.

The case presents a set of facts which are obviously being acted upon under the stress of situations made clear in the case study.

In the second part of the case study, two independent consultants are asked to comment on the same set of facts as participants saw in the first part of the case. This will give participants an opportunity to compare and contrast their analysis with the analyses of two real consultants who were asked to comment on a similar set of information.

Since this case study offers the first opportunity for participants to apply a new set of languages, skills, concepts, and analytic tools on a situation; they should be encouraged to consciously try to apply those tools to this situation.

A small group task is presented at the end of each section of the case study. However, as suggested earlier, the trainer should feel free to modify these tasks to emphasize either points of particular interest to the group; or points which previously have been emphasized and are most relevant to the Lower Volta case.

### Introducing the Case Study

As in any case study, there are no "right" and "wrong" answers. In this particular case study, this point should be emphasized in introducing the case. There is no intention here of being critical of either the mission or the consultants and staff who actually had to struggle with this situation.

It is suggested that the trainer introduce the case by providing a broad outline of the situation. The trainer may wish to put up on a flipchart a summary of the broad goals of the project as designed at this preliminary stage. These goals are contained in the first page of the case study.

### Timing of the Unit

#### Set-up

The trainer should verbalize a transition from the previous unit of new concepts, language and skills into this unit; which is an opportunity for participants to begin to apply what we have been discussing. With the above suggestions about providing an overview, and some goals of the proposed project, this set-up should take between 5 and 10 minutes, before individual reading time.

#### Individual Preparation

During individual preparation of this case study, trainers should make themselves available to answer clarifying questions, but otherwise should not intervene in the process.

#### First Small Group Task

Prior to going into the first small group task, it is suggested that the trainer lead a short total group discussion to establish the major facts of the case. It should take no more than 10 minutes before people are formed into small groups and directed to the task included in the case study. As a variation on the task, depending on the composition of the group, other kinds of perspectives can be introduced into the task by the trainer.

#### Reports-Out

According to the design, this will be the second of several formal small group reports out. Trainers should be sensitive to some level of nervousness on the part of reporters, since they will be using some new language and concepts they are not familiar with. It is suggested that during the reports-out, trainer interventions continue to focus on clarifying questions designed to make sure the reports are clear. Stay away from evaluative comments at this point in the design.

### Process Discussion

It is suggested that all discussion and comment on one another's group reports be kept until all of the reports are out. At this point, the trainer may begin a series of open-ended questions such as: "What did group A think of group B's point about vegetables in this country in West Africa?" etc. Once again, the trainers should concentrate on this discussion avoiding evaluation of one another, and focus on clarifying the key points of analysis. At the end of the process discussion, the trainer should move to summary: "So, what would group A recommend at this point?" The trainer may wish to allow a brief caucus so that groups can modify their recommendations and summary points, as a result of the total group discussion of the reports.

### Individual Preparation - Small Group Task

The trainer has the option here: to make it both an individual preparation and a small group task, or to make it merely an individual preparation total group discussion.

As mentioned above, the second section of the case is a series of comments, analyses and recommendations from two consultants. The purpose of this is to enable small groups or individuals, or both, to compare and contrast their analysis with that of the "experts." It should be emphasized in setting up the second part of the case, that the actual consultants used in this real world case only had an hour or two to complete their analysis and submit it. Once again, their's were not "right" analyses, but merely some ways to go about it and conclusions to come to which, for most people, seem reasonable.

### Summary/Wrap-up/Transition

The process discussion here, however the trainer organizes it, should also serve as a summary and wrap-up of the case discussion. The trainer must also be sure to make comments and allow some discussion of where this is all leading to in the forthcoming discussions and case studies.

- o Reference should be made back to the Tanzania case and the effect of policy (AID and Host Country) on this type of project design.
- o References should be made back to the concepts presented in Tuesday's lectures, discussions and exercises.
- o Reference should be made toward the case study to follow (either Puno or Palawan) in which the project design issues will be pursued forward into project implementation, management, and evaluation issues.

## TEAM TASK 2

Write a scope of work for the Project Paper design team. Include:

- 1) Skills to be present on team,
- 2) Team tasks.

TANZANIA: POLICY CHOICES AND DILEMMAS

December, 1982

by

William LeClere

and

Brenda Gardner

Portions of this Case Study are  
Adapted from "The Consumption Effects  
of Agricultural Policies in Tanzania"  
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## TANZANIA: POLICY CHOICES AND DILEMMAS (A)

### Background

Tanzania, a country of some 18 million people, is located on the East Coast of equatorial Africa. The country has been independent since 1961, and its government has been led for 20 years by Julius K. Nyerere, one of Africa's best-known and most widely respected leaders.

More than 90% of the population lives in rural parts of the country, with most of the population concentrated in the coastal regions and highlands surrounding Mt. Kilimanjaro. Nearly half of the GDP is derived from agriculture, and more than 80% of the country's export is derived from agricultural products.

The country is quite diverse geographically, ranging from the highest mountain in Africa, Kilimanjaro in the North, to the Great Rift Valley sweeping through the central lowlands; and with a large highland area in the Southwest adjacent to the Livingstone Mountain range. There are three great lake systems; Lake Victoria on the Northern border with Uganda, Lake Tanganyika in the West, and Lake Nyasa in the South. Rainfall throughout the country is highly variable, and dependent on the Southward monsoons, which bring rain to most of the country between December and February each year.

Tanzania is a single-party state, committed to an ideology of socialist principles in conjunction with retention of traditional African tribal and family values.

The map (Figure I) shows the mainland regions.

Table I shows five indicators of development in Tanzania, in contrast with U.S. statistics; as well as a population pyramid of Tanzanians by age and sex, as of the 1978 census.

### Policy Setting

The main thrust of the development strategy in Tanzania has been toward self-reliance, including the opportunity of acquiring the resources needed for development through trade and borrowing.

The domestic resource base for Tanzania is its land and its people; and agriculture is expected to provide both food for domestic consumption and foreign exchange earnings for acquiring goods and services needed to develop an industrial base. The interaction of agricultural policies with the macroeconomic consequences of industrialization policies has strongly influenced food consumption and nutrition issues in Tanzania.

Tanzania's agricultural policy has not been directed at a trade-off of food versus cash-crops, but rather has been directed at generating more output from agriculture to support industrial development.

In a recent series of informal interviews with senior Tanzanian authorities, and expatriate consultants involved with the formulation and implementation of agricultural and food policies, they were asked to comment on several of the issues dealt with in this case study as follows:

Interviewer: Would you agree with the observation that agricultural and food policy of your government during the seventies was directed at both increasing food supplies for domestic consumption, and at generating more export earnings to support industrial development efforts?

Economist: That's an oversimplification of the issues we were -- are still facing. First of all, you have to keep in mind the overall policy context in which we were working in the past decade. A massive villagization process was actually being implemented during those years, including the movement of large numbers of farmers into new locations. Ujamaa villages were organized to place great emphasis on communal farming; and, that was a major adjustment for many farmers to make. Also, we have had several years of general draught in some regions, which drastically affected our food production capability.

Interviewer: But wasn't all of this accompanied by a major government thrust toward industrialization, largely to be financed by future increases in planned food exports?

Bureaucrat: That was true, at least in part. And there were some mistakes made. But there was always the problem, down at the village level, of grassroots decision-making over whether to grow crops primarily for consumption or for cash. And the disbanding of the earlier cooperative unions in the seventies was not a universally popular, or fully understood decision. There was a lot of uncertainty about how the villagization scheme would work, and how the new marketing mechanisms - the parastatals - would work. But there certainly was the intent, at least, in the various five-year plans, that increased cash crop production would add to our export earnings over the years.

Ministry Official: You also have to keep in mind that we have a lot of major communication (infrastructure) problems in some of our most productive regions, particularly in Ruvum and Rukwa Regions, in the South and West of the country.

Interviewer: But you have had those problems, infrastructure problems, prior to the seventies, and agricultural production was in better shape then. What happened? Have these new policies, villagization and the new parastatal mechanisms, simply not worked?

Expatriate Consultant: It's the "import substitution" philosophy which the World Bank, IMF and others have sold to these countries -- not just Tanzania. By persuading them to invest so much of their limited resources into these industrial schemes and to specific agricultural-consumer sectors; to lessen their dependency on imported products, they have sold their agricultural souls to the industrialization boys.

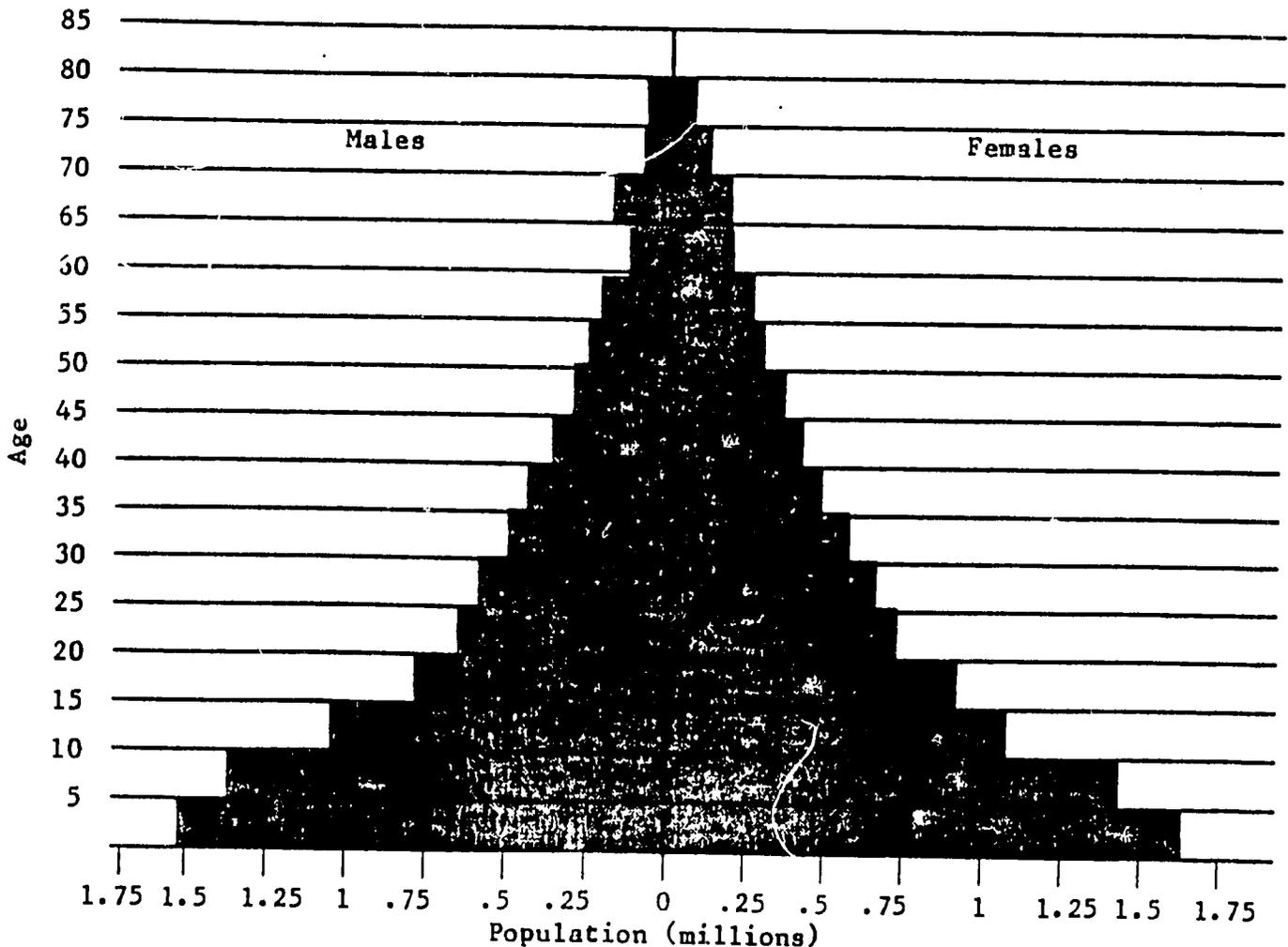
Figure I.



Table I

Life Expectancy (Years)	Tanzania	48	
	U.S.	73	
Infant Death Rate (Per 1,000 Live Births)	Tanzania	152	
	U.S.	13	
G.N.P. Per Capita (Dollars)	Tanzania	230	
	U.S.	9,700	
Income Spread (Ratio)	Tanzania	1:9	
	U.S.	1:20	
Structure of Economy (Percent of Labor Force)	Tanzania	84   6   10	
	U.S.	3   33   64	
	Agriculture	Industry	Services

KEY INDICATORS of development in Tanzania are contrasted with the U.S. statistic. The life expectancy in Tanzania was 48 years in 1977; it was 37 years in 1960. The infant-mortality rate was 152 per 1,000 in 1977; it was 190 per 1,000 in 1960. The G.N.P. per capita was estimated to be \$230 in 1977, which is less than 3 percent of the U.S. figure. The richest twentieth of all Tanzanian households have nine times the post-tax income of the poorest twentieth. In the U.S. the richest twentieth have 20 times the pretax income of the poorest twentieth. The Tanzanian labor force is 84 percent agricultural, 10 percent service and 6 percent industrial.



POPULATION PYRAMID of Tanzania  
breaks down the population of 1978 by age and sex

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Interviewer: And now the piper's being paid?

Economist: Well, he's trying to get paid (laughter) last year, you know, we were in trouble with the World Bank!

### Development Strategy

The Arusha Declaration in 1967 set the tone for development strategies for the country for the seventies. The self-reliant strategy enunciated by Nyerere in that declaration was based on the following principles:

1. The equality and centrality of man, not simply as a means of bringing about development, but as the main target of development.
2. Respect for one another as both producers and consumers.
3. The sharing of resources among all, regardless of specific roles.
4. Work by all and exploitation by none.

### Villagization

In rural areas, this development strategy was initiated through the villagization process, in which farmers were encouraged to join in ujamaa (roughly translated to mean "communal extended family") villages to live and work together, and to achieve greater agricultural productivity. Party guidelines suggested that villages be formed by no fewer than 250 farm families to provide some productive economy of scale and non-capital intensive agricultural methods were encouraged, since labor was one commodity not in short supply in Tanzania.

Between 1968 and 1972, progress was made in implementation of the villagization process, but progress was slow, so in 1972 a goal to organize all farmers in villages by 1976 was set. In 1975 the Tanzanian parliament passed the Village and Ujamaa Act giving legal status to the villages and making them the primary unit of development. Villages were encouraged to register as multipurpose cooperatives, and they became eligible for government loans, access to extension services, and other inputs designed to increase agricultural productivity and social well-being.

Communal farming, which at first was encouraged, became a necessary function for each village in order to remain eligible for various forms of government assistance. Farmers also continued to cultivate their own private plots for family sustenance.

By the end of the decade, more than 8,000 villages had been organized and more than 95% of the rural population were living in villages. By that time, the average village had 400 families living in it.

## Decentralization

Simultaneously, the government decided to decentralize its bureaucratic support structure, to provide more grassroots support to the villagization process. This part of the strategy was intended to move decision-making and planning out of Dar es Salaam, and to organize it closer to the people.

Decentralization was intended to give regional authorities more autonomy to decide on their own development plans within the general context of national policies and guidelines.

## Industrial Development

The industrial development of Tanzania also picked up on the self-reliant theme of the Arusha Declaration, with strong emphasis on aggressive, centralized direction of the development effort. By 1974 the previously private (more than 90% value-added in 1967) manufacturing sector had become predominantly public (more than 50% of a larger value-added) sector. Assets of private enterprises were taken over through government compensation of the owners. More than 90% of investment in new industrial enterprises since 1974 has been by public funds.

The industrial development strategy has three articulated, long range goals:

- o the substitution of domestically-produced consumer goods for imported ones;
- o the support of these industries by the building of primary tool and machine-manufacturing industries;
- o the development of the country's mineral resources as the foundation of its industrial base.

Some progress has been recorded in achieving these industrial development goals in that the share of GNP credited to industry has risen from 5% in 1962 to 10% in 1977. Much of the industrial investment has been in the manufacture of footwear, textiles, food processing, beverage, tobacco and furniture for domestic consumption.

Major surveys of mineral resources have been completed, and significant coal, uranium and other precious metal reserves have been located and documented. In the past several years natural gas-producing sites have been confirmed offshore in the Indian Ocean.

## Rise of Parastatals

In an effort to streamline the marketing and distribution of agricultural products, the emergence of large, centralized parastatal organizations began with formation of the National Milling Corporation in

1968, as the major manufacturer and processor of agricultural products. Prior to 1976, the primary market for agricultural produce was a network of regional and district level cooperative unions, who established prices and bought from villages and farmers, delivered and stored in cooperative godowns, and in turn sold to the National Milling Corporation (NMC) and other parastatal authorities being established in the seventies.

In 1975, NMC's role was expanded to include the procurement, transport and storage of all grains and staples, and in 1976 it became responsible for direct acquisition of crops from villages with the abolition of the cooperative unions. Also in 1976, the entire marketing function of other crops was turned over to parastatal crop authorities, in an effort to reverse the trend of rising marketing costs by streamlining the marketing services provided to farmers.

For an overview of the major officially marketed agricultural products by region of the country, see Figure II.

### Pricing of Export Crops

In considering what crops to plant, the Tanzanian farmer is influenced by pricing policies, in this instance, controlled by large parastatals such as NMC or the various parastatal crop authorities which establish and announce official prices in July of each year.

In general, official price recommendations for export crops are based on import parity pricing, calculated by subtracting unit marketing costs from world market prices expected to prevail in the forthcoming year. The assumption is that rising world market prices will lead to increased remuneration for farmers, and to reallocation of land, labor and capital to those crops for which market prospects are most favorable.

In Tanzania the Market Development Bureau in the Ministry of Agriculture recommends food crop prices based on export parity to the Economic Committee of the Cabinet, which alters the proposals considering long-term food security, foreign exchange generation, and rural income distribution issues.

Tables II and III show some comparative data with regard to producer prices to Tanzanian farmers on some of the most important export crops in the country.

Governmental policies affecting household production and consumption decision include export taxes and restrictions on private trade and transport of certain crops, imposition of official producer and retail prices, tariff levels and quotas on imports and provision of public services. Overall governmental economic policies also have a profound effect on producer and consumer behavior.

Figure II

Major Marketed Agricultural Products by Region



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Table II Percentage Changes in Producer Prices and  
Unit Export Values, 1970 to 1979

Crop	Producer Price*	Unit Export Value*
Cashew	80	256
Cotton	117	228
Tobacco	71	158
Pyrethrum	63	97
Tea	139	84

\*Using nominal prices.

Table III Ratio of Producer Price to World Market Price\*

Crop	1970-71	1978-79	Percentage Change
Cashew	.695	.352	-49.4
Cotton	.260	.172	-33.8
Tobacco	.654	.413	-36.9
Pyrethrum	.022	.018	-18.2
Tea	.076	.098	+28.9

\*Producer prices are for buying season (July-June). The world prices are for the calendar year.

Source: Ellis, Effects of Agricultural Pricing Policy, 1970-79.

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## Macroeconomic Issues

Tanzania has followed a fixed rate policy since the Tanzanian shilling was issued in 1966. Some minor changes in the values were made by altering the gold content; devaluation occurred in 1975 and 1979, but since 1975 a period of managed floating has existed. The explicit policy has been to adhere to fixed official exchange rates.

The pattern of exchange rates is influenced by many factors, including inflation worldwide, sudden drops in export revenues, tight import controls, fear of nationalization, and neighboring countries political and military disturbances.

Over-valuation of the Tanzanian shilling, relative to the currency of its major trading partners, has encouraged producers to switch resources to the production of non-tradables and consumers to demand more traded goods. This imbalance has resulted in Tanzania taking its export sector and stringent restrictions on imports. Producers seeking to evade the increasing export tax have shifted resources to other activities.

Growth in the government sector doubled in real terms in the seventies. Much of this growth was financed by increasingly large fiscal deficits, requiring borrowing from the Central Bank. Between 1978 and 1979 the money supply rose by 53%, further acting as a tax to release real goods and services from households to the government sector. Government holdings on international reserves are now less than a fifth of their real level in the sixties. Although the growth in fiscal deficits and international borrowing was to provide resources for parastatals and other government services to support the agricultural/production sector, the tax resulting removed more resources from agriculture than it provided in government services.

The same group of officials and expatriates was asked to discuss the current exchange rate policy and other macroeconomic policies of the government

Interviewer: Isn't a major devaluation of the Tanzanian shilling in order, or even long overdue, in order to return some stability to the economic marketplace in the country?

Economist: That's exactly what has been at the heart of the argument with the IMF in recent years. Our government has taken the position that it is a matter of national sovereignty -- national pride if you will -- to keep control over our own economic destiny.

Interviewer: But isn't the reality that, this situation is wreaking havoc with your agricultural production and distribution policies?

Bureaucrat: Not necessarily -- of course there are problems -- but overall agricultural production is remaining up. And while we still have some problems in pricing policy, there have been increases in official prices in recent years, and that should lead to increased production.

Interviewer: But aren't most of the unofficial prices for grains and other foodstuffs moving faster than official prices, and won't that actually cause the amount of food crops reaching official markets to fall?

Ministry Official: That's been a problem, and of course transport has been a real problem this year in getting the crops out of some of the regions. But I think that with the move toward greater local government control, and the new cooperative legislation, which will reconstitute the cooperative unions much like we had them in the sixties, we are definitely in for a jump in production in the next few years.

Interviewer: If you think about the Tanzanian farm family as a consumer-unit, rather than just a producer-unit, how have all of these policies affected them? Are they better off than they were ten years ago?

Expatriate Consultant: I don't think there is enough reliable information available to answer that question. There was a household budget survey done in 1976/77 comparable to a similar survey done in 1969. But it hasn't seen the light of day, and I would be surprised if it ever did. I think it is politically not a --.

Economist: Now wait a minute -- I know about that survey and it will see the light of day. There have been difficulties with the analysis of the data, but it will come out, probably later this year. To answer your question, I think some people are better off than they were ten years ago, and some people are worse off. But I think that is true in almost any country, under almost any system.

I think we've made some solid accomplishments in the rural sector during the seventies, and I think that sometimes we fail to stop and acknowledge them. It is true, and this is particularly so in certain regions, that there are shortages of certain commodities in rural areas. Paper products, soap, and cooking oil are particularly in short supply. But on the other hand, we do not have starvation in our village, and whatever its shortcomings, we have accomplished a national village organization program in which more than sixteen million people have been organized into a planned, national network of agriculturally productive units. And, we have made great progress in improving the overall quality of life in those villages, including roads, housing, improved water supply, health programs, and so forth.

Ministry Official: And in the urban areas, we have very little serious food shortages, except for certain vital commodities such as beer (laughter) we have no serious food problems in the cities and regional center towns.

Interviewer: But isn't the farmer in Tanzania caught in what we refer to as a "Catch 22" in the States? If he grows cash crops to help out with export earnings, he will have to buy foodstuffs for his family at a higher price on the unofficial market, right?

Bureaucrat: No, but most of them still maintain family plots, for their own family food supplies, so they don't have to go to the unofficial market for their own food supplies.

Interviewer: So then, you get caught in the "Catch-22" as far as official government policy is concerned, because then they will spend more energy on their family plots for personal food supply, and less energy on the village, communal plots, where most of the cash/export crops are grown, right?

Ministry Official: I think we can do both. You keep presenting it as an "either"/"or" proposition, and I do not think that is so. I think we can produce agriculturally for both the family food needs and our national cash/crop-export needs. But in a way, our friend here is correct -- we do not have the information we need to answer your question. The household survey information will help. But, right now we really don't know as much as we would like to know about how the consumer -- particularly the farm-family consumer unit -- is doing; given the past ten years of agricultural and food policies.

### Food Policy Issues

The apparent impact of these policies is that farmers in Tanzania are being induced to plant food crops first, and then are allocating resources to cash cropping and other productive activities. This is sometimes described as a "food first" strategy. This, however, was not an explicit goal of the country's overall development strategy. In per capita terms, it is resulting in less production for export, and in food crops being produced at higher real resource costs since more labor and land are being used to meet farmer's consumer food needs.

There has been continued government support for extension services through the Ministry of Agriculture. The National Maize Program has sought to bring together improved agronomic practices, purchased inputs and extension support to increase maize production. In some regions, with uncertain weather, it has been reported that increases in production have not been sufficient to recover the cost of purchased inputs.

In areas with better climate and soils, some production improvement can be attributed to the National Maize Program, perhaps in combination with the provision of a guaranteed market for all grain productions.

The Tanzanian Rural Development Bank has sought to provide inputs on credit to Tanzanian Farmers. In some regions farmers are only provided inputs on credit for cash crops, when they wished to use them on other crops. In addition, farmers have been unable to buy inputs with cash savings, and not all qualify for loans. Furthermore, massive parastatal borrowing has crowded TRDB-farmer loans out of the limited money supply available.

## Food Security

Variations in rainfall are often cited as major causes of instability in Tanzanian food supplies. It is true that many regions experience years of low rainfall serious enough to have negative impact on crop production. But it does not appear that weather alone causes instability and food insecurity. The way the agricultural markets react to production downturns seems to exacerbate the fluctuations in supplies reaching different segments of the people.

In many countries, farm families that produce their own food can stabilize their food security by saving surpluses from good years in the form of assets and converting these assets to food in bad years. In Tanzania, this is often not a viable option because of the unreliability of grain markets in rural areas. Furthermore, cash is not a good store of value due to inflation, and other durable goods which might be used as stores of wealth are in short supply.

So, when output declines in rural areas, farm families reduce the marketed surplus, making volumes of food reaching markets more variable than actual food production. Also, Tanzania's unofficial market, which is unconstrained, competes more successfully for available supplies in bad production years. All of this causes further reduction of official markets. Since the government is concerned with the urban consumer, this causes the government to be forced to draw down on reserves, and to increase imports.

## Markets

The great majority of grain production in Tanzania is, and always has been, consumed by the producing household. Various studies in efforts to determine what percentage of grains reach the official market make it reasonable to conclude approximately 20 percent is distributed officially.

The National Milling Corporation is the official market in Tanzania for grains. The performance of NMC as a parastatal has been hindered by policies and practices.

The Act establishing NMC specifically directs it to act as a commercial, business-like operation. However, in actual practice, the parastatal has been called upon several times to serve as a means of government distribution and redistribution of income; including implementation of a maize flour subsidy, a transportation subsidy, and the requirement that it purchase all stock offered for sale; and in other areas of activity, such as to provide food to the army during the Uganda war and subsequent food aid to Uganda after the war. All have served to weaken the financial viability of the organization.

As a matter of internal policy, NMC has adopted a strategy of crop procurement at the earliest possible time after the growing season, due to the lack of storage facilities in many villages. This has led to enormous expansion of NMC's overhead base, confusion and expense around transportation, and substantially increased staffing levels.

A second matter of internal policy is the organization's policy of paying villages in advance of crop collection, based on the village's prior estimate of production.

The cumulative result of these policies has been a 2 billion Tsh overdraft since 1976.

### The Legal Monopsony

It is illegal to sell more than small amounts of grain to buyers other than NMC. Yet in most parts of the country, for most parts of the year, the NMC price is lower than that offered by unofficial markets. Legal enforcement of this policy varies from region to region, adding further confusion to the impact of this legal monopsony. In many cases communal production is sold to the NMC to raise village revenues, while production from private plots is sold unofficially.

By making unofficial transactions illegal, the policy has also had the effect of raising the risk of dealing unofficially causing both farmers and middlemen to charge higher prices to hedge against their legal risks.

### Price-setting Process

As mentioned earlier, the technical analysis supporting all government-controlled agricultural pricing is conducted by the Marketing Development Bureau (MDB) of the Ministry of Agriculture. In general, these recommendations are based on import parity. Over the past 15 years, Tanzania has been a net importer of food in two of every three years. The average net annual imports in deficit years has been 83,000 tons, while average annual net exports in surplus years have been 20,000 tons.

Based on performance during the seventies, there appears to be an unstated but binding policy that official prices cannot be lowered. This policy hampers MDB's ability to set prices which will encourage the production of different crops at economically optimal levels, based on supply and demand considerations.

In addition, given the present system whereby producer prices for the coming season are announced in July there is no way of revising prices during the growing season. So in a year of poor harvest, with the producers consuming more of their products, the smaller amount of available marketable sales drive up unofficial prices. The affect of these practices is to further lessen the food available through official markets, increasing the importance of unofficial markets in meeting consumer needs.

### Production of Preferred Staples

Tanzanians have shown a long-term preference for maize, rice and wheat over such crops as sorghum, millet, and cassava. During the seventies domestic production of these grains for the official market has been insufficient for demand, and substantial quantities of these crops have been imported.

Maize is the most important foodstuff in Tanzania. Maize demand has grown throughout the country, but official maize production has been increasingly concentrated in a few productive regions.

Rice is preferred (and more expensive) to maize in Tanzania's urban areas. NMC sales have consisted of roughly equal parts domestic purchases and imports. Wheat is also much more expensive than maize and is popular with urban residents. Most rice and wheat production in the heavy producer regions come from large and relatively highly mechanized National Agriculture and Food Corporation farms.

### Production of Drought-resistant Staples

Much of Tanzania, particularly the central regions, is susceptible to drought. Throughout the seventies, government policies were designed to mitigate the potential effects of drought on national food security, by promoting the cultivation of drought-resistant staples: cassava, sorghum, and millets.

The cultivation of drought-resistant staples have been encouraged through guaranteed markets, increased producer prices and public information campaigns. In the period 1974-5 to 1977-8 real prices for cassava rose by 29 percent, for sorghum bulrush millet by 41 percent, and for finger millet by 182 percent, as shown in Table IV. Subsequent to these rapid increases, nominal producer prices were held constant from 1978 through the current seasons. Thus the real prices for all these crops have returned to the levels which existed at the time of the mid-decade drought years. Tanzanian farmers responded predictably, as shown in Figure III.

Therefore, it can be assumed that the policy of promoting drought-resistant staples succeeded in getting farmers to plant more of them, however it cannot be assumed that consumption of them increased. The seasons in which production increased most dramatically were also good growing seasons for the more preferred staples. Also, in some regions with more reliable rainfall, NMC purchases of these staples, when promoted, were largely raised as cash crops, placing them in direct competition with traditional export crops (coffee, tea, and tobacco) and preferred food crops (maize and rice and wheat).

The National Milling Corporation was therefore forced to export the resulting surpluses at a loss in the 1978-9 marketing year.

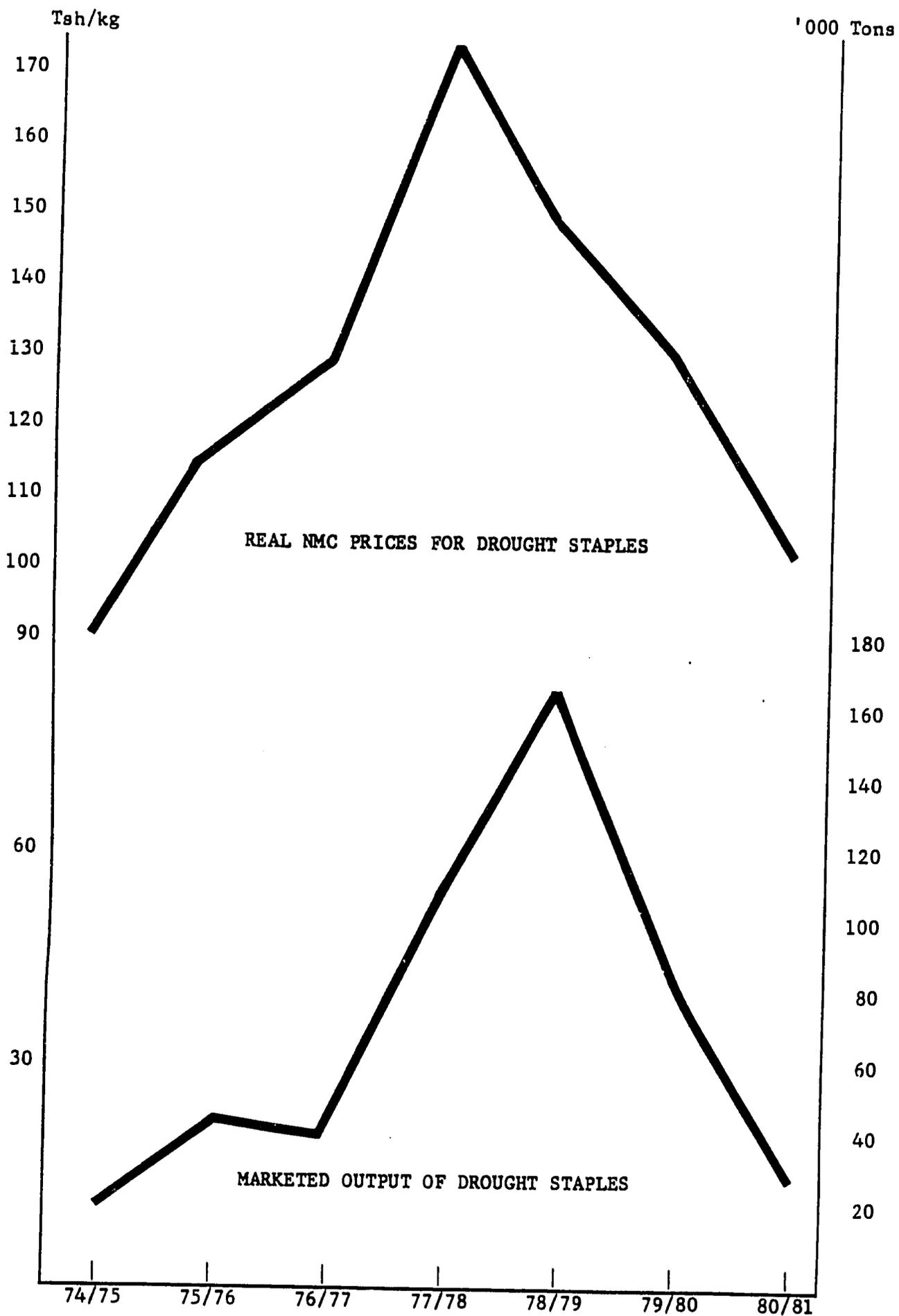
Table IV Real Producer Prices for Food Grains  
(1980 = 100)

Crop	70/71	71/72	72/73	73/74	74/75	75/76	76/77	77/78	78/79	79/80	80/81	81/82
Maize	85	72	68	70	90	125/134	127	119	102	106	96	105
Paddy	189	155	145	121	117	167	159	168	144	159	167	175
Wheat	186	170	148	121	138	167	190	175	150	143	158	167
Wt. Avg. Pref. Shgs.	114	99	91	85	101	144	141	134	115	120	116	124
Sorghum	-	-	78	107	99	125	143	140	120	106	96	88
B-Millet	-	-	78	107	99	125	143	140	120	106	96	88
F-Millet	-	-	-	-	99	134/142	151	279	240	212	144	131
Cassava I	-	-	-	66	65	67	79	84	78	69	62	61
Cassava II	-	-	-	62	61	63	63	70	60	53	48	44
Wt. Avg. Dr. Staples	-	-	-	-	90	115	129	172	148	130	100	95

Source: MDB

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Figure III  
 Real Producer Prices and NMC Purchases of Drought Staples, 1974/75-1980/81



Source: Sigma One Corp.

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## Pan-Territorial Pricing

Before 1974 the into-store prices at regional go-downs were the same for all officially marketed crops, but producer prices from region to region varied, mostly dependent on transportation costs. Pan-territorial pricing was introduced to minimize the differences in returns to farmers in remote regions. This policy was introduced to equalize income differentials between farmers living in different regions, and to increase national agricultural output by stimulating production in remote regions through price incentives.

The policy has had its most noticeable affect in two remote regions, with stable rainfall and good soil conditions. Rukwa and Ruvuma have become two major maize-surplus regions since introduction of pan-territorial policy, along with a guarantee to purchase all available maize. In 1980 and 1981, the transportation costs procuring the maize grown in these two regions was 40 million Tsh, against NMC sales of this maize for 36 million Tsh. The major demand for maize from official markets is in the opposite end of the country from Rukwa and Ruvuma.

It should be noted that farmers in remote regions, such as Rukwa and Ruvuma, have fewer alternative (unofficial) markets to access, than some of the more centrally located regions with access to urban markets. As a result, the remotely located regions seem more responsive to official market incentives than other regions in the country.

The 1982-1983 consumer prices announced in July of 1981 will re-introduce a form of regional price differentiation. The new system will pay bonuses to growers of maize, paddy rice, millets, sorghum and cassava in those areas which are agronomically better suited for the production of these crops. This policy seems to reflect a food security concern, repromoting drought-resistant crops and maize (including Rukwa and Ruvuma). It does not include regional price differentiation for export crops.

## Unofficial Markets for Grain

Unofficial markets exist because official markets for grain in Tanzania are unable to equilibrate the supply and demand for grain for large segments of the population. Many farmers are unwilling to produce grain for the official price; others cannot easily sell on official markets because of poor access to NMC buying due to the parastatal's logistic constraints. Because NMC's sales are limited by low levels of purchases, and because NMC grain is largely sold in a few urban areas, many consumers are unable to meet food requirements through the parastatal. The unofficial agricultural markets which communicate demand to farmers and supply consumers with essential food commodities are a large and essential part of the food system in Tanzania.

## Urban Food Needs and the Necessity for Unofficial Markets

The preferred grains which NMC sells are cheaper than those sold on unofficial markets. In the case of maize, there is a direct subsidy; from January 1980 until July 1981 sembe sold for Tsh 1.25 per kilo while costing NMC 3.80; the consumer price is currently Tsh 2.50 with rice and wheat flour selling for Tsh 5.35 and 5.65, respectively. All these prices are well below unofficial market prices, and all are subsidized by the country at large through financing of NMC's operating deficit.

Residents of different regions who are dependent on market purchases for their basic food supply have differential levels of access to NMC sales. The NMC allocates grain to the regions. However, once that central allocation decision has been made, individual Regional Trading Corporations (RTCs) decide where and when to sell. The RTCs receive little remuneration for transporting grains for sale to rural areas, and the residents of district and regional centers are more able to make the RTCs aware of their food demands.

## Functioning of Parallel Markets

When residents of rural areas buy grain, they ordinarily do so directly from local farmers. The most important determinant of availability and price is the level of production in the area. These rural consumers may exchange cash or goods produced from other economic activities for their food, or they may be forced onto the market because of their own poor harvests.

Maize is still the staple food of most urban dwellers, and cassava is also commonly brought to the larger towns. Much of the flow of grains into district, and even regional centers, is done in a small-scale, informal way. The expense of transportation, however, forces this trade to use vehicles and fuels efficiently. Many cars and trucks on other business carry a sack or two of grain as well. There are enough farmers with reason to go to town and enough town residents with friends or relatives in peripheral areas to account for a large part of this trade. Middlemen and their access to transportation become important in two kinds of grain markets: those that involve major one-way flows from one region to another, and those that involve illegal exports.

For example, Mwanza is a city with a fast-growing population dependent on sources other than the NMC for the majority of its food supply. In the months preceding the 1980-81 harvest a considerable portion of Mwanza's demand has been met by illegally transported and sold maize from Arusha. Enterprising individuals established unofficial marketing networks to realize the best possible returns from available surpluses. Trucks and petrol had to be acquired for this purpose. Even at the high parallel market cost of transport, it pays individual traders to make the trip west to Mwanza and other areas. The fact that NMC purchases in Arusha have declined drastically in the past two years while harvests have not suffered as badly attests to this (Table V).

Table V. NMC Purchases of Maize from Arusha, 1977/78 - 1981/82

Year	Volume (1000 Tons)
1977/78	60.3
1978/79	69.5
1979/80	47.4
1980/81	17.4
1981/82*	11.8*

\* Estimated  
Source: NMC

Grains are exported illegally from border regions to Zambia, Kenya, Rwanda, and Burundi. High parallel market exchange rates and shortages of consumer and capital goods are a major impetus to this trade. A trader who sells maize over the border can get Tsh 2.5 to Tsh 3.5 for each Kenyan shilling he brings back into the country even though the two currencies are officially almost at par with each other. The trader can also purchase cloth, batteries, or a number of other items which are scarce in Tanzania.

#### Consumption Effects

Policies affecting agriculture as a whole, and those which influence the buying and selling of agricultural products, have influenced the ability to Tanzanians in different socioeconomic circumstances to maintain adequate food intake.

Given the wide disparity between the official and parallel prices of major food grains, the availability of NMC supplies has been a crucial determinant of food consumption in urban areas. Consumption levels over the past seven years have probably been higher and more stable in Dar es Salaam and other cities which have consistently received these supplies than in those areas which have not. About 45 percent of the urban population lives in regions where the NMC provided less than half of urban food needs. Residents of Dar es Salaam have probably been able to maintain their calorie consumption over this period. The official price of sembe was at, or below Tsh 1.75 per kiloe until June, 1981, making it possible for a family of four to purchase 15 kg. per person per month for Tsh 105 per month. From January 1980 until June 1981, the NMC sold sembe for Tsh 1.25 per kilo, allowing the same family to meet basic food requirements for only Tsh 75 per month. If the head of household received a minimum wage of Tsh 480 per month in 1980, the family's grain supply represented only 16 percent of total income.

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Table VI shows the percentage of the urban workers' income necessary to purchase 60 kg. of maize per month at parallel market prices. The prices used for 1980 and 1982 reflect an average across the country and time of year; further, the prices are for unmilled maize which still requires family labor or hired milling services before it can be consumed. The 1978 price is fairly low, reflecting that grain was much more affordable in years of good harvests than bad. The results highlight the differences in purchasing power over food which are caused by differences in access to markets. If NMC supplies are available, between 16 and 26 percent of income is necessary; without NMC supplies 30 to 50 percent of income is required.

Table VI. Cost for Cereal in Urban Areas (based on 15 kg of sembe per person per month and a family of four with one wage earner)

Tsh	1978		1980		1982	
	Official	Parallel	Official	Parallel	Official	Parallel
Sembe Price	1.75	2.00	1.25	4.00	2.50	5.00
Monthly Cost	105	120	75	240	150	300
Income	400	400	480	480	600	600
Income Percentage to Grain	26	30	16	50	25	50

The urban middle class has probably maintained its level of food consumption over the past decade, buying both from the NMC and on parallel markets. It is likely that this segment of the population had preferred access to NMC stocks of rice and wheat, either through government allotments or special influence.

#### Consumption Levels in Rural Areas

In years of normal and good harvests, rural Tanzanians who produce substantially all of their own food have probably maintained their food consumption levels while reducing their consumption of non-agricultural goods and services. In times of poor harvests, these people have probably reduced their consumption because it was difficult to store previous surpluses in the form of assets, and to convert these assets to food on the markets to which they had access.

Rural people dependent on markets for part or all of their grain requirements, who rarely are able to buy NMC grain, have probably decreased their consumption due to the high prices and unreliability of unofficial markets. This group includes those growing primarily cash crops and workers on estates. It is also true for villages that have diversified away from

crop production. Households in these conditions represent at least 10 percent of the population of Tanzania. Many individuals have reacted to this situation by making food crops their primary economic activity, thus reducing their dependence on food markets. This has further reduced export crop production and diversification of the rural economy, and forced the rural majority to dedicate the bulk of their human and material resources to securing food supplies. This has impeded the course of rural development as conceived in the Arusha Declaration.

### Nutritional Status

There is some evidence of the nutritional status of rural Tanzanians from food consumption and nutrition studies conducted in the past six years. These studies have been concentrated in the central areas of the country, and most are more focused on anthropometry (weight and height relative to age) than direct food consumption. They are presented here to highlight an important finding -- families which produce their own food are better able to feed themselves than families who depend on exchanging cash or services for food on the market.

One study examined food consumption behavior in four Iringa villages in 1979. One village was an Ujamaa village with diversified production; one a village specializing in maize with high production; one village primarily supplied labor to nearby tea estates in return for cash; the fourth village produced onions for cash and, in times of crop failure, had come to depend on food aid for survival. All the villages were well below FAO standards for calorie consumption. The village which was the highest in consumption of calories was the one highly dependent on food aid; 51 percent of total calories in April/May (pre-harvest) and 29 percent in October (when only reserve stocks of aid remained) came from imported soy fortified sorghum grits. Calorie consumption as a percent of recommendations decreased from 79 percent to 70 percent as the food aid was phased out. Mean calorie adequacy in the maize producing village improved from 56 percent in the pre-harvest period to 81 percent post-harvest; in both periods between 60 and 70 percent of calories were from maize. Calorie intake improved slightly after harvest from 62 percent to 68 percent of standard in the village with diversified production, where around 80 percent of total calories came from maize. The village which supplied labor to the tea estates had the lowest average calorie consumption -- 49 percent of standard in the first period and 44 percent in the second -- of any of the villages. Seventy percent of total calories in that village came from maize.

One trend which emerges is that maize was the staple for all villages unless food aid was available; in that village the 21 percent decrease in calories from decreased aid was compensated for by a 20 percent increase in share of calories for maize. There was no evidence of substitution of "inferior" millet or sorghum grain as a staple in families with low food consumption. The more frequently families in the study consumed maize, the larger the quantity consumed per meal.

Another finding concerns the status of non-food producing villages relative to those which were self-sufficient. One village dependent on cash income was very badly off in terms of consumption, and the other was almost completely dependent on aid. Where the primary economic activity was food crop production, people were better able to provide for themselves. In the village which combined food production with other economic activities, calorie consumption was somewhat lower than where maize production was predominant. In both of the villages which produced maize, it was consumed at more than 90 percent of all meals. About 20 percent more per meal was consumed in the period after the harvest than preceding, suggesting that storage was difficult.

Anthropometric examination of children found that the labor-supplying village and the village with diversified production had the highest incidence of malnutrition. This correlates with the low-calorie consumption of these villages.

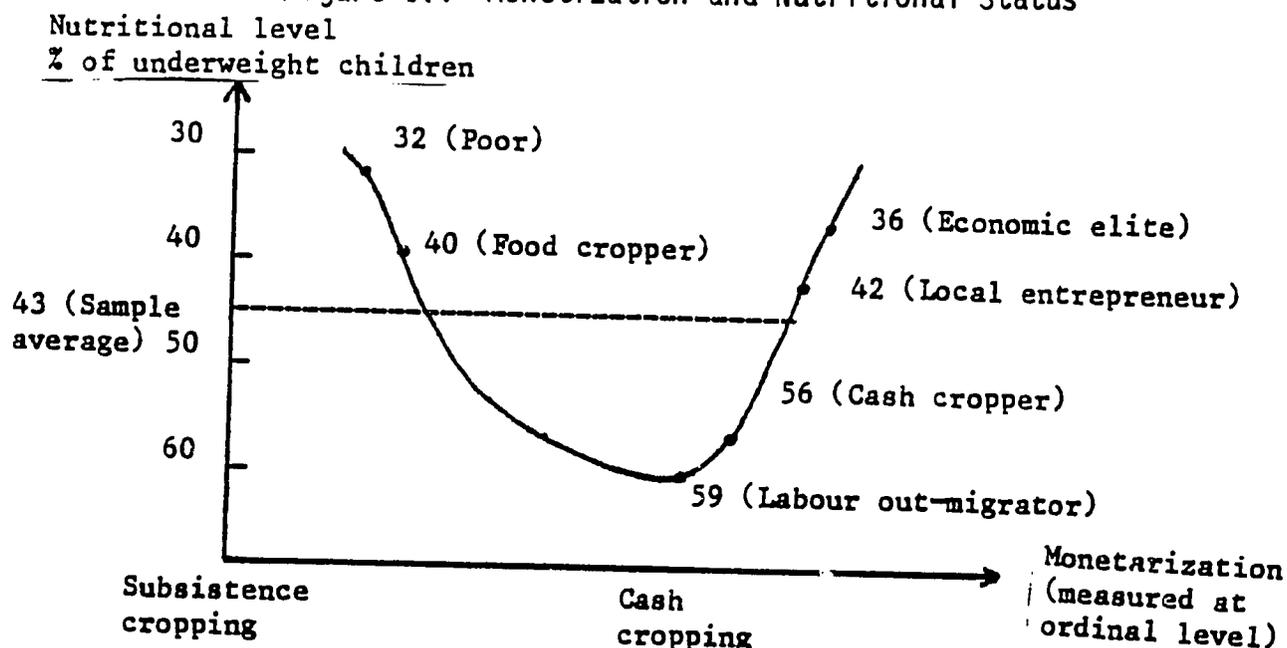
In the maize-producing village and the aid-dependent village income had no effect on calorie adequacy. In the other two villages, increased cash income from sources other than food sales did correlate with improved adequacy. Again, those oriented more towards cash production did not fare as well as those producing their own grains, although income seems to have made some marginal difference.

A study of a village in Morogoro was carried out in January, 1977. The village produced maize as its primary economic activity, and the anthropometric status of children under five years was quite good. Over 95 percent were above 80 percent of the standard in terms of weight-for-height, and more than two-thirds were above 90 percent of the standard. Classification by Gomez (weight-for-age) was somewhat lower; only 57 percent were above 80 percent of the standard and only 28 percent above 90 percent of the standard. Only 14 percent of the children were below 70 percent of the standard for weight-for-age. Ninety-five percent of the families in the village cultivated their own maize. There does not seem to be a significant correlation between size of harvest and anthropometric status. About 42 percent of the families produced some cotton as well, but there was no correlation between cash-crop production and nutritional status. There was a correlation between crop failure and malnutrition, although it was not very strong. There was also a weak correlation between increasing cash income and improved anthropometric status. Overall, the study found that in a village where people are largely growing their own staples, anthropometric status was fairly good even six months after the harvest.

A study of the nutritional status of children under five years in several villages in the Southern Highlands was also carried out in 1977. Malnutrition was measured anthropometrically and related to socioeconomic variables of the children's families. The study took place in an area where cash production was increasing; pyrethrum had displaced food crops on some land. A very strong correlation was found between the percentage of cash in

the family's income and malnourished children; except for the economic elite, the children of subsistence farmers and those who raise food crops were better off (anthropometrically) by a substantial margin than children of cash crop producers or labor migrators (see Figure IV.)

Figure IV. Monetization and Nutritional Status



In another survey of a village, cassava was the main staple but production was inadequate to meet food needs. The villagers purchased additional food with cash income, 75 percent of which was derived from charcoal production. Maize, rice, and beans were the foods commonly purchased. Anthropometric status of children was low in this village; 60 percent of children under five years were below 80 percent of the standard for weight-for-age.

The above studies are by no means a representative sample; they are extremely limited in area and time. They do, however, tend to confirm a conclusion from the preceding section; rural families which produce their own staple foods are retaining significant quantities for their own consumption. Families oriented toward cash-producing activities in all of these studies tend to have poorer nutritional status, measured both in calorie consumption and anthropometry.

The long-term trend toward preference for maize has continued in rural as well as urban Tanzania. The past decade has also seen a sharp increase in reliance on cassava in most areas of the country. This has been primarily due to peoples' perceptions of the necessity of keeping their own famine reserve. In urban areas, preferences for rice and wheat have continued to develop, although much of the supply must be imported. While most of the rice and substantially all of the wheat which have been imported have been aid or concessionary sales; continued demand for these commodities will place a strain on domestic production resources unless the aid continues.

### Small Group Task (A)

If the Government of Tanzania turned to you in the Mission and asked for your overall advice, from a policy point-of-view, what would be your team's response? Specifically:

1. What macroeconomic policy adjustments would you recommend, from the point-of-view of improving the balance of payments situation in the country?
2. What internal pricing and market policy changes would you recommend, to achieve a better balance between agricultural production concerns and consumption/nutrition concerns?
3. In your overall policy recommendations, what particular issues would you suggest the Tanzanian government pay particular attention to in order to improve the nutritional position of the rural Tanzanian farm family?

During your team's considerations, you must keep in mind the sensitivity of the Tanzanian government toward such issues as self-reliance, in the way they think about the development process.

## Introduction

The Tanzanian Structural Adjustment Program is designed to address the major macro-economic and structural constraints affecting the economy. The program therefore is to be set out in two parts. The macro-economic section puts forth measures that are intended to strike a better balance in the economy, to reduce inflationary pressure and provide the environment in which the balance of payments situation can be improved. The second part of the program consists of a package of sectoral programs (still being defined) and steps to ensure improved sectoral level implementation and performance. The two parts of the program are interlinked and interdependent since improved sectoral performance requires good overall macro-economic performance while long-term improvement in macro-level variables are dependent upon efficiently producing sectors. This case reports the current status of the first part of this two-part program.

The general strategy in the Structural Adjustment Program is to slow the rate of growth of capital investment and try to consolidate the gains made over the past decade.

The document has a macro-economic orientation and is a statement of what is to be achieved. The development of the sectoral action plans will put flesh on the program. The Structural Adjustment Program was prepared by the Ministry of Planning, with input from other ministries.

On the budget side the Program's objectives are to stop growth of deficit. This will require a more rapid growth in revenue than has occurred in the past and a reduced rate of growth in expenditure. Major sources of revenue have been customs duty, income tax, sales and excise taxes and export taxes. Of these, sales and excise taxes are most important, accounting for 58% of revenue in 1981/82. The TSh. 5.1 billion revenue from this source is made up of 60% beer and cigarette taxes (TSh. 3.1 billion) and 40% from other products. The beer and cigarette component cannot be easily increased as these goods are heavily taxed already so further tax increases are unlikely and the industry is operation at close to capacity so large sales increases cannot be expected. The Government is, in fact, assuming a large increase in sales and excise tax revenue from the non-beer and cigarette items. This increased revenue is to be TSh. 700 million in 82/83 and TSh. 2 billion in 83/84. This would increase revenue from this tax category to TSh. 5.8 billion in 82/83 and TSh. 7.1 billion in 83/84. A crucial utilization in non-beer and cigarette industries is presently quite low, probably 35-40% and that this low utilization is due to lack of foreign exchange to purchase the necessary spare parts and raw materials for these plants, accomplishment of this revenue increase will require a substantial reordering of foreign exchange allocation priorities. The Structural Adjustment Program does not, at present, put a quantitative estimate of the magnitude of this reallocation and whether it is consistent with overall priorities and foreign exchange availabilities.

The increase in imports implied by the increased capacity utilization should also serve to increase the revenue derived from customs which would further augment the revenue anticipated. The assumption about capacity utilization seems critical to successful implementation of the Structural Adjustment Program.

On the expenditure side, it is anticipated the government will hold recurrent expenditure for 82/83 to the budgeted level of TSh. 14.1 billion. In the Structural Adjustment Program this level was estimated to be an 11.8% increase over 81/82 recurrent expenditures that were listed at TSh. 12.6 billion. Recent figures indicate the 81/82 recurrent expenditure totaled TSh. 13.7 billion, or an over-expenditure of TSh. 1.1 billion from the Structural Adjustment Program estimate. The result is that the 82/83 recurrent expenditure is only 3% over the 81/82 level rather than 11.8%. With the current and projected rate of inflation in Tanzania (30% or more) it will be difficult for the Government to hold recurrent expenditure to a 3% increase. This, in turn, will mean the borrowing limit of TSh. 4.4 billion will also be breached as the Government will be forced to cover the deficit. For the past two years the money supply has increased by 26.5% and 27.7% versus a targeted increase of 18.5% and 20%. For 1982/83 a 20% rate of growth is projected.

While recurrent expenditures in Tanzania typically overrun the budgeted levels, development expenditures have been reduced from TSh. 6.5 billion to TSh. 4.8 billion, a level of expenditure that seems attainable as 1981/82 development expenditures were TSh. 5 billion.

The objective of the Balance of Payments component of the Structural Adjustment Program is to expand export earnings sufficiently by the end of the program such that import requirements can be covered without the need for exceptional financing measures. Also, over the three years of the program it is intended to pay off areas in import payments.

Part of the Balance of Payment problem is the structure of imports in Tanzania. As part of its Basic Industrial Strategy developed in the early seventies to rapidly diversify the economy, the Government made a decision to rapidly expand its industrial base by a program of import substitution. To accomplish this industrialization as rapidly as possible, the industrial sector received priority, both in terms of investment funds and foreign exchange allocations. Hence, in comparing the development budget allocation between the second (1969/70 - 1973/74) and third (1976/77 - 1980/81) development plans, one finds that the share of investment funds allocated to agriculture decreased from 18% to 15% of the total while the percent allocated to industry increased from 5% to 22%. At the same time import composition changed. Imports of machinery and transport equipment averaged TSh. 1,005 million over the period 1973/74 or 27.6% of imports, of which machinery and transport equipment averaged TSh. 627 million. From 1975-1980 imports of machinery and transport equipment averaged TSh. 2,853 million or 44% of the total imports, of which the machinery and physical plant increased industrial capacity but also created a secondary demand for foreign exchange to bring the spare parts to keep the equipment operating and raw materials to keep the plants operating. Unfortunately, at the same time the demand for foreign exchange was growing, the supply was stagnating. The Structural Adjustment Program proposes there should be a shift in the balance of imports from capital good towards inputs for current production.

Increased Agricultural Exports

A component of the balance of payments program is increased agricultural exports.. Increased exports of the major agricultural commodities are expected to provide the major source of the increase in export earnings of approximately \$250-300 million dollars. Table 1 below represents the level of exports of the major crops in 1981/82 and the projected exports in 1984/85.

Table 1 - Actual 1980/81 Exports and  
Projected 1984/85 Exports for Major Export Crops

<u>Crop</u>	<u>1981/82 (tons)</u>	<u>1984/85 (tons)</u>
Cotton	37,100	50,000
Coffee	63,000	73,000
Tea	9,200	15,000
Tobacco	9,200	17,000
Sisal	82,000	100,000
Cashews	61,000	61,000

The Structural Adjustment Program projects that exports for cotton, coffee, tea, tobacco and sisal can be increased while cashew exports will stabilize.

Coffee: Coffee exports are projected to increase from 63,000 tons in 1981/82 to 73,000 tons in 1984/85. Production has increased from an average of 49,000 tons in the 1970's to 63,000 tons in 81/82. This increase was due primarily to increases brought on by the 1975 Brazilian freeze. There is a large potential for increased production from yield increases if smallholder productivity is increased. At present, smallholder yields are quite low, 238 kg/ha as compared to estate yields of 810 kg/ha. Since 92% of the coffee planted is on smallholder farms, an increase in smallholder yields would have a significant impact on production. The Coffee Authority of Tanzania has undertaken a Coffee Improvement Program (CIP) which has one of its main objectives the increase in coffee yields.

Cotton: Cotton exports are projected to increase from 37,100 tons in 1981/82 to 50,000 tons in 1982/83. The export level of 50,000 tons implies an annual lint cotton production of 65,000 - 70,000 tons, the difference between the production at 65,000 - 70,000 tons and exports of 50,000 tons being local mill purchases and consumption. Cotton production, after peaking in the first half of the 1970's at an average production of 71,000 tons, has declined and for the past 4 years stabilized at 56,000 to 60,000 tons. The decline in production is laid to several factors chief of which are (a) higher food crop prices which encourage farmers to devote more resources to food crops (TSh. 24-30 per man day for maize sold on the unofficial market as compared with TSh. 8.0 per man day for cotton), and (b) lack of investment in processing and transport facilities that delay cotton purchasing and processing. At present, the cotton industry does not have the capacity to process increased production if it was forthcoming. Presently the industry cannot gin more than 325,000 bales in a year.

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Effective ginning capacity today is half of what it was eight years ago due to lack of investment in processing equipment. This reduction in capacity has had two negative impacts: (a) the capacity of the industry to respond to increased production is nil, and (b) the reduced capacity means that the gins are operating 12 months a year rather than 9-10, leaving them no time to undertake repair and maintenance for the next season, leading to increased break-downs and down-time. At present the Netherland government is assisting the cotton industry by providing the foreign exchange and assisting technical assistance to rehabilitate the plant and transport equipment. Even with the additional investment, the industry faces a very serious problem: at the current exchange rate the industry is uneconomic. Given the present cost-price relationships in the industry, the Tanzania Cotton Authority can only afford to pay farmers TSh. 2.48/kg for cotton and still break even. In fact, the price paid is TSh. 5/kg, thus leading to losses estimated to be TSh. 123 million in 1981/82 and TSh. 420 million in 1982/83 (assuming no large increases in production in 1982/83). Hence, the TCA is caught in a dilemma where it needs increased investment to process increased production, but, in fact, the larger the production the greater the losses and the less able the TCA will be able to repay the investment costs. At the same time, it is under pressure to raise producer prices so as to increase exports to earn badly needed foreign exchange, but higher producer prices mean higher local costs and thus higher losses for the TCA.

Tea: Tea exports are projected to rebound from the level of 9,200 tons in 1981/82 to the 1978/79 level of 15,000 tons. Tea production in Tanzania increased in the 1970's from 9,000 tons in 1970/71 to an estimated 18,000 tons in 1977/78 after which production declined somewhat. The growth in production during the early 70's came primarily from the expansion in area planted by smallholder producers. In 1970/71 there were 12,403 hectares planted in tea of which 9,155 hectares or 75% were estate plantings and 3,247 hectares were smallholder plantings. By 1977/78, area planted to tea had increased to 18,548 hectares of which 9,566 hectares were estate planted and 8,982 smallholder plantings. Hence, essentially all of the increase in production over the period was due to increased smallholder plantings. According to available statistics, total area planted in 1977/78 has remained at 18,548 hectares. Given that it takes three years for new plantings to produce, this means that any production increases over the life of the program are going to have to occur as a result of yield increases. In fact, the existing plantings should maintain their yields over the next 3-4 years. The decrease in production in the last several years has been due to a combination of (a) less than optimal weather, (b) lack of spare parts and diesel with which to operate plants, and (c) shortage of labor to harvest the tea on the estates. With average weather, diesel and spare parts, smallholder production should continue to increase as tea yields generally increase until the plant reaches maturity in the 10th year of production. At present, smallholder yields are low, averaging only 450-500 kg/ha as compared with estate yields of 1,300-1,500 kg/ha. The reason for the yield differences for smallholders should be identified and recommendations made as to whether the yield gap can be closed and what would be required to close it. In the case of estate tea, a major problem seems to be the shortage of pickers. This shortage of labor has been compounded by the fact that due to world market

conditions, tea prices have remained constant since 1977/78 at TSh. 1/50 per kilo. This freeze in price, combined with recent minimum wage increases, has further exacerbated the labor problem, making it more difficult for the estates to maintain the required labor force. In the case of smallholders, the constant price, combined with the inflation rates of recent years, means that real prices to smallholders have failed significantly, making food crop returns to labor production a more attractive alternative. In August of this year, tea prices were raised 30% in an attempt to improve profitability. While these price movements will probably not cause producers to increase plantings, it should affect the amount of resources, particularly labor that they allocate to the competing crops, since it raises return per man day from about TSh. 16 to 23 for tea.

Tobacco: Tobacco production and exports are projected to be restored to its peak level of 1976/77 by 1984/85. Tobacco, like tea, registered production gains in the first half of the 1970's, increasing from 11,971 tons in 1970/71 to 19,144 tons in 1975/76. In the last five years, production has trended the other way, falling to an estimated 15,000-16,000 tons in 1981/82. Tanzania produces both flue-cured and fire-cured tobacco and production of both has decreased.

In the case of flue-cured tobacco, Tabora and Iringa Regions are the main producing areas accounting for 76% of total production. The decrease in production appears to be due to lower real prices to producers in recent years and to the indirect effect of villagization. While nominal prices paid to producers have been increasing, they have lagged behind the rate of inflation, and therefore real prices have decreased. At the same time, prices of competing food crops which can be sold on the unofficial market have increased relative to tobacco prices (TSh. 13-30/man day for maize versus TSh. 8.8-11.6 per man day for tobacco). Possibly more important than the price effect, however, is the growing shortage of wood to cure the tobacco grown in these areas. As a result of villagization, people are grouped together in larger villages which in the tobacco areas means greater competition for a given amount of wood. It takes 1.33 hectares of woodland to flue cure a ton of tobacco. Cutting of the woodlands has been on-going for 15 or more years with little attention given to the replanting the cut-over areas. The result is an increased shortage of wood as farmers now travel 15-20 miles to obtain needed wood. This has greatly increased the cost of production to farmers both in terms of money and time.

Fire-cured tobacco which is grown primarily in Ruvuma has stagnated in recent years due to producers shifting into maize production. This shift has been brought about by high official maize prices in Ruvuma. Due to its isolated location, the national uniform maize price has provided quite an incentive for production, especially since maize requires substantially less labor than tobacco.

Cashewnuts: The program projects cashewnut production to stabilize at 61,000 tons, the same level of production as in 1980/81. From 1973/74 to 1979/80, cashewnut production fell from 145,000 tons to 41,400 tons. In 1980/81, production recovered to 60,000 tons as a result of a large increase in prices paid to producers. In 1981/82, production decreased again to 50,000

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tons. The decline in production in the second half of the 1970's is attributed to several factors:

(a) Declining prices. While nominal prices increased, the real price paid to producers was so low that even after the 60% price rise in October 1980, the real level of cashewnut prices was only 75% of the average price which prevailed in the early 1970's. The result of this decline in real prices seemed to discourage new planting as well as good management for the existing trees. Given that it takes three years for the cashew tree to bear fruit, new plantings undertaken will not impact on production until after the end of the program.

(b) Villagization. A second factor that affected cashew production was the villagization program whereby people often moved far from their cashew plantings. The above two factors were the main two used to explain the decline in cashewnut production. Prices have been raised in recent years and replantings have been undertaken.

Sisal: The program projects sisal production to rise from the 86,000 tons in 1980 to 100,000 tons. In 1964, Sisal production was 230,000 tons while 15 years later production had fallen to 81,000 tons. The 1980 production level was an increase of 6,000 tons, and the first year production had shown increase since 1969. According to Tanzanian Government reports, an annual production of 80,000-100,000 tons over the next 4-5 years seems possible. The area planted to sisal is capable of producing 100,000 tons; what has been lacking is the labor to harvest the sisal. According to a recent report, if all available leaf had been harvested, the total production would have been 120,000 tons, not 86,000 tons. This failure to harvest the sisal was due to a shortage of 2,500 cutters. This labor shortage has apparently affected government estates more than private estates due to the fact that private estates provide incentive pay to cutters based upon the amount of sisal actually cut by a worker.

#### Commodity Review Summary

One deterrent to increased export crop production appears to be an exchange rate that acts as a tax on the production of those crops. In almost every case the export crop producers are also food crop producers. Labor is the primary input in smallholder production and this labor is allocated to crops by producers according to the return that they expect. Given that food crops are sold on unofficial markets where prices are 3-4 times above official prices, there is a real incentive for cash crop producers to give food crop production priority in terms of labor allocation.

The Structural Adjustment Program mentions the need to provide export subsidies or preferential exchange rates for non-traditional exports to help overcome the negative impact of the overvalued exchange rate.

A second way to raise export crop prices to producers appears to be to reduce parastatal marketing costs by improving management of the parastatals. At present, many parastatals operate at a loss, with the deficit covered by

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overdrafts from the National Bank of Commerce. Without improved management, the tendency will be for losses to increase as volume increases, particularly if the increased volume is to occur due to price increases. The Tanzanian Government is making a concerted effort to improve the management performance of the parastatals.

### Small Group Task (B)

What is your team's overall assessment of the Tanzanian government's Structural Adjustment Program, as described in the (B) case? Specifically:

1. How does the macroeconomic adjustment strategy outlined here compare with the policy recommendations your team would have made to the Tanzanian government as a result of your analysis of the (A) case study?
2. How does your team evaluate the marketing and pricing strategies you see reflected in the (B) case study? Why do you evaluate them the way you do?
3. What specific recommendations would you make to the Tanzanian government concerning their implementation strategy, assuming they pursue the basic adjustment strategy reflected in the (B) case study?

During your team's deliberations, you should pay particular attention to the comments expressed during the interview sections of the case study. These may be particularly important when considering the third question above.

## TANZANIA: POLICY CHOICES AND DILEMMAS

### Trainer Notes

The overall purpose of the case analysis and discussion is for the participants to better understand how a developing country's development policies may adversely affect the consumption/nutritional well-being of rural and urban populations.

### Overview

This case study is organized into a sequenced (A) and (B) case study.

In the first part (A) a brief background precedes presentation and some analysis of development policy, pricing, marketing, distribution policy and some evidence of its impact on consumption and nutritional issues in rural and urban areas of the country. The (B) section of the case study outlines the broad policy of the government of Tanzania to attempt to redress the balance of payments crisis facing the country, while trying to balance other issues in the development dilemma.

The small group task following each section of the case study are designed to focus group analysis and discussion toward individual participants coming to a more comprehensive understanding of how broad agricultural, rural and economic policies in developing countries sometimes inadvertently put their own consumers at greater risk nutritionally. The process discussions following each task are designed to help participants come to a greater understanding of the difficulty of coming up with simple solutions to complex problems: made even more complex when consumption-nutrition issues are introduced into the development formula.

### Introducing the Case Study

There are no "right" or "wrong" answers to the Tanzanian case study, just as there are no simple right answers to the awful dilemma facing the government of Tanzania today in the real world. In presenting Tanzania as a case study, we do not intend to demean or criticize the government or its people in their striving for self-reliant development. Rather, we present their dilemma as typical (if a bit extreme) of many countries trying to find a workable balance among policies all of which are conceived to achieve such development.

It is important that the trainer make such an introduction as above while presenting the case study. It is equally important while monitoring small group discussions that this focus be reinforced, to help groups avoid getting "hooked" on detailed content in the case (which is retained to maintain reality in the kinds of situation information they will have to deal with on a policy level). If the trainer interventions consistently refer back to the small group task relevant at the time, the problem should be manageable.

Timing of the Unit

Set-up (Allow approximately 5-8 minutes for the set-up)

The trainer should refer back to the AID policy discussion, or the AID strategy discussion around policy, which precedes this case study. It is vital that this reference clarifies the differences, and the necessary overlaps of the United States Policy in this area, and how that can be appropriately used (and not appropriately used in some situations) to help understand, interpret, and influence host country policy.

Individual Preparation - (This should require approximately 20 minutes)

When introducing the individual preparation time for the case (which should be approximately 5 more minutes after the general set-up) participants should be encouraged to focus on several issues as they read:

- o How does this government's policy behavior appear to be congruent or incongruent with the AID/US policies just discussed? Be Specific!
- o What do you think are the likely effects of this host government's economic, agricultural and rural development policies (as presented in this case study) on the consumption/nutrition concerns of rural and urban Tanzanians (beyond those made obvious by the case)?
- o Think about how you would try to influence the government of Tanzania, if you were in the mission there when this set of policy facts became clear to you.

First Small Group Task - (This should require approximately 35-45 minutes)

There is a first small group task included with the case study as included in the regular curriculum. Its instruction and focus are self-explanatory, and are not dealt with here except in general suggestions as how to handle the first part of the unit, per se.

The overall purpose of the first small group task (whatever version the trainer chooses) is to get individual participants in small groups to share their analysis of a host country policy situation which is, obviously, doing great potential damage to their own people nutritionally and from a consumer point-of-view. The focus of the dilemma is "So, what can we do about it, or would we do about it if we were there?"

(The idea of having much of this case discussion, and much of the other case discussions in small groups, with a task, rather than in the classic total case discussion format should be noted and clarified. The idea is largely driven by the fact that the participants in this workshop all come from a relatively common base of professional training and experience. Most are agricultural or rural development specialists, with several or more than several years experience as Foreign Service Officers or GSOs, or consultants or some combination of the above. All have some extensive overseas experience in the AID orbit working in the rural and agricultural fields. The small group, task-oriented case discussion and report strategy is based on the assumption that participants have a large body of experience to share with each other. However, if you asked them to do that directly, they would (probably) deny they had it. The small group case analysis and discussion format provides a more acceptable format for this kind of peer group sharing and training to take place.)

Reports Out - (Allow about 15 minutes for each report out)

This will be the first formal report out from a small group. Accordingly, the trainer should be particularly sensitive to the fact that, for those not accustomed to this type of training method - they must be made to feel comfortable and in a sense "successful" in accomplishing their task.

The purpose of the reports out at this point in the design are several:

- o To get people on their feet and taking responsibility for contributing to the learning of the training program. This is a "process" objective which will continue to permeate the program through the end. (It is usually not necessary nor helpful to have a trainer articulate this objective.)
- o To enable participants to compare their analysis of the Tanzanian policy issues, given their current understanding of nutritional-consumption issues as a starting point for consideration of how they (as agricultural officers and rural development specialists) can think about things differently.
- o To lay the groundwork for anticipating what the Tanzanian government might consider doing next, and to begin to think through strategy questions which might be the most vital to be posing - as a guest country trying to help a host country think through its policy options.

It is suggested that the reports out be allowed to flow as naturally as possible, with the trainer allowing basically only clarifying questions and holding the process discussion for the end of the reporting period. This may not be entirely possible, literally, but it is a desirable process goal.

Process Discussion - (This should require approximately 30 minutes)

Given the complexity of the issues involved in the Tanzanian case study, it is suggested that one trainer might manage the process up to this point, and then a co-trainer might take over the process discussion part of the exercise. This will give the second trainer the advantage of being able to listen and observe the various reactions participants have to the case itself. If this option is exercised, it is vital that the second trainer (who will lead this discussion) be present and active during the small group task work described above. This will give him/her information about what the key points are which individuals and groups are pulling out of the case study.

It is recommended that, after the reports out, a comparison and contrast and "What do you make of that?" type of process discussion be managed by the trainer. Some leading probe questions might include the following:

- o What would you do differently if you were a policy maker in this situation?
- o If you could influence policy with the President of Tanzania, what would be your key recommendation from a nutritional/consumption concern?
- o What do you hope they (Government of Tanzania) will do next?

Individual Preparation (B) Case - (This should require about 20 minutes)

When reading the (B) case, participants should be encouraged to think about several new issues, as they read:

- o How is this new Structural Adjustment Program (SAP) likely to affect consumption-nutrition issues in Tanzania?
- o If you were in a position to affect the implementing guidelines for this program, whom would you try to influence and in what specific ways?
- o What might be some further unintended side effects on consumers from a nutritional point-of-view, if this program is not implemented with sensitivity to these issues?

Second Small Group Task

The purpose of the small group task is clear from the above leading questions and the content of the task itself (see case study).

The overall purpose of this task is to help individuals, in small groups, explore their present level of understanding of how they might influence such "emergency" programs such as the SAP, to introduce more awareness of the consumer and nutritional consequences of their actions. The focus of the task is not on Tanzania, since such "emergency" programs are being initiated/or forced on developing countries over the world.

MATERIALS FOR PARTICIPANTS

SUPPLEMENT TO FLEURET ARTICLE

The article by Patrick Fleuret reviews community level trends and policy implications in nutrition in areas undergoing agricultural development. It also raises general issues and makes general suggestions for avoiding frequently encountered problems.

The following is abstracted from a case history of an agricultural production project in a South American country. The purpose of this abstract is threefold:

- 1) to give a concrete example of how some of the problems Fleuret discusses can occur;
- 2) to point out some of the inadequacies in monitoring and evaluating the project that has led to a lack of appropriate intervention; and
- 3) to suggest kinds of monitoring that might correct some of the informational inadequacy.

The Case

The case involves an area in a South American country that historically has been characterized by both large and small scale agricultural and livestock production. Since the early decades of this century, loans and development projects of one kind or another have gradually transformed the area into a major producer of commercial crops. This process was accelerated after 1941 by a variety of programs funded by private foundations, particularly the Rockefeller Foundation, and more recently by AID programs. The programs have ranged from supporting educational/research development to underwriting national development agencies. They include medical as well as agricultural focuses.

Development of the area began in the 1920s following construction of roads, using U.S. loans, that made it possible to transport crops and animals to market. Large landholdings expanded during the 1920s at the expense of small holdings to make way first for cattle production and then for sugar cane. Cane production has continued to increase in importance, particularly since the 1950s.

In recent decades the national extension service, funded by USAID, has introduced new farming methods that have substituted open-field, mechanized, monocrop cultivation of soya, sorghum, beans, and corn for the traditional crop mix of cocoa, coffee, plantains, and fruit trees. In the area as a whole, land devoted to cash crops increased fivefold between 1958 and 1970. Sugar production increased 1.5 times between 1950 and 1960, and doubled between 1960 and 1974, to reach 853,460 metric tons. In one subarea singled out for intensive study, four plantations -- owning 80% of the cultivated land -- enjoyed an increase in sugar cane production from 2,000 tons in 1938 to 91,750 tons in 1969. And the increase has continued.

Partially as a byproduct of this development, pollution from sugar mills has increased, the number and size of small landholdings have diminished, and malnutrition appears to have increased. In the early 1970s, according to height/weight surveys, 50% of the population under age 6 were deemed to be malnourished. Nevertheless, those charged with evaluating the program have considered it overall to be a success. Clearly, production increased, and one report suggested that a particular community could remedy its protein deficiency by retaining and consuming 7% of its soya crop and 8% of the total calories it now sells. Others have suggested that the real cause of malnutrition is population increase.

Along with other programs in the area, educational programs have attempted to foster changes in dietary choices and to promote birth control. Neither of these approaches has shown appreciable success to date. More recent plans have been to intervene with credit for small farmers, although the proposed lower limit (20 hectares) would eliminate most families suffering nutritional stress. Further, the national government is experimenting with direct intervention through a food coupon program.

### Difficulties

1. Loss of land and loss of variety of crops. Peasants in the area have been losing land to large landholders since the beginning of the century. This situation has accelerated as the cost of farming has increased. In the area studied intensively, a third of the land under peasant control in 1972 had passed to the sugar plantations by 1976. Of the land still controlled by small farmers, somewhat less than half is devoted to cash crops. The result is a net loss of production of such foods as cassava, plantains, beans, panela, corn, and potatoes.

2. Loss of wage income. Wages have not kept pace with profits, which range from 26% for sugar plantations with mills to 54% for those without them. Suppression of wages is made possible by:

- 1) hiring practices (crew contracting);
- 2) piecework payment; and
- 3) the fact that workers with some land (although not enough to support their families) are able to augment their earnings with their own agricultural production.

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3. Increased caloric requirements and changes in distribution of food within family units. Labor on the sugar plantations requires approximately twice the caloric expenditure per worker that is expended on peasant agriculture. Among families who are at the margin of caloric sufficiency, this means that calories must be diverted from family members who are not working on the plantations, if workers are to be able to continue working.

4. Atomization of the "community." There is a tendency to assume that any aggregation of peasant households represents a community in the sense that the community makes joint economic plans and that goods and services are distributed among members through non-market mechanisms. This may have been typical in some parts of Latin America during the colonial period. However, such communities are increasingly rare and even so-called "closed corporate communities" tend to atomize quickly once they are brought into the cash economy and their members become wage laborers.

In the area studied intensively for this example, the atomization process began as early as the 1920s, and presently a process of stratification is underway. In the community, 30% of the households had no land in 1971, and an additional 50% had fewer than 2 hectares. As a result, the household or extended family, not the community, is the unit that acts collaboratively on economic issues. Thus, prescriptions, such as that made by the extension service that the community withhold a percentage of its cash crop for its own consumption, are meaningless:

- 1) because goods are not shared among community members; and
- 2) because in this case fewer than half the households in the area have any cash crop to withhold.

Food producers are unlikely to distribute their surpluses to their landless neighbors except through cash sale (in which case they are not withholding it from the market).

#### Suggestions for Improved Monitoring

1. Changes in land use and land tenure. The factors most consistently and clearly associated with nutritional stress in areas undergoing agricultural development are:

- 1) taking land out of cultivation of traditional food crops; and
- 2) removing land from the control of small scale producers.

However, it is unrealistic -- on both political and economic grounds -- to suggest that in most cases this trend could be reversed. In many areas, in fact, there is historical evidence that until small farmers are stripped of their land, they are reluctant to join the wage labor force. Nevertheless, changes in land tenure and land use can provide early warnings of nutritional problems to come.

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2. Self-reporting of land use. Where peasants are given incentives for growing certain crops, there is a tendency to report such use whether or not it is true. In the present case, there was a discrepancy of 20% between the number of households reporting to government interviewers that they grew soya, and those actually found to be doing so during long-term investigation.

3. Changing food preferences. In cases where resistance to consumption of non-nutritional food is strong it may make more sense to encourage some small farmers to increase production of nutritional foods. These crops can be sold on the local markets without the need to re-educate consumers. Soya, which is regarded as fit only for cattle fodder, is a good example of resistance to a non-traditional crop.

4. Unit of analysis/point of intervention. The particular pattern of production and distribution in a particular rural community should never be taken as given. At the very least, attention should be paid to monitoring food consumption (and other factors) among people in various socioeconomic categories. Later in the training session, suggestions will be made for discovering and sampling these strata.

Interventions above the level of those who are experiencing nutritional stress (as in the instance of loans to farmers with more than 20 hectares in the present case) is more likely to generate further concentration of land-holdings and wealth, rather than to produce a "trickle-down" to the lower strata. An example is the case of loans to farmers who presently hold more than 20 hectares.

5. Intra-familial distribution of food. Nutritional surveys should seek information on overall consumption of food for households. In addition, they should also look for seasonal variations in the availability of both food and money to buy food, and the distribution of food within families. Because farm wage labor is likely to be seasonal, an attempt should also be made to discover which members of the family are engaging in wage labor. Do high caloric demands during working periods temporarily diminish the food going to non-employed members of the family? When will this occur? All this will make direct nutritional intervention more efficient.

6. Anthropometric indices of nutritional adequacy. Standard anthropometric surveys are of questionable value in determining whether or not a population is suffering nutritional inadequacy, unless baseline figures have been established for that particular population. However, once such a survey has been conducted, figures from the original data can be used for comparison with later surveys to see whether status has changed.

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PERU:

Training Case Study on Integrating  
Nutrition Considerations Into a Development Project

Training Case Study  
(Revised)

December, 1982

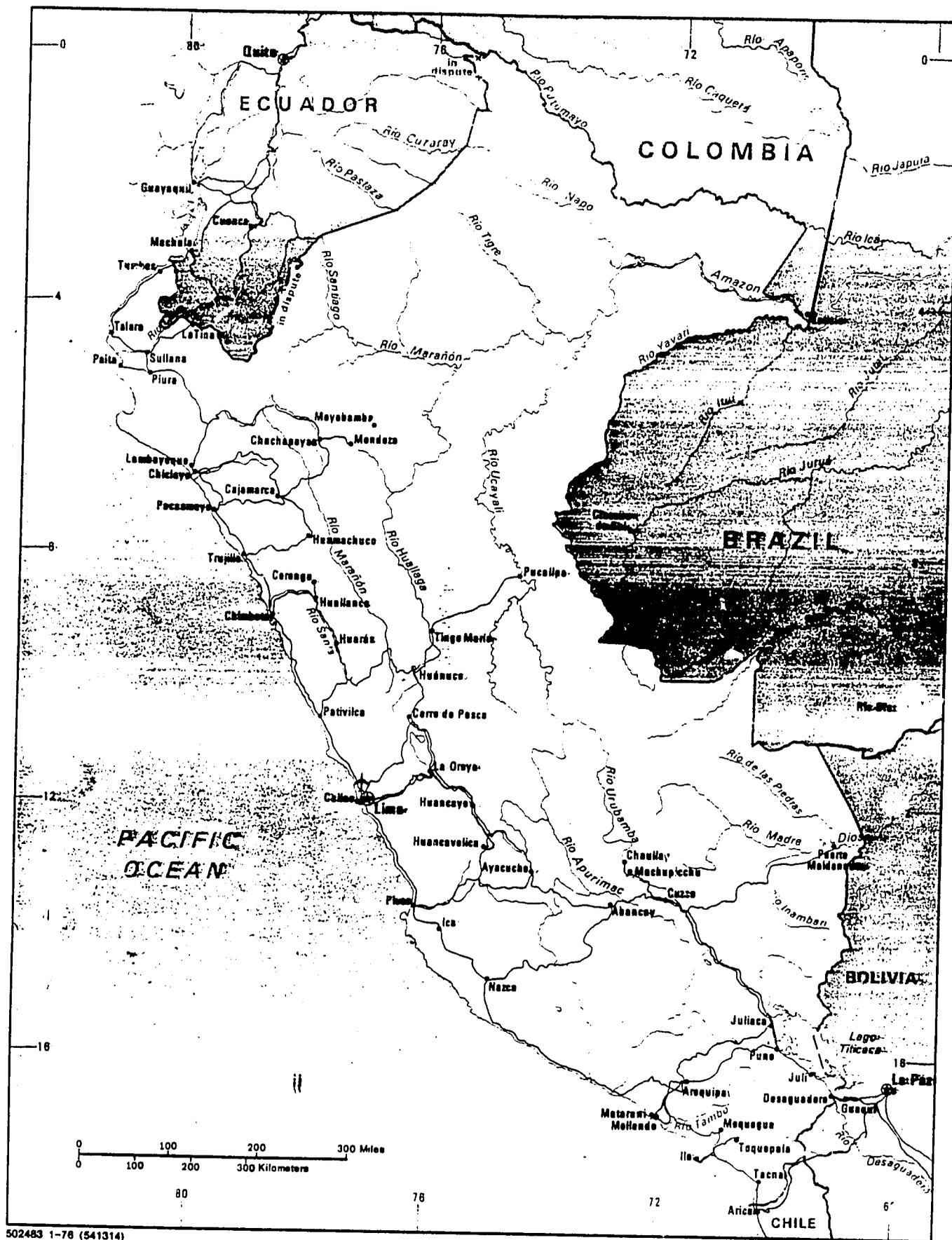
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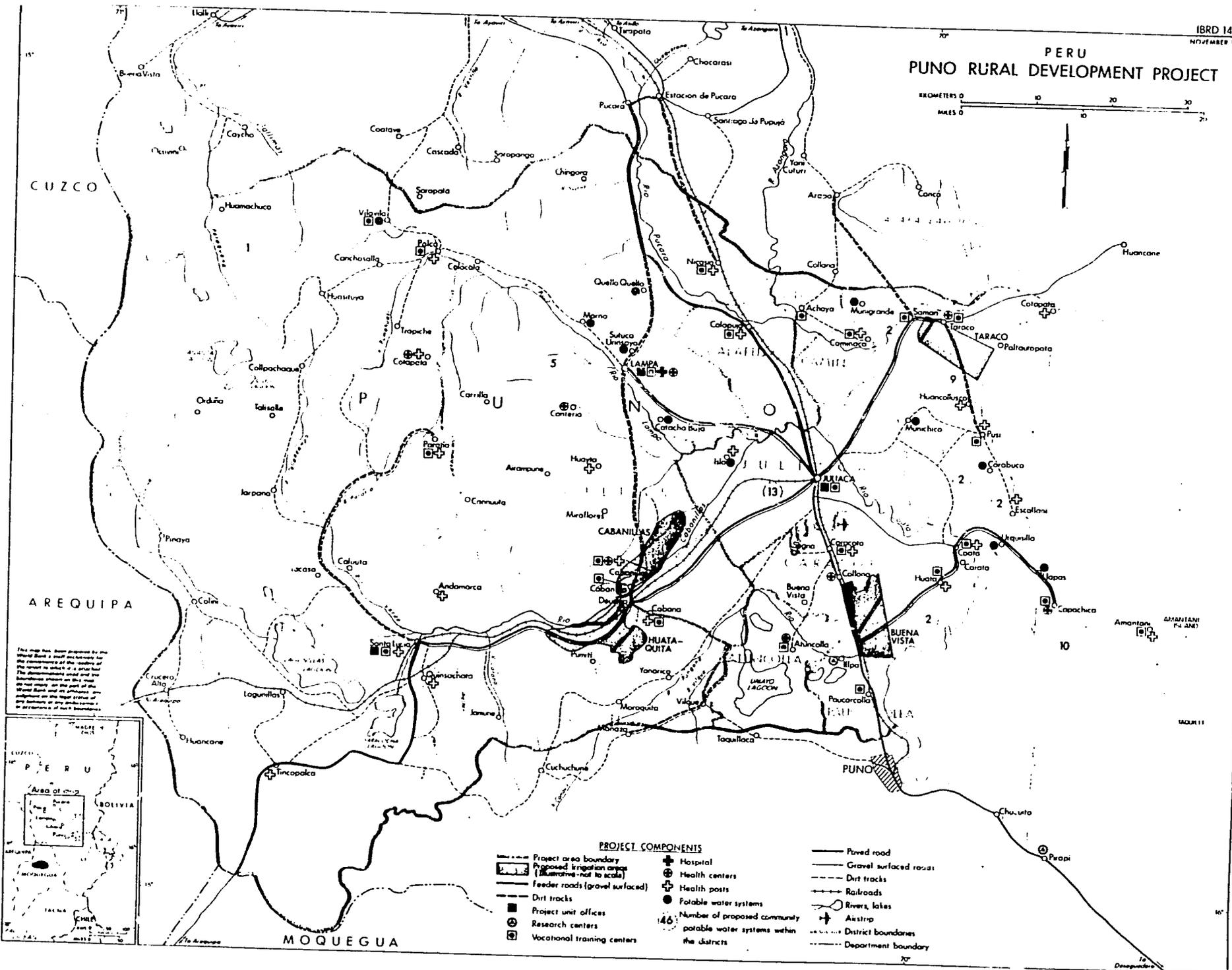
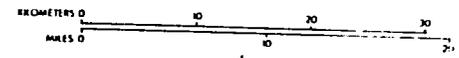
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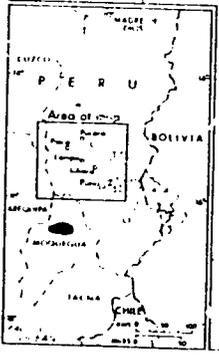
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 Boundary representation is  
 not necessarily authoritative

— Railroad  
 — Road  
 ✈ Airport

# PERU PUNO RURAL DEVELOPMENT PROJECT



This map has been prepared by the World Bank in cooperation with the Government of Peru. It is based on the best available information and is not intended to be used for navigation. The Government of Peru is not responsible for any errors or omissions in this map.



- PROJECT COMPONENTS**
- Project area boundary
  - - - Proposed irrigation canals (illustrative - not to scale)
  - Feeder roads (gravel surfaced)
  - - - Dirt tracks
  - Project unit offices
  - ⊕ Research centers
  - ⊕ Vocational training centers
  - ⊕ Hospital
  - ⊕ Health centers
  - ⊕ Health posts
  - Potable water systems
  - ⊕ Number of proposed community potable water systems within the districts
  - Paved road
  - Gravel surfaced roads
  - - - Dirt tracks
  - Railroads
  - Rivers, lakes
  - ✈ Airstrip
  - District boundaries
  - Department boundary

## PUNO INTEGRATED RURAL DEVELOPMENT PROJECT (A)

Note to the Reader. The accompanying videotape describes the country and project area of this case in general. A script of the videotape is available if you wish to review its contents in detail.

### The Project Area: Further Background

Traditional farming patterns in the altiplano of Peru are well adapted to its harsh climate. Farmers with small holdings, the target group for the Puno Integrated Rural Development Project, usually produce a variety of crops on small, dispersed plots of land. These pieces of land are usually located in several micro-climatic zones. However, farm families without access to land in varied micro-zones must rely on ancient patterns of food exchange to provide them with the full range of dietary elements common in the region.

Most of the land in Puno is controlled by the large government-run enterprises which were products of the agrarian reform: agricultural cooperatives and agricultural "societies of social interest." In the project area, for example, 49% of the total area of 715,175 hectares of pasture and arable land belongs to 6 enterprises, and the rest to individuals or peasant communities. 80% of the approximately 30,000 families settled in the area live in the peasant communities. The population living outside the enterprise-owned lands, therefore, has much less land per family (see Table I). (This is total land, including pastures and non-productive lands.)

Table I:

Comparison of Productive Land per Family  
for Residents of State Enterprises  
with Residents of Community or Individual Holdings

	Number of families (%)	Amount of Land # hectares (%)	Land per family (ha.)
Enterprise-owned lands	. 6,000 . (20%)	. 350,436 . (49%)	. 58.4 .
Peasant community-owned or individual lands	. 24,000 . (80%)	. 364,739 . (51%)	. 15.2 .

(Source: H. Martinez, 1982)

History of project activities. Puno has been the headquarters of a number of international development projects since the 1950's. Table II lists these projects. In general, a common characteristic of these projects is that they have developed independently, and that each was designed and implemented without utilizing the experience of previous studies and experiments.

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Table II, Part A

International Development Projects Conducted in Puno  
1950 to the Present

Source: H. Martinez, 1982

Name of Project	Dates	Description	Donor Agency
Regional Plan for Development of the Peruvian Scuth	1956 to 1958	Covered 7 departments, including Puno, resulting in a series of connected studies of natural resources, agriculture, cattle-raising, communications, etc. Included technical assistance and credit programs, focused on large and middle-sized landowners.	United States Interamerican Cooperative Food Service
Puno-Tambopata Program	1954 to 1961	Part of the Andean Program of the United Nations which covered Bolivia, Ecuador and Peru. Community Development activities covered: (1) training outreach workers to act as health, agricultural and community improvement auxiliaries, (2) training midwives, (3) training professionals, (4) conducting basic education programs, and (5) establishing communal workshops.	United Nations International Labor Organization, Food and Agricultural Organization, World Health Organization, UNICEF and UNESCO
National Plan for the Integration of the Native Population	1961 to 1965	A continuation of the Puno-Tambopata project, expanded to cover five departments.	Government Of Peru
Integrated Food and Nutrition Project	1961 to 1965	Covered the initiation of agricultural and horticultural demonstration plots, including school and kitchen gardens, Mothers's Clubs and pre-school education.	UNICEF WHO

1982

Table II, Part B

International Development Projects Conducted in Puno  
1950 to the Present (Continued)

Name of Project	Dates	Description	Donor Agency
Project for the Development and Integration of the Native Population	1966 to 1970	Covered 5 zones in Peru: its activities and methods were identical to those of the Puno-Tambopata Program, except that it included strong participation by several ministries and other government agencies.	Inter-American Development Bank and the GOP
Program for Integrated Services for the Puno Region	1974 to present	A series of health, basic education, nutrition activities, emphasizing the the family, youth and children; included most of the same features as the Integrated Food and Nutrition Project, above.	UNICEF and the GOP
Juliaca Micro Region Integrated Rural Development Project	1980 to present	Also known as the Puno Integrated Rural Development Project, the subject of this report.	World Bank and the GOP

1975

Pre-Project History

In 1977, the Government of Peru (GOP) addressed the problems of food consumption and nutrition by developing a strategy to make Peru self-sufficient in food production, and to eliminate malnutrition. The Strategy for Food Project, financed jointly by FAO and the Government of Sweden, recommended accomplishing these goals by reinforcing traditional consumption patterns and habits, and by more efficient utilization of local food resources. Peru's southern region, which includes the Department of Puno, was recommended as the pilot area where these recommendations should be implemented.

The Food Strategy Project consisted of an eight-month study conducted by three FAO consultants (a nutrition economist, an econometrician, and a food-supply specialist). They used the following regional data to shape their recommendations:

--In 1972, 49.5 percent of the population above five years of age was illiterate, compared with a national average of 31.1 percent.

--In 1973, infant mortality averaged 102/1000 live births, compared with a national statistic of 65/1000.

--The average GNP (gross national product) was below US\$100/year, compared with a national average of US\$620.

--There was a low per capita average intake of calories and nutrients. The actual deficit as compared to FAO requirements, was approximately 17 percent for calories and 23 percent for protein; the intake of vitamin A and calcium was also deficient.

--The National Planning Institute office in Puno reported that 85 percent of the population under six years of age presents some degree of malnutrition on the Gomez classification scale:

First degree malnutrition	53 percent
Second degree malnutrition	28 percent
Third degree malnutrition	4 percent

1981

The consultants concluded that the major nutritional problems of the region were protein and calorie deficiencies. The population groups most adversely affected were the urban poor, farm families with small holdings and the landless rural poor. Distinct urban and rural food consumption patterns were described. The urban diet contained high levels of bread, rice and noodles, while the rural diet was based on quinoa, potatoes and barley. Populations in the rural areas of the Department of Puno were found to have significant levels of vitamin A deficiency. This deficiency, according to the FAO report, was "independent of calorie deficits".

The consultants' study proposed a number of strategies to deal with the nutritional needs of the Puno region. The consultants suggested that production of locally grown foods be increased, that attempts be made to reduce post-harvest losses, and that food distribution systems be improved. Some methods proposed by the team were eventually included in the Puno Integrated Regional Development Project (which came after the Food Strategy Project): for example, the creation of integrated agricultural and nutrition extension activities and construction of small scale irrigation works to increase production; development of better food storage units and methods; the provision of applied research, technical assistance, and extension of activities to promote food crops and livestock native to the highlands in order to minimize unnecessary problems with food preferences and agronomic adaptation.

This study influenced the later project design efforts of the Peruvian Government and the donor agencies to consider food consumption and nutritional consequences in the selection of project components and strategies.

The following five pages include some basic economic and food consumption data reported by the FAO team to the GOP.

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Table III: Characteristics of Economic Strata of Rural Puno used in Diagram I

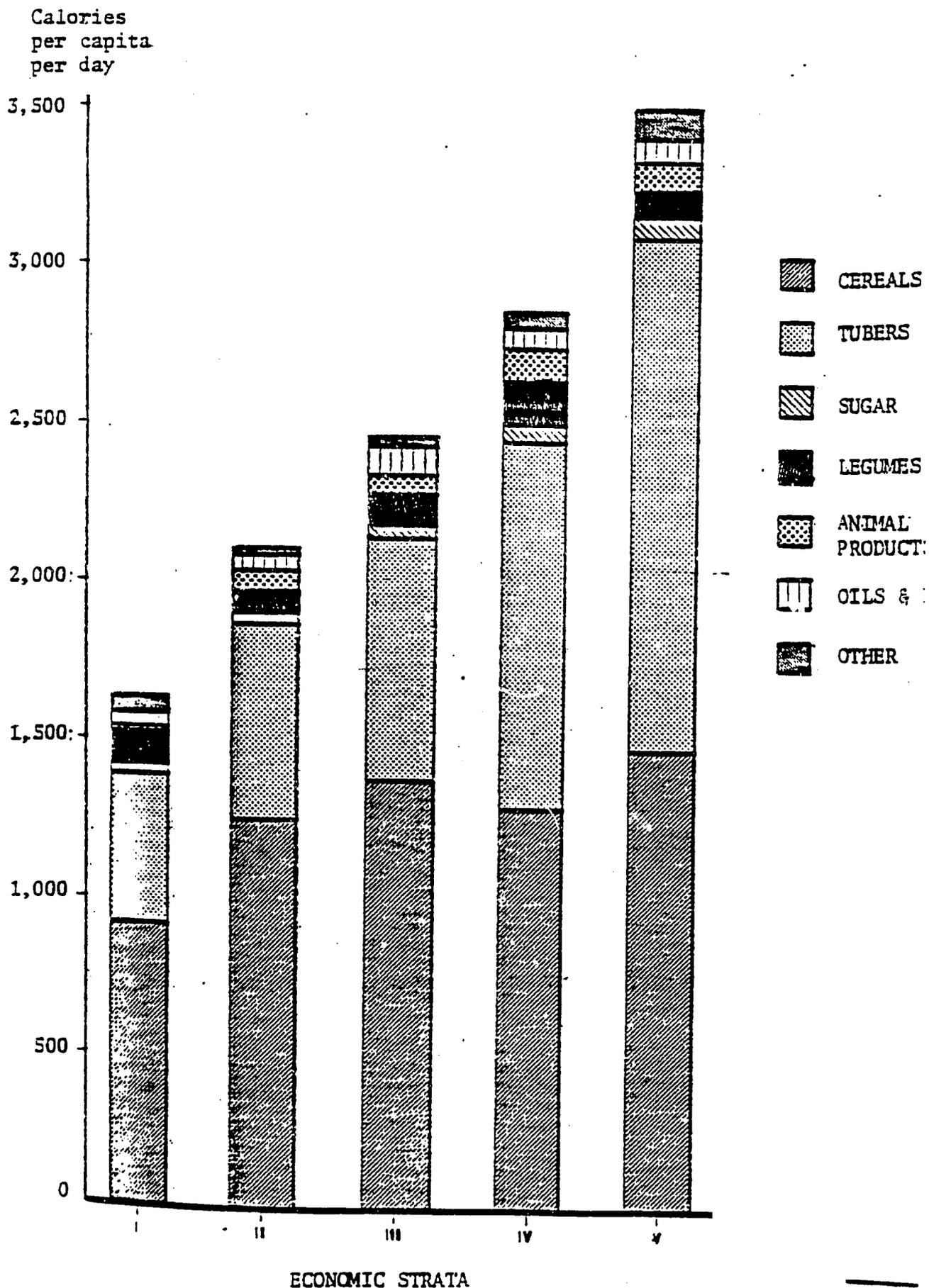
Strata	Category of Total Expenditures (in soles* of 1972)	Percentage of food production used for home consumption	Percentage of families in strata
I	0-1999	81	20
II	2000-2999	78	19
III	3000-3999	75	16
IV	4000-4999	72	14
V	5000 and up	74	31

\*The sol is the Peruvian monetary unit, equivalent (in 1972 soles)  
45 soles = US\$1.00

Source: Informe del Proyecto Sobre Estrategia para Alimentos, Peru, Organizacion de las Naciones Unidas para la Agricultura y la Alimentacion, Rome, 1979, FAO/SWE/TF ESN: TF/SWE/79, p. 81.  
Translated by Charlotte Miller. (Not available in English.)

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Histogram: ENCA data: Consumption of Calories per capita per day by food groups and economic strata, Rural Puno sample



Source: Informe del Proyecto Sobre Estrategia para Alimentos, Peru, Organizaci de las Naciones Unidas para la Agricultura y la Alimentacion, Rome, 1977  
 FAO/SWE/TF ESN: TF/SWE/79, p. 83

1977

TABLE IV: AVERAGE CONSUMPTION OF CALORIES PER CAPITA, PER DAY, OF SELECTED FOODS BY TWO LEVELS OF SELF-SUFFICIENCY IN FOOD CONSUMPTION FOR RURAL PUNO

FOODS	Levels based on index of self-sufficiency, calculated by dividing the market values of home produced food by total expenditures, a statistic designated as A/G					
	Level I (calories per capita per day)			Level II (calories per capita per day)		
	0.00	A/G	0.66	0.67	A/G	1.00
	Low level of self-sufficiency and high level of market dependency			High level of self-sufficiency and low level of market dependency		
Rice	40			12		
Quinoa (a cereal)	294			369		
Barley	402			508		
Bread	40			23		
Macaroni products	21			10		
Chuno (potato starch)	371			351		
Potatoes	364			568		
Sugar	45			32		
Dried broad beans	83			81		
Lamb and mutton	23			2		
Animal and vegetable oil	73			56		
Fresh milk	16			15		
All vegetables	8			6		
Other foods	504			397		
Total calories from home production	1827			2188		
Total purchased calories	457			242		
TOTAL CALORIES	2284			2430		

Source: Informe del Proyecto Sobre Estrategia para Alimentos, Peru, Organizacion de las Naciones Unidas para la Agricultura y la Alimentacion, Roma, 1979, FAO/SWE/TF ESN: TF/SWE/79, p. 85.

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TABLE V: Characteristics of Economic Strata used in Diagram II

Strata	Category of Total Expenditures (in soles* of 1972)	Percentage of families in strata
I	0-2999	26
II	3000-4999	12
III	5000-6999	15
IV	7000-8999	12
V	9000 and up	35

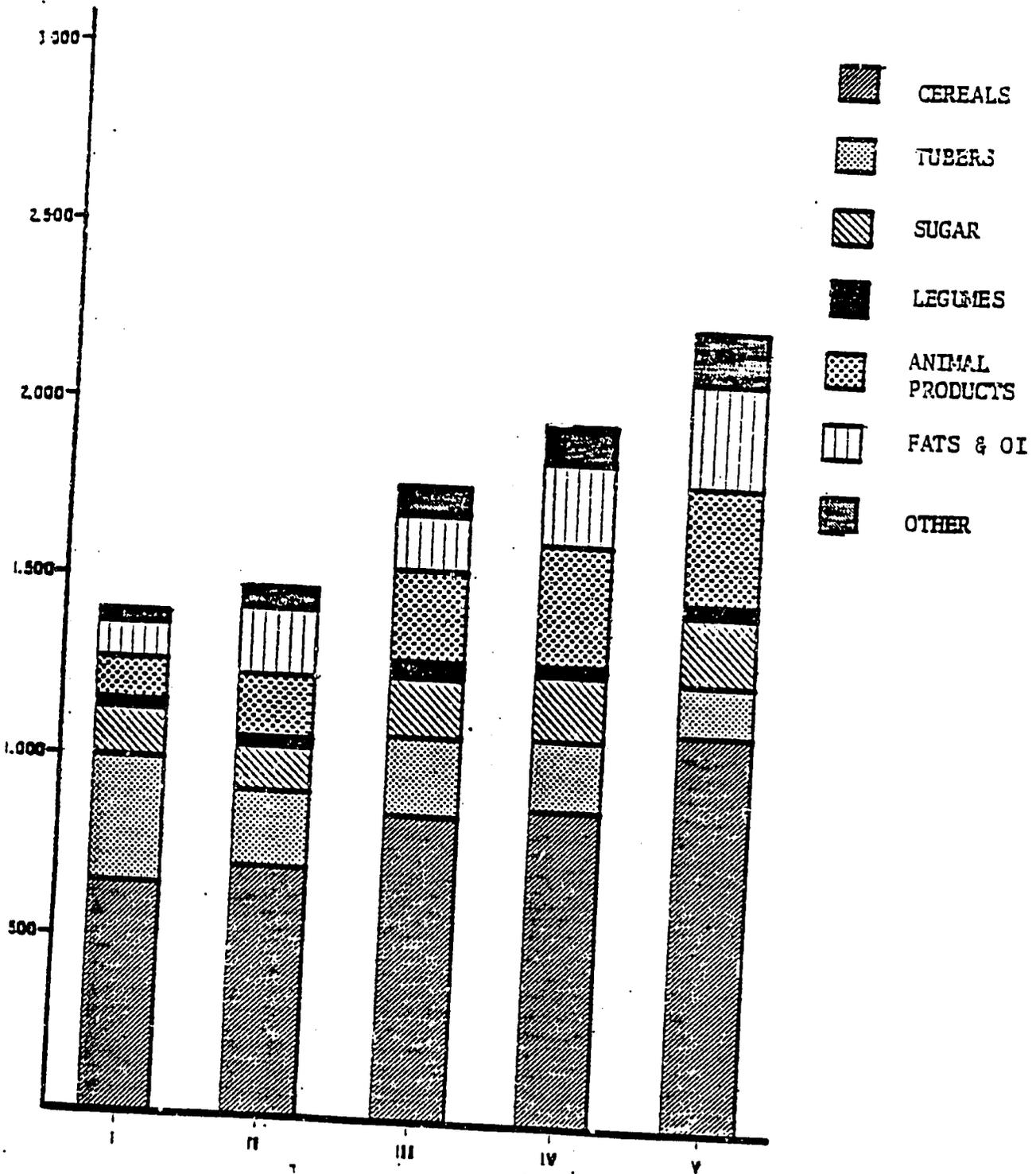
\*The sol is the Peruvian monetary unit, equivalent (in 1972 soles)  
45 soles = US\$1.00

Source: Informe del Proyecto Sobre Estrategia para Alimentos, Peru,  
Organizacion de las Naciones Unidas para la Agricultura y la  
Alimentacion, Rome, 1979, FAO/SWE/TF ESN: TF/SWE/79, p. 86.  
Translated by Charlotte Miller. (Not available in English.)

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Histogram: CONSUMPTION OF CALORIES PER CAPITA PER DAY BY FOOD GROUPS AND ECONOMIC STRATA, URBAN SAMPLE, PROJECT AREA (covering the Departments of Puno, Arequipa, and Madre de Dios)

Daily Calories per capita



ECONOMIC STRATA

SOURCE: Informe del Proyecto Sobre Estrategia para Alimentos, Peru, Organizacion de las Naciones Unidas para la Agricultura y la Alimentacion, Rome, 1979, FAO/SWE/TF ESN: TF/SWE/79. p. 87

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### Project Identification

At roughly the same time as the Food Strategy activities were being undertaken, a joint World Bank/FAO project identification mission recommended to the Bank that a rural development project be developed for Puno to alleviate the food shortages there. The Food and Agriculture Ministry then took charge of the preparation of such a project for the micro-region of Juliaca since that micro-region had been the object of previous studies, and was included in existing plans.

The World Bank was motivated to finance the new project due to (1) a decision to enlarge its credit assistance to Peru, including 10 other agricultural loans for agricultural credit, irrigation, colonization and improvement of drainage systems; (2) the apparent feasibility of the project, later calculated at an estimated 27 percent rate of return; and (3) the strengthening of the formal democratic system after more than a decade of military government.

The GOP's motivations for the project included (1) the acknowledgement that Puno constituted an over-populated zone with limited natural resources, especially for agricultural use; (2) the recognition that Puno was one of the most depressed zones in Peru, inclined to social conflict, and constituted an important source of the migration to coastal cities; and (3) a priority for implementing a broad, multisectoral project with attention to issues of equity, such as food consumption and nutrition, to reinforce a policy of economic decentralization aimed at increasing administrative authority and responsibility in regional centers.

The GOP began to conduct necessary and useful pre-feasibility studies as a basis for project preparation.

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SMALL GROUP TASK (A)

You and your team are a joint GOP/World Bank AID team charged with designing an integrated rural development project for Puno. Using the data presented in the case and the videotape, identify project activities which would maximize food consumption objectives and would also be consistent with GOP and AID policies.

Before you begin, identify the specific nutrition/consumption problems in the project area.

Specifically, prepare a report for oral presentation covering the following questions:

1. What objectives in agricultural, rural and nutritional development would you include in a project for the target area?
2. What additional data collection and/or analysis would you recommend undertaking:
  - (A) before project design proceeds further?
  - (B) before project implementation?
  - (C) as an ongoing, overall planning and policy tool?
  - (D) as a project management, monitoring and evaluation tool?

Please present your recommendations as a group report, using analysis of data in the text of the case to support your recommendations.

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PUNO INTEGRATED RURAL DEVELOPMENT PROJECT (B)

To: Government of Peru

Date: July, 1979

From: Development for a Better World, Inc., Washington, D.C.

Subject: Consumption Implications of Agriculture Production in Puno  
Integrated Rural Development Project (Juliaca Micro-Region.)

The Problem

The project needs to address the serious malnutrition problems prevalent in the Micro-region of Juliaca. Present project activities, as designed, will not reach many of the seriously malnourished families who are among the very small landholders. The project also needs to increase nutritional benefits among malnourished families served by seemingly unrelated project activities.

There are no surveys of nutrition status available for the project area. But indirect evidence and related surveys indicate the presence of major calorie and nutrient deficiencies. Most conclusions about Peruvian nutritional status, including that of the Project Area's population, stem from FNCA (a national food survey), 1972, and indicate that a major problem exists. The area's vulnerability to draught creates the potential for further nutritional deterioration.

Although the ENCA sample did not permit extrapolation at the Micro-region level, department figures for Puno are a reasonable indicator. They show that more than 50% of the children under five, and pregnant and lactating women are at risk of serious malnutrition. An average calorie availability exceeding requirements, and failure to consider impact of health on caloric needs, masks the serious defects likely to occur among the lowest 30% in socio-economic status. Protein deficiencies were closely associated with calorie deficits in the typical protein-calorie malnutrition pattern. Calcium (average 90% of need) and vitamin A deficiencies (average 80% of needs) are also significant.

Protein-calorie malnutrition showed a high inverse correlation with size of family farm plot, with more than 90% of protein-calorie malnutrition found among families with three hectares or less of cultivable land. The clear concentration of malnutrition among the smallest landholders is the main factor influencing recommended emphasis on the consumption/nutritional issues discussed below.

High correlation of vitamin, mineral, and micronutrient deficiencies with protein-calorie gaps indicates a general undernutrition, despite a food balance sheet for the Department that shows average per capita availability to be close to requirements. This calls for increased availability of basic staples (potatoes, quinoa) to malnourished families.

Recommended Objectives

The overall purpose of the recommended objectives, below, is to improve the nutritional status of 4,000 subsistence farm families in 40 communities in the Project Area. This target group, among the lowest 20% of the socio-economic strata, represents the greatest concentration and severity of nutritional problems, and is unlikely to benefit substantially from other project activities.

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Therefore, the following additional objectives are recommended to support overall production goals:

- . To provide extension services that improve subsistence agricultural patterns and to modify consumption patterns in a manner that improves nutritional status,
- . To provide each community with a multi-sectoral strategy for improving nutrition,
- . To improve traditional family diets by adding such items as fruit, vegetables and meat,
- . To produce a surplus of food beyond subsistence that would provide families with a source of revenue to purchase food necessary for a better diet, and items needed for agricultural production,
- . To train semi-professionals and volunteers from Puno in order to establish a strong link between the project and the community, and,
- . To establish, with the aid of extension personnel and VBPs, means of carrying out a simple nutrition plan in the region.

Related sub-objectives include:

- a) increased consumption of home-produced food and other improvements in food habits,
- b) improved community distribution of nutrients in relation to nutrition needs, and
- c) changes in livestock practices.

Achievement of these objectives will also improve the nutritional status of 2,000 other smallholder families whose incomes are expected to increase through project activities by assuring that income improvement leads to increased consumption of nutritionally appropriate foods.

#### Baseline Data

A sample survey of baseline data should be carried out by the Peruvian National Institute of Nutrition. Anthropometric measures should be used. The Institute should work closely with local communities to ensure that the survey plays an educational and sensitizing role as well as a data-gathering mission.

Choices of communities on which to focus the recommended objectives should be based on the following criteria:

- A. The community should have, or be scheduled to receive, a health promoter. Commitment of the government to multi-sectoral intervention at the local level, and efforts to link consumption and health activities make this criterion important.

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- B. The community should be receptive to participation. Intra-community rivalries and disillusionment with past development efforts make some communities reluctant to participate in new programs. This program will depend heavily on voluntary commitment.
- C. The community should have a prevalence rate of 40% malnutrition or more among pre-school children, and pregnant and lactating women.
- D. The community should be reasonably accessible and have soil, water and related conditions adequate for potential achievement of nutritional self-sufficiency. Where minor irrigation work, terracing, or other reasonable action is required to meet this criterion, these actions should be included as part of the community nutrition plan.
- E. The community should not be one currently receiving, or scheduled to receive, adequate agricultural extension services.

With more than 60 health promoters planned for the Project Area, and more than 140 primary schools already operating, the selection of 40 appropriate target communities should not be difficult. Those chosen should average approximately 100 households, with at least five people per household, making the community nutrition activities reach some 20,000 people. Additional nutrition extension services in areas that have substantial malnutrition despite adequate production and incomes, will reach another 10,000 people through community feeding programs and improved consumption patterns.

#### Implementation Recommendations

In order to achieve these objectives in the communities selected, the project must include new activities designed to implement the necessary actions. The project should have several major agricultural production components: extension in production, management practices, inputs and storage, applied research, agricultural credit, and small irrigation works.

Specifically, the project needs to develop a large extension capability aimed at improving livestock practices and making more effective use of agricultural inputs. Extension activities must be supported by an ambitious, applied agricultural research component. Livestock agents should be trained to work toward reducing the overstocking and overgrazing of sheep in the region. Applied research in livestock should be conducted in intensive herding of alpacas at lower altitudes than currently practiced. Alpaca produce fiber for market and could provide meat for increased protein consumption. Unfortunately, alpaca meat is considered an inferior food in the region. Some livestock specialists have recommended the slaughter of younger animals to make the meat more attractive as a food, and more marketable both locally and nationally. Research on the feasibility of this needs to be carried forward.

In addition, the stock of sheep needs to be improved although it may be necessary to limit the actual number of animals raised, particularly in light of potentially large alpaca herds. Numbers of beef cattle raised should be

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Extension agents should be used to staff demonstration centers which convey new techniques for improved storage, particularly of potatoes and other indigenous foods. Potatoes should be given a high priority by the project because of their important role as a major staple in local diets. Potatoes also have a very high caloric yield per hectare, and are an important source of vitamins and other nutrients. Extension workers should be aware of the trade-offs to the farmer of planting varieties that are selected for precocity, frost resistance, and/or storage life. For example, frost resistant varieties may be inappropriate for traditional processing such as freeze drying.

An agricultural credit component should be set up to provide farmers with the resources to purchase improved inputs such as seed, fertilizers and fungicides. Despite traditional resistance to using credit for crop inputs, it is possible that farmers may gradually turn away from low-risk, short-term loans (usually to fatten bulls for sale), and turn toward using credit for the purchase of inputs for food production. This might occur with appropriate and effective extension services.

The project should identify and fund the construction of a number of small irrigation schemes (about 15 hectares) to increase food production. This emphasis would allow sub-projects to be located in favorable micro-climactic zones, and would also reduce the risk of machinery damage from severe frosts in unfavorable zones. This type of sub-project is designed to encourage the production of high value cash crops for market in communities which are self-sufficient in food, but who have a shortage of water. If a community is not self-sufficient, such irrigation activity can result in the production of food for local consumption.

Experience in Peru and other countries indicates that community development, extension, and related services can achieve significant improvements in the quantity and disposition of nutrients among subsistence farming communities otherwise little-helped by surrounding "development." Costs can be kept low by the use of para-professionals and volunteers (VBPs), and by encouraging community food-planting areas, vegetable gardens, and small-animal raising.

The practice of selling animals to meet cash needs can be modified to ensure nutritional efficiency by encouraging the purchase of appropriate foodstuffs with cash acquired through these sales.

The major feature of the recommended strategy is to promote agricultural and nutrition extension services.

### First-year and Start-up Strategy

Typical first-year program activities for a target community would include:

1. Initial orientation, motivation and promotion (one month).
2. Community agricultural, socio-cultural and health studies, including nutritional status with the assistance of VBPs from the community (two months).
3. Development of a community nutrition plan, identification and planning for target families (one month).

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4. Preparation of land for planting, delivery of inputs and credit advances, construction of enclosures to receive animals (two months).
5. Agricultural, livestock, nutrition (food habits, etc.) and health extension services.

During subsequent years, extension services would be extended to additional families, and continue with communities for the expansion and improvement of school and community gardens, animal production, and related self-help, small-scale capital projects. Pilot project experience indicates that extension services over a five-year period will be required to provide optimal increases in productivity and changes in consumption patterns. Entry into a community at least six months before planting offers a higher probability of increased output during the first growing season.

#### Organization and Staff

As indicated earlier, these consumption/nutrition-focused initiatives should be tied to health extension services, to be provided through the health services delivery system envisioned elsewhere in the project. Health promoters and their supervisors will have to collaborate with other staff to actively pursue the recommended objectives. Agricultural, livestock and nutritional extension staff will complement and reinforce other project efforts.

These nutritional activities should be coordinated and managed within the project's Farm and Rural Enterprise Development Unit. It is suggested that a skeleton professional staff manage and participate in field work which will be primarily conducted by agricultural sectorists and VBPs specializing in health, agriculture, livestock and family nutrition. Staff should include two senior specialists in agroalimentary extension. Their orientation should be toward community nutrition. They should be supported by two nutrition-extension specialists and three social workers who operate in communities served by other project agricultural extension, and which utilize family and community consumption practices designed to deal with serious malnutrition situations.

These professionals should be supported by seven para-professional sectorists who would work directly with community agricultural and livestock VBPs. The project should include group extension activities for small farmers on individual crops and animals, making the sectorists role one of motivation reinforcement and community extension, rather than direction of instructors and demonstrators.

This staff should train, monitor and provide technical assistance to about 30 agricultural and 40 social VBPs, oversee community studies, administer a revolving fund for small, no-interest loans, and coordinate health and other sectors in attaining nutritional objectives for the nutritionally most vulnerable groups in the region.

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### Vehicles, Equipment and Supplies

It is recommended that three four-wheel drive vehicles be added to project commodities, to be shared among professional staff in support of the above outlined activities. It is also recommended that 14 motorbikes and 80 bicycles be purchased during the implementation period.

These recommended activities require no special expenditures for seeds, animals, or construction materials. These can be obtained at cost from project sources, and can be financed by a revolving fund. This fund should also finance the purchase of fertilizers and pesticides required for the agricultural activities described. The packages used should emphasize organic fertilizers and pesticides so that credit needs per hectare will average less than \$50 (US). A revolving fund of \$80,000 is recommended for achievement of the four-year targets of 100 school gardens and 40 community gardens, 40 seed beds and 400 home gardens. Animals, poultry, and construction materials for enclosures will be financed as part of the related activities in the agricultural components of the project.

The revolving fund, providing no-interest, in-kind loans with minimum administration, should permit these nutritionally-focused activities to meet credit needs that fall outside the criteria or feasibility of other project activities. Small loans are recommended to avoid dilution of the self-help tradition still widespread in the region.

For more significant community expenditures, such as silos and other storage units, these recommended activities will draw on conventional credit facilities, available through the project's credit component.

### Training

Implementation of these activities will require training of sectoristas, agricultural and small-animal promoters, and community nutrition extension workers. Previous pilot projects have resulted in the development and testing of an eight-week, continuous training program for sectoristas, and three-phase, six-week cycles of intermittent field-oriented training for promoters. These training models are recommended to support these activities. Trainers should maintain continuing relationships with sectoristas and promoters throughout their later service, providing technical assistance and ongoing training, as needed.

These activities will also call for technical assistance and training to strengthen and support their community nutrition extension skills. Outside expertise should be called upon to show the importance of the link between food shortage and nutritional objectives.

### Monitoring and Evaluation

A baseline nutritional status survey should be undertaken at the outset of the implementation of these recommendations. Improved nutritional status can be monitored through the information system already built into the health component, permitting both assessment of project-induced change and surveillance to anticipate exogenous impacts. Routine data collection within the agricultural components will contribute to evaluation of output increases at the family level. Evaluation of nutritionally-focused activity will therefore be measured by results of collective cultivation, changes in food habits, magnitude of community nutrient gaps and changes in community nutrient distribution patterns.

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Evaluation of the impact of nutritional activities is difficult to isolate because any nutritional improvements in the project region will also reflect overall economic effects of the project, results of the health and potable water components, and other factors.

Intermediate output estimates, based on pilot project experience, indicate significant values for increased production of subsistence crops and vegetables (at retail prices). In school gardens, for example, the typical huerto of 300 square meters, showed gross returns.

225 kilos of lettuce @ US\$.40 =	\$ 90
450 kilos of cabbaged @ US\$.40 =	180 (four crops planted in equal areas)
180 kilos of carrots @ US\$.40 =	72
150 kilos of onions @ \$US.25 =	<u>37.50</u>
	\$379.50

With no labor costs (students and volunteers) paid and other charges estimated at 25 percent of gross (US\$ 94.87), the small garden shows a net of US\$ 284.63. A small professional staff, with the help of teachers using the gardens as educational demonstrations, could easily manage 75 gardens by the project's fourth year, generating a return of more than US\$ 21,000. With promoters also generating an equal amount through community gardens, or the equivalent in family gardens, plus additional returns in animals, fruits, and vegetables under plastic, and improved productivity in huertos, total increased value could become substantial. Increases of 40 percent in potato output, egg production and weight of chickens are feasible. For a typical community with all recommended activities, total value of increased production could approximate:

school garden	-	US\$ 284
community garden	-	284
granja		272
chacra		375
hothouse		<u>300</u>

40 localities @ US\$ 1,515 ea. = 60,600

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This illusory estimation of future value-added hides the difficulties, frustrations, inaccuracies, and failures involved in working with the least prepared, most deprived group. The figures are not suggested to support rigorous economic calculations, but to emphasize that physical outputs are significant, especially when related to the present target group as per capita income and nutrition status.

### Projections

These nutrition activities, though not directly and exclusively responsible, can contribute to achievement of adequate nutrition status for at least 15,000 people by the end of the project period. This includes 10,000 of the 15,000 malnourished likely to be found among the 20-25,000 people in communities to be served by all recommended activities. An additional 5,000 people, reached by other project activities and nutrition extension, will also attain adequate nutritional levels. These beneficiaries, primarily infants, but also adults, will be from the poorest and most deprived groups in the Project Area, for whom improved nutrition is the first and most important evidence that they are sharing in the benefits of development.

Future incidence of malnutrition in the Project Area, assuming negative outside influences do not increase, should diminish by 50 percent from current high rates, if project goals, including those contained herein, are attained.

NUTRITION RECOMMENDATIONS - DETAILED TABLE OF COSTS  
(US\$000)

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Total</u>
<u>Equipment and Supplies</u>					
(a) Office Equipment and Supplies <sup>1</sup>	4		2	2	10
(b) Education Equipment and Supplies	5	3	3	3	14
(c) Miscellaneous (sleeping bags, helmets, etc.)	5	3	3	3	14
(d) Agricultural Demonstration Equipment, Tools for Communities <sup>2</sup>	15	15	10	10	50
(e) Building Material	10	10	10	10	40
	39	31	28	28	128
<u>Training Costs</u> <sup>3</sup>	38	21	21	21	101
<u>Revolving Fund</u> <sup>4</sup>	80	20	20	20	140
<u>Technical Assistance</u> <sup>5</sup>					
(a) Compensation	15	9	9	9	42
(b) Travel and Per Diem	7	5	5	5	22
	22	14	14	14	64
<u>Surveys and Evaluation</u> <sup>6</sup>	15	15	15	15	60
<u>Administration</u> <sup>7</sup>					
(a) Salary Support	33	33	33	33	132
(b) Per Diem <sup>8</sup>	8	9	11	12	40
(c) Vehicles and Spare Parts <sup>9</sup>	56	14	21	21	112
(d) Maintenance and Fuel	14	14	14	14	56
	111	70	79	80	340
Total Base Costs	305	171	177	178	833

Footnotes

1 Illustrative lists of office and education equipment and supplies are found in PEAN grant renewal application to UNICEF.

2 Forty communities will each receive \$500 worth of agricultural tools during Project period. Balance of \$30,000 in agricultural equipment based on lists in PEAN grant renewal application.

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Footnotes, Con't

3 Training costs include \$2,000 of special instructional materials in Year 1 and per diem, at \$5 per day, during 60 days (\$300) for 120 sectoristas and promoters in first year and 70 in subsequent years.

4 Revolving fund for small non-interest bearing loans will start at \$80,000; amounts in later years are for replenishment and expansion.

5 Technical assistance compensation is at average of \$3,000 per month. Travel and per diem are calculated at averages of \$500 per trip, and \$40 per day, with two consulting visits each year.

6 The National Institute of Nutrition has agreed to provide baseline nutrition status survey and annual surveillance surveys at fixed price of \$15,000 per year, a subsidized rate since the institute makes no charge for supervision and administration.

7 Salary support includes eight professionals at average of \$200 per month, seven sub-professional sectoristas at \$120 per month, and three clerical-janitorial employees at \$100 per month.

8 Per diem is \$5 and 15 employees will travel average of 100 days during first year and increase travel in later years.

9 Vehicles include six four-wheel drive wagons (\$10,000 each), 14 motor bikes (\$600 each) and 80 bicycles (\$200 each), during life of project.

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Small Group Task (b)

The Government of Peru has asked your team to comment on the recommendations concerning certain nutrition/consumption-related objectives and activities in the Puno Integrated Rural Development Project. What is your team's reactions to the recommendation from Development for a Better World, Inc.? What parts of it would you recommend that the Government of Peru accept or modify ?

Specifically, be prepared to report responses to the following questions:

1. How do the recommended objectives and described activities fit with your team's presentation from the (A) case study? What are some key similarities and differences?
2. What specific recommendations would you make in addition to or instead of those in the report with respect to:
  - (A) gathering of initial or baseline data in the project region/target communities?
  - (B) implementation and start-up strategies toward achievement of these objectives?
  - (C) monitoring and evaluation of the impact of these recommended objectives/activities (as modified by your team's earlier work)?

Please be prepared to present your responses as a group report, using visual aids on flipcharts, as you please.

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PUNO INTEGRATED RURAL DEVELOPMENT PROJECT (C)

A loan agreement between IBRD and GOP was signed on April 28, 1980 for \$15 million. It established that (1) the loan for the crop and livestock components would be executed by the Banco Agrario del Peru, and other activities through the Puno Development Corporation (CORPUNO); (2) the development of some activities by subsidiary arrangements with the corresponding sectorial organization; and (3) the use of consultants and experts for the execution of some activities.

The stated objectives of the project were: (1) to increase the crop and livestock production in an area of approximately 20,000 hectares of upland, arable land and pastures of secano (pastures and lowland cultivated only with the aid of rain), and of 4,100 hectares of irrigated land to increase the revenues of approximately 17,000 low-income rural families; and (2) to improvement the living conditions of the peasant families in the area.

Except for the crop and livestock credit activities, all others were to be performed through the CORPUNO, a departmentally developed organization that distributes the responsibility between the participating regional sectorial organizations. The Project Unit created within CORPUNO was charged with the administration of all activities and the coordination of the participating institutions. It was also to be the coordinating element between the institutions and the ministries, and was charged with the approval of annual programs and reports on the progress of activities prepared by each of the institutions.

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It was also to execute the subsidiary agreements (with the INIPA, among others, and advise the CORPUNO on political areas.

A Coordinating Committee, to meet at least once each trimester, was charged with everything related to the project's progress. It was presided over by the CORPUNO chief and included representatives of Agriculture, Transportation, Education and Health ministries, the Agrarian Bank (Juliaca Branch) and the Regional Office of the National Institute of Planning (INP). There was also a representative of the small and middle producers and another of the agrarian reform enterprises.

Table 2 lists the activities proposed to achieve their objectives. It must be noted that a contribution of \$12.3 million from GOP beneficiaries should be added to the \$15 million IBRD loan.

The principle objective of the nutrition activities was the improvement of the nutritional situation of 4,000 peasant families in 40 communities. The target group represented 20% of those families with the greatest economic and social needs. In addition, 2,000 very small landholding families were added to the target list.

The selection of target communities was to be based on the recommended criteria: 1) availability of a health-extension officer; 2) a demonstrated will to participate by the community; 3) 40% or more of the pre-school children being malnourished; 4) accessibility of community and existence of sufficient arable land and water in that

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Table 2Project Activities, Executing Agencies Costs  
and Beneficiary Families

<u>Activities</u>	<u>Executing Entity</u>	<u>Investment and Operat. US \$</u>	<u>Benefic. Families</u>
1. Agricultural credit to finance on-farm investments and incremental production costs.	Banco Agrario	6,992,139	14,000
2. Rehabilitation and construction of small irrigation systems, benefiting about 4,100 ha.	Regional Directorate of Agriculture and Food (DRAA)	3,582,410	2,500
3. Planting some 1,500 ha. of forest trees for soil conservation and fuel.	DRAA	629,120	2,850
4. An intensive crop and livestock extension program and technical aid to improve and strengthen small rural communities.	Project Unit	1,937,320	13,500 and 7 enterprises
5. A nutrition program for 40 communities.	PROSIRP	651,500	6,000
6. Support to applied crops and livestock research programs, an associated training and demonstration program and an irrigation training center.	National Institute of Agrarian Research and Promotion (INIPA)	887,335	
7. Rehabilitation and upgrading of 515 kilometers of rural roads, strengthening the road maintenance capability of the Transport and Communication Ministry, and construction of six post offices.	Regional Directorate of Transport and Communication (DRTC)	1,859,315	
8. Construction and equipping rural health facilities (6 health posts and 6 health centers), training and equipping rural health agent, and equipping the already constructed small hospital.	Regional Directorate of Health (DRS)	380,103	
9. Installation of small communal potable water systems in 46 localities.	DRS	744,742	53,000
10. Constructing and equipping of 23 training centers.	Regional Directorate of Education (DRE)	321,112	4,200 persons

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<u>Activities</u>	<u>Executing Entity</u>	<u>Investment and Operat. US \$</u>	<u>Benefic. Families</u>
11. Studies to prepare a second-phase project covering a much larger area in the Southern Altiplano.	Project Unit	929,378	

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Source: The World Bank: Report No. 273-E.

2/1

community; and 5) the community having inadequate agricultural extension services.

The nutritional/consumption activities of the nutrition component were intended to 1) provide extension services for improving subsistence agricultural patterns and modifying consumption patterns in a manner that improved nutritional status; 2) provide each community with a multi-sectoral strategy for improving nutrition; 3) improve traditional family diets by adding such items as fruit, vegetables and meat in order to overcome specific inadequacies; 4) produce a surplus of food beyond subsistence to provide families a source of revenue for purchasing food necessary for a better diet and items necessary for agricultural production; 5) train semi-professionals and volunteers from Puno to cut costs and establish a strong link between the project and community; 6) establish and carry out a simple nutrition plan with the aid of extension personnel and volunteers.

The selection of these strategies was based on the experience of the Program of Integrated Services in the Puno Region which is the implementing agency of UNICEF's Food and Agriculture Project.



The monitoring and evaluation of the nutrition component was undertaken by the project itself, headed by a senior agricultural economist. A consultant from outside the project was sought to design the system for data collection to detect emerging problems. Reports were solicited from each project component on a trimester basis for review by IBRD. These reports discussed project status in terms of achievements and shortcomings.

The Project Unit recognized the need for a basic study of the area's nutrition status. Project personnel felt that the formulation of a solid statistical data base was an urgent need. The evaluation concentrated on the results of collective farming, changes nutritional habits, and the nutritional self-sufficiency of the various communities. These first studies had a direct bearing on the ongoing work of nutritional components.

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Table 3

Nutritional Component - Investment and Operating Costs

(Percentage Distribution)

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<u>Investment, Technical</u>	
<u>Assistance and Training</u>	<u>%</u>
- Equipment and supplies for Project Unit (Based on programs supported by UNICEF in Peru)	6
- Tools for participating communities (to be provided to approximately 40 communities)	4
- Building material for participating communities	6
- Staff training (Materials and per diem for 30 days for 60 volunteer sectoristas)	5
- Vehicles and spare parts (Four 4-wheel drive vehicles, 10 motorcycles and 80 bicycles)	13
- Technical assistance (Expatriate technical assistance, transport and per diem)	<u>10</u>
<u>Subtotal</u>	44
<u>Operating Costs</u>	
- Staff salaries (Three professionals and seven sub-professionals)	15
- Per diem	4
- Vehicle maintenance and fuel	7
- Credit fund (revolving fund for short-term loans)	21
- Survey and evaluation (By National Institute of Nutrition, under an agreement to be signed with the Project Unit)	<u>9</u>
<u>Subtotal</u>	56
N = US \$ 651,500	100

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Source: The World Bank: Report No. 2736-E.

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Current Project Status

A) Village Based Paraprofessionals (VBP's)

A fundamental element in the development of the nutrition strategy has been the use of VBPs. VBPs were selected in each community by an assembly of villagers, a traditional town meeting. The ideal criteria for selection of VBPs was the following:

a) that the VBP would be influential in the community, b) that he would be literate, c) that he would have a working knowledge of Spanish, and, d) that he would be willing to volunteer his time.

VBPs can serve as the critical link between project headquarters and the communities.

Once selected, the VBPs were sent to a 5-10 day training course. Community development VBPs were trained to recognize village level problems and how to use local resources to overcome these problems; agrarian VBPs were trained in cultivation and vegetable gardening; and the livestock VBPs learned how to establish small farms to raise chickens, rabbits and guinea pigs, etc. During the training session, the VBPs were observed and aided by nutrition extension officers.

VBPs were to spend one day a week working directly on assigned sectoral areas, and then to meet together to share observations at least once every two weeks. However, not all VBPs have followed the suggestions they received in training, and many get discouraged. For example, one VBP explained, "I think that I am not going to continue; I have served for 3 years. One has to take care of himself, considering that there is the high cost of living, and in a day one can lose everything..."

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Table 4

Activities Programmed and Executed in 1981  
and Programmed for 1982

Activities	1981		1982	Total
	Programmed	Executed	Programmed	
C. <u>Communities to be attended</u>	20	20	10	30
1. <u>Training</u>				
- Courses for promoters	3	5	6	6
- Training for promoters:				
. Social	20	20	20	20
. Agrarian	20	20	20	20
. Livestock	20	20	20	20
- Actualization - Reinforcement of the promoters training:				
. Social	-	-	40	40
. Agrarian	-	-	40	40
. Livestock	-	-	40	40
- Seminar for promoters (all of them)	-	-	1	1
2. <u>Organization of:</u>				
- Mother's Clubs	20	20	10	30
- Demonstrative centers	20	18	10	28
3. <u>Nutritional Education</u>				
- Families to be attended	1,440	321		?
4. <u>Diffusion and motivation</u>				
- Production of booklets	26	3	?	?
5. <u>Agrarian activities</u>				
- Farming of potatoes: Ha.	10	16	10	26
- Farming of quinoa: Ha.	20	13	10	23
- Farming of beans (haba): Ha.	-	-	2	2
- Pilot (or communal) vege- table gardens	20	21	9	30
- Family vegetable garden	200	378	120	498

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Activities	1981		1982	
	<u>Programmed</u>	<u>Executed</u>	<u>Programmed</u>	<u>Total</u>
- Distribution of horticultural equipment	20	3	?	?
6. <u>Livestock activities</u>				
- Raising of cuyes (cobayos):				
. Communal farms	3	3	4	7
. Family farms	-	-	8	8
- Raising of rabbits:				
family farms	-	-	2	2

Source: PROSIRP Documents.

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B) Mother's Club

Organized with the aid of the community development VBP, Mother's Clubs have become a significant factor for involving the women of the community in nutrition programs as well as handicrafts, sewing, animal husbandry, and home economics.

They have weekly sessions to learn how to prepare simple dishes based on traditional foods and food obtained from the vegetable gardens. Each participant contributes a portion of food for the preparation of a common lunch or for demonstration preparations. Some of the recipes, however, are impossible to prepare at home. A woman from the Mother's Club in Sutuca observed: "My, the quinoa cocktail that we are preparing is good, but how are we going to do it at home..."

The success of the Mother's Club has been largely due to work done in previous projects. This project has broadened their scope and provided some communities with workshops containing sewing machines and looms.

Nutritional education has provided knowledge to mothers and children of the value, use and storage of traditional food. This is done primarily through the Mother's Clubs. In the first year of the project, development has been limited due to scarcity of kitchen utensils and lack of a home economist. Inability to distribute nutrition literature widely, due to lack of funding and personnel, has also reduced project effectiveness.

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C) Common Farming

1) Agricultural Production Centers

The pilot agricultural production centers have been established in schools and other nearby locations. In some cases, the land used is the property of the school, and in others it has been donated by the participants. In order to ensure that the plots were economically viable, some peasant farmers had to give up some of their land. Nevertheless, the successful demonstration effect of these parcels has been evident in requests to enlarge the area under cultivation and to incorporate more and more farmers interested in achieving similar results.

The project lends each demonstration center seed, fertilizer, fungicides and insecticides. Part of the center's yield is used to pay back the loan. Of the remainder, one portion is used for seed, another for purchase of implements, and the remainder is distributed among the farmers. The productivity of these centers and the vegetable gardens is shown in Table 5.

2) Vegetable Gardens

Twenty pilot vegetable gardens ranging from 20 m<sup>2</sup> to 300 m<sup>2</sup> in area (generally 200-300 m<sup>2</sup>) were started on school property. Under the direction of the agricultural VBP, community members farm the land with seeds provided by the project on a grant basis. A large part of the harvest goes to the school itself and to the Mother's Clubs. What remains is consumed by laborers, and a small quantity is actually sold. Among the vegetables produced are beets, collards, spinach, carrots,

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Table 5

Results of the 1981/82 Campaign  
in the Communities Visited  
(potatoe and quinua)

Community	Cultivated Area (Ha)	Seed Used (Kilos)	Harvest (Kilos)	Estimate Production Ha./Kilos	Seed (for keeping (Kilos)
<u>Farming of Potatoes</u>					
1. Quello Quello	1.2	1,400	10,000	10,285	1,500
2. Sutuca Urinsaya	0.9	1,100	10,000	7,800	1,100
3. Candile	0.5	600	6,700	13,400	900
4. Almozanche	0.1	120	800	8,000	150
<u>Farming of quinua</u>					
3. Candile	0.5	6	942	1,884	8
4. Almozanche	0.5	3	450	1,800	10

Source: Information in the four communities and PROSIRP documents.

onions, lettuce and cabbage. Yields fluctuate due to frosts and lack of water for irrigation.

Family vegetable gardens are considerably smaller and receive additional inputs directly from UNICEF. According to a VBP in Quello Quello:

"They (the peasants) received seed but did not use them all. They did things in a bad way, not as they were taught, but as they thought. They did not obtain a good harvest, only some did...the rest did nothing. The seeds were thrown among the pasture and only some of them. They placed carrots in very small plots in order to plant them again after they had grown a little, as they were taught. Because of that, next year we are not going to give the seed, we are going to have only one big plot, the same as for the school."

Nevertheless, the existence of the smaller plots has introduced new vegetables into villagers' diets. Previous to the project, many farmers were only growing onions and/or cabbage. Many farmers hope that the small gardens will generate a cash income, making them more interested in obtaining higher yields.

### 3) Animal Husbandry

To increase protein intake in diets, guinea pig production has been introduced in three communities, and will be introduced in eight more this year. There have been several setbacks in the development of the nutrition activity:

- 1) Lack of communal land resulting in dispersed lots.
- 2) Lack of hand pumps for efficient irrigation in most communities. Water has to be transported to the fields from up to 4 km away.
- 3) Lack of equipment at Mother's Clubs.

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- 4) The delay in approval and dispersement of budget items for the nutrition intervention.
- 5) Lack of transportation for technicians due to delay in the acquisition of project vehicles.
- 6) Lack of project coordination. Each division is proceeding as a separate entity.

But in Candile a peasant says, "Everything is alright..., the people of UNICEF serve us well..."

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Small Group Task (C)

What is your team's overall assessment of the Puno Integrated Rural Development Project from a consumption/nutritional activity point of view?

Based on the information available to you, what would be your evaluation strategy if your team were invited into Peru to conduct a mid-project evaluation?

Specifically, address the following issues, and be prepared to present your evaluation strategy in response to them:

1. What would be your major working hypothesis in approaching the evaluation task?
2. What would be the highest priority data you would seek?
3. How would you go about getting it?

## PUNO INTEGRATED RURAL DEVELOPMENT PROJECT

### Trainer Notes

The case analysis, small-group discussions and presentations are all designed to help the participants think through the design, implementation and evaluation of a rural development project in which consumption/nutrition issues need to be addressed.

### Overview

The overall case is divided into three parts, cases (A), (B) and (C), in that order. Material for each case was gathered on site, as well as from World Bank, FAO and other documents in Washington, and from interviews and correspondence with people involved in the project design and implementation. It should be noted that information and recommendations have been condensed and modified for case presentation. Materials presented are not intended to illustrate the vast scope of the project, but for discussion and training purposes only.

Part (A) of the case presents background on Puno, Peru prior to actual design of the project. Initial background material is presented through a videotaped presentation, and a script should be made available so participants can refer to it during the first small-group task.

Part (B) presents a series of recommendations by outside consultants on how the larger project could integrate objectives and activities in order to address consumption/nutritional concerns. The memo from the contractor, as presented here, is not simply one set of recommendations by any particular contractor, but a combination of several.

Part (C) presents bits and pieces of recent information (July, 1982) about project activities during implementation, and is intentionally incomplete to allow participants the opportunity to formulate their own assumptions and hypotheses about the Puno project with respect to consumption/nutrition issues.

### Introducing the Case Study

The Puno case is intended for use in the Latin American region. Therefore, the trainer(s) will first want to determine whether any of the participants are familiar with the actual project. If so, the trainer can:

1. Invite that participant to become a resource person for the groups as they work, providing him with learning objectives of the case,
2. Invite him to participate in small group task meetings, but without adding "inside information." At the end of the discussion, make time so he can present his own view of the case analysis.

The case should be introduced objectively to the group, and should not be a question of the right or wrong way to design and implement a rural development project with consumption/nutritional concerns, but as a genuine effort to do so, under difficult circumstances.

### Timing of the Unit

#### Set-up (Allow approximately 5-8 minutes)

The trainer should refer to the concepts and skills that have been introduced during the workshop. It should be emphasized during the set-up that this case study, unlike Lower Volta, will be one that the groups will follow through from pre-design to design, implementation, and evaluation.

#### Individual Preparation (This should require about 20-30 minutes)

If the workshop design schedule is being adhered to, this preparation should take place in the afternoon, after viewing the videotape as a group. It will probably be helpful in introducing the individual preparation task to encourage participants to focus on the small-group task before they read the case.

#### First Small Group Task (This should require about 45 minutes)

In beginning the small groups, the trainer should decide and announce in advance whether he/she wants the groups to produce a written report on flipcharts. If so, it may require an additional 10 minutes for the groups to prepare their flipcharts.

It is recommended that trainer(s) be available during the small-group discussions, and intervene only if they feel the group is missing the initial learning objective.

The major learning points for the first small-group task are:

- To think through and determine what kinds of nutritional objectives could fit in these circumstances with agricultural and rural development objectives,
- To select some of the information-gathering tools learned, and decide how to apply them in this situation to assist in project design,
- To anticipate some planning, policy and management issues that might arise in a situation such as Puno, while focusing on nutritional issues and concerns.

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Report-Out (Allow about 20 minutes for each report-out)

For some groups, the time indicated might include time for some questions and answers. It is suggested that the trainer(s) try to limit these first questions to clarifying questions. Some members from other groups will feel the need to ask rhetorical questions after a report-out, to make a critical point, or to anticipate in a defensive way some potential criticism of their report, which is yet to come.

If it can be managed, it is recommended that groups be asked to hold their critical or comparative questions or remarks until after all reports have been made, clarified and understood. At that time, a general discussion can be more fruitful. Focus on the major learning points (previous page) while leading/facilitating that discussion.

Process Discussion (This should be about 20-30 minutes)

After the general group discussion, the trainer(s) may ask some summarizing questions such as, "What can we conclude from the presentations and discussion?"; "Can you see how those ideas can be applied in your country of assignment?"; etc.

A second series of questions can help wrap up this section of the case discussion, such as: "How can you relate this, specifically, to your own project brought to the program, or to a project you have been familiar with in your country of assignment?"

As this discussion winds down, the trainer will want to make some transitional comments in preparation for the (B) case. Reference might be made to how individual participants would frame their specific recommendations for introducing nutritional activities into the project design. A brief set-up for the evening reading assignment should suffice. It should be emphasized that the (B) case is a series of recommendations from a consultant/contractor who visited the potential project area. Once again, they should be encouraged to read the small-group task at the end of (B) case in preparation for reading this section of the case. This will help them to focus on why it is being read.

Reading the (B) case should take no more than 20 minutes.

Second Small Group Task (Should take approximately 45 minutes)

The task, as presented, is fairly self-explanatory. The problem to watch out for is difficulty with the first item. If their conclusions from the (A) case are inconsistent with the facts of the (B) case, there is a problem. If this happens, the trainers should review the facts of the (A) case with the group to ensure a complete understanding of case objectives.

It is recommended that visual aids, or a flipchart, be used by each group in this small group presentation. This should be possible in the time allowed, however it is suggested that the trainers/facilitators remind groups of their time limit about 10 minutes before their time is up.

### Process Discussion

A different questioning strategy is suggested. Trainers might ascertain what assumptions are behind each group's recommendations by challenging them. Similarities and differences between group findings are other areas on which to focus.

During the discussion, the trainer should let participants know the case recommendations were generally accepted by the GOP. This fact will become obvious when they read the (C) case.

At this point you will want to lead into the (C) case. Transitional questions should focus on measuring the impact of the report's recommendations as well as the group's own recommendations on the community.

### Individual Preparation (Allow approximately 15-20 minutes)

Participants should be told at the outset that information is incomplete about what is actually going on in Puno. This section of the case should give participants the opportunity to apply their own experiences to this new situation.

### Third Small Group Task (Allow approximately 30 minutes)

At this point, trainers should be aware of participant fatigue, and should keep instructions concise, and the pace moving during small group discussions.

### Process Discussion and Wrap-Up

It is difficult to measure and evaluate the impact of nutrition interventions in any development project. In order to get participants thinking about how to achieve this with the Puno project, invite each group to comment on the previous group's report-out. This will help them do their own summarizing, as well as reiterate the major learning points of the entire project.

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