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FINAL REPORT: A CASE STUDY OF VEGETABLE PRODUCTION AND MARKETING IN WESTERN GUATEMALA

Prepared for:

United States Agency for International Development
Development Support Bureau
Office of Rural Development and Development Administration

Rural Marketing Project Development, #936-1192
Under Contract AID/afr-C-1144,
Work Order No. 9

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Research Triangle Institute

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EXECUTIVE SUMMARY

This report presents the results from a case study on rural marketing in the Western Highlands of Guatemala. The study concentrates on understanding the interactions of marketers and vegetable producers in Almolonga and Zunil--two villages in the province of Quetzaltenango. Changes in income growth and distribution are examined within a framework which combines anthropological background and economic analysis.

The results of fieldwork in Almolonga and Zunil indicate that marketing is an important income source for low-income rural families--a population with which AID is particularly concerned. The returns to marketing labor are close to the wage rate in agriculture. Marketing margins vary with the capital, risks, and labor associated with different routes and marketplaces. Entry to marketing is relatively open and all routes are characterized by price competition. An important attribute of the vegetable marketing system is its compatibility, as an income-producing activity, with different types of landholding status, irrigation methods, and cropping cycles.

Economic analysis estimates that two-thirds of the wholesale price of vegetables now accrues as a payment to labor from low-income rural families. Only 12 percent accrues to nonlabor marketing costs, and much of this is for transportation. Because of the low margins and the efficiency of marketing, as well as the demographic characteristics of marketers, interventions aimed at reducing marketing margins are likely to have deleterious effects on the incomes of low-income persons from Almolonga and Zunil.

Simulation analysis was used to determine the importance of different sources of risk to the profits of Almolonga and Zunil vegetable farmers. These simulations show that within-month price variation, the risk which could best be reduced by a large marketing organization, is only significant for several crops and is no more important than the risks farmers face from seasonal price variations and yield variations. Therefore, interventions aimed at enhancing agricultural productivity would appear to have a greater potential to increase incomes.

From examination of this case study and the literature, it is clear that broader market-related issues must be analyzed before the effects of changes in rural marketing systems can be understood. The reaction of margins to changes in different parts of the system and the effects of interventions on the employment and demographic structure of the area are important. Development of horizontal market links results in communication of economic information and an increase in specialization and diversification. Characteristics of marketing systems can have broad effects on the reorganization of all household production. The results of the fieldwork and the concommitant analysis strongly support the concept that marketing development must be viewed in the context of production-consumption relationships, with special emphasis on the household's allocation of time.

INTRODUCTION

BACKGROUND AND CONTEXT

This report presents results from a case study on rural marketing in the Western Highlands of Guatemala. The case study was undertaken by the Research Triangle Institute under contract to the United States Agency for International Development.[1] This section will present the background and context for the study by briefly reviewing some issues related to the role of marketing services in rural areas in developing countries with particular emphasis on the implications for the design of development assistance efforts. These issues are focused on small farmer marketing activities in Guatemala as a specific context for the field work and analysis. It is hoped that the study results will be of relevance and use to the Government of Guatemala and the USAID mission in Guatemala. The main purpose, however, is to identify a broader set of issues regarding the Agency's overall marketing services program.

Marketing consists of all the services of persons and materials used in linking the production of agricultural products to their consumption. These services may include harvesting, processing, transportation, storage, packaging, display, advertising, and similar service functions. These functions are performed by human agents to close perceived disequilibria between demand and supply at different points in time and space. As a consequence of these functions, there evolves the information system for assigning value to products, factors of production, and human time. Marketing is a focus for rural development activities because it is widely believed that inefficiencies and externalities arise in the performance of the cited services functions. Furthermore, these inefficiencies and externalities are thought to be more prevalent when the producers are low income persons with relatively small land holdings. This case study considers the affects on income generation and distribution from possible public interventions in the production and marketing of horticultural products in the Western Highlands of Guatemala.

Issues in Marketing and Rural Development

The marketing systems that have evolved in developing countries are frequently described as inefficient on either technical or economic grounds or both. Technical inefficiencies are diagnosed when analysts observe many actors in the marketing system each operating at relatively small scale with supposedly inefficient techniques for transport, packing, storage, display, and vending of agricultural products. Economic inefficiencies are diagnosed as leading to "excessive margins, exploitative middlemen, and uninformed farmers."[2]

To the extent that many technical inefficiencies have been viewed to be external to individual producers, traders or consumers, public investments have been used to seek technical efficiency in marketing systems. These public investments have taken many forms, but have generally been addressed to achieving economies of scale in transport, storage, and sanitation. Where economic inefficiencies were believed to exist, public intervention through marketing boards has been directed at eliminating monopoly and/or monopsony rents. Typically, public investments and interventions have been promoted and justified on the basis of both technical and economic inefficiencies. This basis has led to the establishment of large public enterprises that are involved in all facets of agricultural marketing.

Currently, concern is being expressed for possible deleterious impacts or equity from public investments in agricultural marketing. For example, recent documents from Michigan State University state that it is necessary to "explore (both) the equity and efficiency implications of alternative marketing arrangements."[3]

These concerns are manifest within the Congressional mandate for the United States Agency for International Development. The Congressional mandate includes an emphasis on promoting the equitable distribution of income, a targeting of services to the poorest of the poor, an emphasis on aid to rural areas in order to reduce rural to urban migration, the promotion of programs to aid farmers with small holdings and the landless in rural areas. In addition, there is increased concern for the generation of employment opportunities. In this context, marketing services are both a means for the distribution of farmers' produce and a potential source of income

for poor rural persons. Relatively little is known about the economics of marketing services in this broader context. While extensive research has been undertaken by anthropologists, little of the insight developed has been brought to bear on rural development policies and programs.

Anthropological analyses of marketing systems suggest that the systems which have developed in response to different geographical, historical, and cultural conditions may not ensure the complete equilibration implied by the neoclassical economic paradigm. These systems can have different consequences in valuing the products and factors of production (including human time and land) of rural producers. These effects can promote, be neutral to, or constrain the economic choices available to participants in the system. Anthropological analysis has shown that the hierarchical structure of a marketing system is a crucial determinant of these consequences. As such, classifications of these hierarchies should allow a diagnosis of the causes of inefficiencies and externalities which may exist. This case study attempts to integrate the anthropological perspective with the analytical approach of economics to broaden the understanding of the role of marketing services as instruments for enhancing rural development and improving the well-being of low income producers and consumers of agricultural products.

Further reasons for interest in marketing focus on the perceived failure of prior efforts to improve marketing in developing countries. These failures range from marketing boards that are little more than mechanisms to tax the farmer, to empty grain silos, and empty public markets that were sincere efforts to reduce the alleged technical and economic inefficiencies. Past public investments in facilities and institutions have failed to fully achieve the intended benefits and may have, in some cases, generated regressive impacts on the intended beneficiaries. Some of the claims include the following. Costs have been greater than expected, savings have been less than expected, unemployment has been created, physical facilities have not been used, and the urban middle class has benefited at the expense of the rural poor.

The Agency's concern for distributional as well as efficiency impacts of future marketing projects form the broad context and motivation for this case study and for the Rural Marketing Project Development Study. The case study was undertaken in Guatemala because the Agency is assisting the Guate-

malan government in a number of developmental efforts related to the marketing of agricultural products.

Among these are projects to expand and diversify production of crops by low income farmers and to develop facilities and institutions for distributing, processing and packaging of fresh fruits and vegetables. These efforts seek to increase farmers' incomes, reduce food costs, and improve the diets of low income consumers as well as contribute to overall economic growth.

Objectives of the Case Study

The overall objective of this study is to assist the Agency in conceptualizing the small farmer marketing problem in its social and economic dimensions. The specific objectives are:

1. Provide information to improve the design of field assistance efforts in rural development;
2. Provide specific information about the structure of rural markets in the context of small producer/small consumer access to market services;
3. Provide USAID/Guatemala with information that will assist in the implementation and evaluation of the small farmer marketing project.

The study contributes to these objectives by highlighting a number of issues that should be considered when designing and executing marketing projects. The study uses limited primary data from two villages and sparse secondary data from a number of sources. Given this meager data base, the study can only raise issues, not resolve them.

AGRICULTURAL ACTIVITIES OF THE WESTERN HIGHLANDS OF GUATEMALA

The agricultural activities and general economic activities in Guatemala have been described by many authors. Economic and statistical descriptions can be found in recent publications by the Agency[4] and by the World Bank[5]. There are also a number of recent unpublished reports which describe the agricultural activities of families in the Guatemalan highlands. These include a report prepared for the AID mission by Adriana Bosch in 1978 and various monographs prepared by the socioeconomics analysis unit of I.C.T.A. (The Guatemalan Institute for Agricultural Sciences and Technology). Descriptions of agricultural markets can be found in the dissertations of Smith,[6] Churchill,[7] and Gonzales.[8]

In particular, Smith[9] has used the Central Place Theory to describe the marketing systems of the highlands. She describes integrated systems as being characterized by a lack of political control over the developing economy, a lack of concentration and monopoly in production and distribution, and a high degree of peasant participation. In addition, such systems involve growth in domestic demand for local products. This last attribute is particularly important because internal demand in the region leads to innovation and diversification of production. In such a system, marketing functions are performed by residents of the region. Bulking centers provide the translation of demand from one village to another; the regional economy is integrated so that markets effectively assign the correct prices to labor and output. Such a system is effective in identifying and closing disequilibria throughout the region. Such are the conditions in the province where this case study was undertaken.

Smith also defines dendritic systems as being characterized by a lack of major marketplaces; large towns that exist in the system are located near more developed regions. Small towns are strung out away from the intermediate centers, generally becoming smaller with increasing distance. In Guatemala, the departments in the northwestern periphery follow this pattern of the

dendritic system. The marketing system of the region consists of traders, from the other regions, who supply the small towns with consumer goods. There is little use of productive resources for cash production; Smith has attributed this lack to the marketing system's inability to dispose of surplus or specialized agricultural goods. To satisfy their demand for cash incomes, 50 to 75 percent of Indian heads of households must migrate to the coast to work on plantations.[9] Monopoly control of local markets and transportation and a very low degree of peasant participation in commerce is said to keep the markets oriented to vertical links with consumer goods suppliers outside the region. The lack of hierarchical organization of marketplaces results in the absence of horizontal linkages between villages in these systems. The demand for cash incomes, combined with a paucity of economic opportunity, keeps the price of labor extremely low. Agriculture attempts to meet subsistence needs because there is little effective demand for agricultural products. Smith states that economic conditions in outside regions determine the prices of factors of production, making any reorganization or development difficult.[9] She describes primate marketing systems which are distinguished by the predominance of a small number of urban centers with only high-level marketplaces. These systems exist in areas of large-scale agriculture, particularly in cash crops for the export market. Commercial services for the export sector are performed in the urban centers where owners and managers reside; therefore, very little bulking takes place in rural marketplaces. In addition, transportation links are good between commercial centers, but are very poor to rural towns. Such is the case in the Western Lowlands of Guatemala. Most productive resources, including land, are owned and controlled by large-scale enterprises. Thus the region is dependent on traders from highland areas for food and labor and on external, more developed economies for market outlets for the products of the plantations.

The field work for this study was undertaken principally in the areas around Quetzaltenango which Smith has classified as having integrated marketing systems. In such systems innovation and public intervention aimed at assisting small producers can be expected to achieve some short-run gains. In dendritic systems such as the northern periphery of the highlands, infrastructure investments such as feeder roads may be desirable. However, it is

unlikely that marketing interventions could achieve any self sustaining gains in income generation for small farmers. In the primate systems of the coast, marketing interventions would probably assist large-scale farmers in the sale of their export crops. Some of the land reform areas in the south coast are producing basic grains, and these areas are already being assisted by the National Agricultural Marketing Institute. After consideration of this information and assessment of the limited time and resources for field work, it was decided to concentrate in the vegetable production zones of Quetzaltenango with a limited overview of the other two types of market structures.

The following brief overview of the rural economy is presented as an aid for the reader who is not familiar with any of the many descriptive and analytic works on the Guatemalan highlands.

A BRIEF OVERVIEW OF THE RURAL ECONOMY

Rural villages through highland Guatemala produce corn and beans (the milpa complex) for domestic household needs. Villagers also engage in one or more activities for cash incomes--wheat, potato, or vegetable production, artisanry, trade, and migrant labor.[10]

Corn is grown on unirrigated land. It is planted in March, weeded and hilled once or twice, and harvested at the end of the year. Corn has a long growing season in the highlands because of the cool climate. Field beans or some other grain legume are grown in associated culture with the corn plants. Those families able to grow most or all of their own corn and beans typically sell only that amount necessary to recoup their costs, especially fertilizer costs. Those families who can not produce their yearly supply typically take cash from their other activities to cover the costs of their basic diet.

The majority of the farms in the highlands are 1 hectare or less and many families participate in off-farm activities as additional sources of income. The World Bank report indicates that the intake of foodstuffs by persons residing in rural areas is considerably below recommended levels (range 25 to 89 percent of recommendations). At the time of the World Bank study (1975), the rural daily wage rate was one third of the estimated minimum family budget for the typical rural family. Accordingly, the typical

rural family needs to achieve full-time employment for more than three of its members to meet the minimum budget on an annual basis. It is unlikely that farm-related activities can provide this level of employment for most rural families.

Adriana Bosch reports in her study that about 3 percent of the land in the highlands is planted to horticultural crops (including potatoes). But on those farms with horticultural production, fruits and vegetables sales represent approximately 80 percent of the household income and household incomes tend to be higher. In general, all cropping activities represent less than half of the household income.

In her sample, Bosch found that off-farm employment for wages contributed 10 percent of the average family income and nearly 30 percent of the cash income. Other off-farm activities, such as marketing, milling, crafts, butchering, and construction-related work contribute the balance of the farm income. Incomes were found to vary widely across geography and different commodities.

In this context of rural poverty, vegetable production and marketing have been considered as a possible source for increasing incomes and well being. The following is an overall description of vegetable production in the highlands.

Vegetable Production and Marketing as a Source of Income

Thirty or 40 years ago, vegetable production was the specialty of a very few villages in the highlands. Evidently, there was one vegetable producing village in each subregion--Aguacatan in the Huehuetenango area; Solola and Panajachel in the area around Lake Atitlán; Almolonga and Zunil in the Quetzaltenango area, and San Pedro Sacatepequez in the San Marcos area. Each of these vegetable producing towns was near a major urban center, whose demand supported specialized production in some favored outlying village, which was the sole provisioner of vegetables to that center. This situation has changed with the advent of trucking. Today these towns compete among themselves to serve the largest urban markets, particularly Guatemala City. The initial vegetable-producing villages today face competition from other villages within their own regions. In Almolonga, for example, a wide array of vegetables has been produced for decades. However, in the last 10

to 20 years, as cabbage production has spread throughout the highlands and carrot production has spread to Llanos de Pinal, Almolonga producers have come to specialize in better quality produce (large onions, cauliflowers) and in more delicate or exotic produce (e.g., celery and brocoli).

The spread of vegetable production in the highlands may be termed "diffusion by example." Production is a matter of personal experimentation. Farmers begin with the hardiest crops and over time find the most profitable crop in their area. For example, farmers in Concepcion Chiquirichapa have long produced potatoes, but not until the mid-1950s when one farmer "found" that a particular variety gave far greater yields in the volcanic ash did potato production become the major cash crop of this town.

As vegetable production spreads from one farmer to another within a village and then from one village to another, the amount of produce coming onto the market increases. This is particularly a problem for dry land producers who are forced by the timing of the rains to plant, and therefore harvest, at more or less the same time. The resulting glut on the market severely depresses prices at particular seasons. Moreover, farmers complain that prices for vegetables have not increased significantly over time. A simple comparison of wholesale farm prices in Almolonga over the past 5 years confirms that vegetable prices have risen less rapidly than the overall cost of living.

All producers are free to enter into the production of any commodity, and many do, with predictable consequences on prices. It was clear from the production interviews in Almolonga that farmers will substitute a different vegetable for one that had a low price at that time the previous year. Unfortunately, there are no informational services provided to farmers that might help them in these decisions.

The situation in Concepcion Chiquirichapa this past summer provides a clear example of both rapid changes in production decisions and the extension of vegetable production in the highlands. Farmers in Concepcion plant corn for their own use and potatoes for sale. Potatoes require an especially heavy investment in fertilizer and herbicides. In June of this year, the wholesale price for potatoes in Guatemala City was so low ($2.50 to $3.00 per hundred weight) that farmers could not recover even their purchased-input costs. Thus when it was time to plant the second crop of potatoes, farmers

had to reconsider their options. A few simply abandoned production, leaving their fields idle. Others went ahead and planted potatoes in hopes of a later increase in prices. Some opted for wheat, which enjoys a stable market because of government subsidy programs. And some, especially those with irrigation or nearby water sources, decided to take a chance on vegetable production.

Increasing farm incomes through vegetable production has become an important goal of the agricultural development activities of the Guatemalan government. The income increases would go to land-poor, low-income persons and probably would be spent in the highlands, thus creating an effective demand for the products and services of other low-income persons. Whether public intervention can lead to increased incomes depends on a large number of factors. Farmers grow vegetables when they believe they earn an income from producing and selling them. Public interventions may raise farm incomes by reducing costs of production through technical innovations, facilitating the sale of larger quantities of vegetables, increasing the prices which farmers receive, or combinations of the above. Such interventions are likely to alter the economic relations which have developed in the commodity system. Careful examination of gains and losses to the various human agents that are involved in the factor and product markets associated with the interventions is required before any interventions are deemed desirable. Production costs can be decreased by improving technology and knowledge of growing methods used by farmers. Agricultural extension and technology development services are being offered to small farmers thorughout Guatemala by agencies of the Agricultural Public Sector.

In evaluating the effects of public interventions aimed at assisting farmers, it is important to estimate the distributional shares of vegetable output which are earned by the various factors of production. These are important statistics for estimating the distribution of gains and losses (equity) which may arise from public interventions in the vegetable-producing, marketing sector.

Farm incomes may increase when the value of vegetables grown increases; this may involve either more output, higher prices, or both. Normally, more output and higher prices will be obtained only if there exists an increasing demand for vegetables. If technical or economic inefficiencies exist in the

marketing system, higher incomes could also be achieved by their removal. A more efficient marketing system could reduce the margin between farmer and consumer and allow increased farm gate prices with unchanged consumer prices and quantities or unchanged farm gate prices with lower consumer prices and correspondingly greater quantities. Either of these situations could lead to increased incomes for farmers at reduced marketing costs or reduced incomes for marketers.

A change in the marketing system, as in all economic changes, implies gains to some persons and possibly losses to others. The design of public interventions in the marketing system requires an understanding of the present distribution of incomes among the various factors of production and an understanding of how the interventions would affect the absolute distribution of incomes among the various individuals involved in the production-distribution-consumption chain that is being served by the present marketing system. At the present time the small farmer marketing project is being initiated in Guatemala with USAID mission support. The documents and designs of this project are used as specific isues for analyses as a means of focusing the analysis on some issues of current relevance. It is not the intent of this study to evaluate or prejudge that project, but simply to use its working hypotheses as a guide for this research. It should be emphasized that there are few primary statistics that are representative and apply to any region in any fashion. The analyses undertaken with the little data that was collected are intended to be indicative of issues that require further study in planning marketing interventions.

THE AGRICULTURAL PUBLIC SECTOR AGENCIES IN GUATEMALA

The following descriptions of the institutional environment provides the context for public intervention aimed at assisting small farmers in Guatemala. Guatemala began developing the Agricultural Public Sector with the judicial decree #102-70 in 1970 which established the present structure. The aim was to integrate and accelerate the public efforts in order to improve the productivity of the traditional agricultural sector through the following institutions.

General Directorate (Office) for Agricultural Services (DIGESA)

This office is responsible for coordinating and implementing the production plans of the Agricultural Public Sector within the national development plan. This responsibility is carried out with the coordinating support of the other institutions of the Public Sector.

The purpose of the production plans developed by DIGESA is to transmit the results of agricultural research to the technicians who teach and provide technical assistance to the farmers and see that the services of all the institutions of the Agricultural Public Sector are integrated and received by the farmers. Figure 1 describes the interaction of the training phases of the production technology programs.

The agricultural "promoter" who works for DIGESA and in cooperation with BANDESA and the other institutions is the primary source of services for the small farmer. The promoter collaborates with the farmer in the preparation of work plans, investment and credit, and his prime responsibility is to promote technical assistance so that the activities of the different institutions function together. As shown in Figure 1, the agricultural promoter receives the technology package, which is the result of research, and then he bases the work plans, investments, and technical assistance on the specifications of the package.

To administer the activities of the promoters, DIGESA operates under a decentralized structure and has implemented a planning and control system.

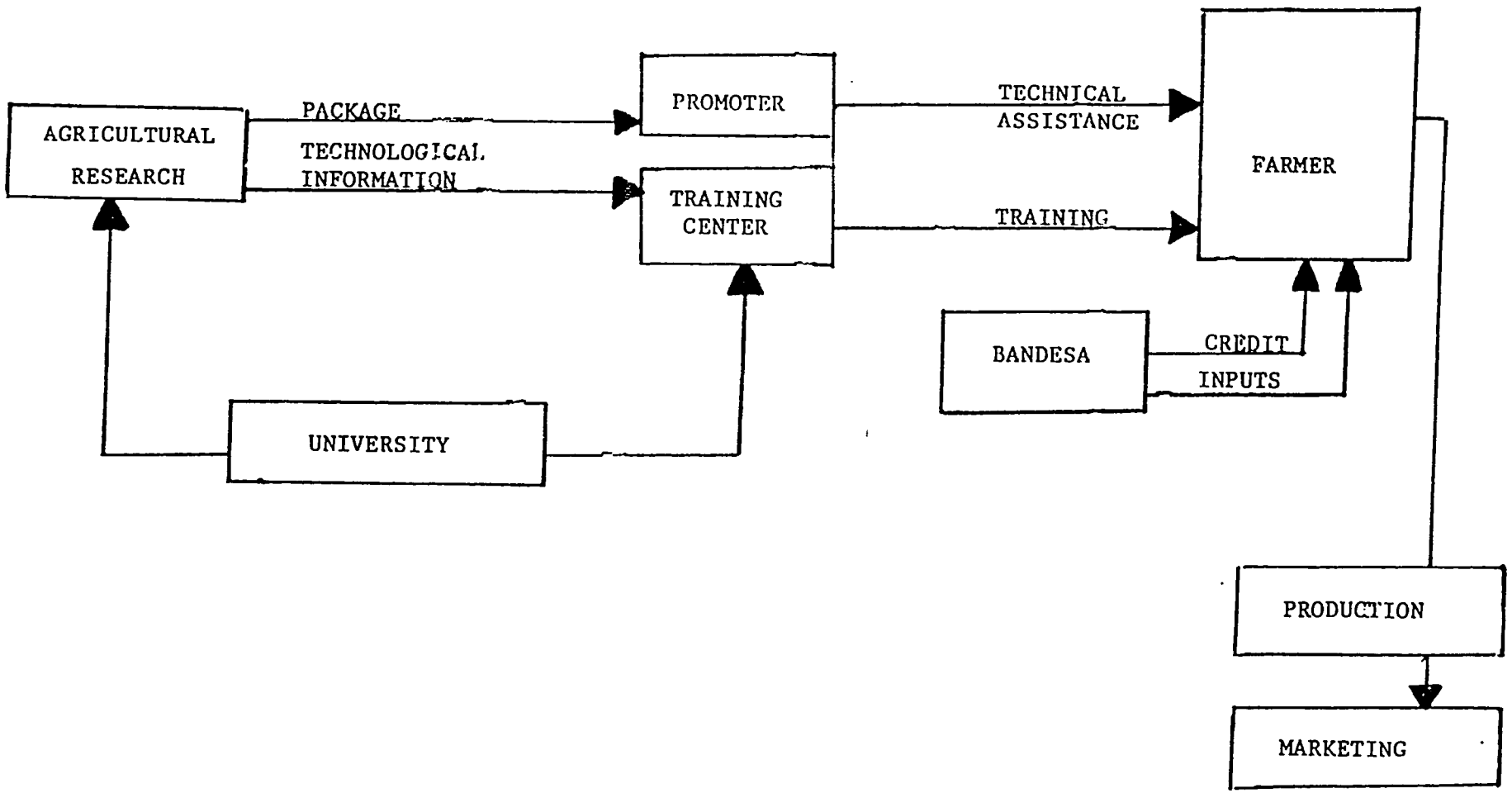


Figure 1. Operation of production programs.

To plan and manage this system, many decisions are taken which have implications for other institutions in the Agricultural Public Sector and/or depend on the plans and activities of these other entities.

The basis of the DIGESA system includes the following activities which are undertaken by the Sectoral Planning Unit (USPA).

1. Project identification
2. Programming activities
3. Introduction of controls (physical and financial)

The plans are explicit for each crop in each subregion and they include the following:

1. Minimum of promoters required by subregion
2. Number of hectares expected to be planted to each crop by region
3. Yields projections to forecast supply
4. Quantity of credit required by crop and region
5. Number of farmers to be served in each region

Agricultural Commercialization Institute (INDECA)

The purpose of this institute is to stabilize the prices of grain by setting minimum prices and intervening in the markets with direct purchasing or imports, depending on what is required by the conditions of supply and demand.

Minimum prices are established on the basis of the estimated cost of production to assure an adequate market price for producers. Imports are used to assure the availability of food to the consumer. To date, INDECA programs have emphasized control of the market for basic grains (maize, wheat, beans, etc.). To make its price stabilizing function effective, INDECA has a program to construct silos to store basic grains. INDECA intervenes in the market for horticultural products through the issuance of export licenses. Its policies can be described as proconsumer because it acts principally to curtail exports when prices rise above prespecified levels. The policies regarding horticultural marketing not only depress the incomes of producers and marketers, but may also induce further instability and risk for the vegetable sector.

National Institute for Agrarian Transformation (INTA)

In 1952 the first law for agrarian reform was passed. INTA has had the responsibility of building roads, bridges, churches, and schools, as well as directing national farm cooperatives. From 1970 to 1972, 157,381 hectares with a beneficiary population of 71,496 were handed over to INTA, and in 1973, 1,006 plots of land for cultivation were established. Those benefiting from the plots were provided with a technical assistance program. The work of the institute has been focused on colonization projects.

In this way, INTA works toward the production and social welfare goals of the farmer. At the same time the beneficiaries of INTA profit from the services of other institutions in the Agricultural Public Sector. For example, BANDESA, DIGESA, INDECA, and ICTA are offering their services to beneficiaries of the agrarian transformation.

National Bank for Agricultural Development (BANDESA)

BANDESA was established in 1971 with the formation of the Agricultural Public Sector. Previously, "The Institute to Promote Production" (1948) was given the responsibility to provide credit to the industrial, housing, and agricultural sectors and The Agrarian Bank (1953) financed the beneficiaries of the agrarian reform. BANDESA operates a trust portfolio with funds from the government, the United States Agency for International Development, the Inter-American Development Bank, and other lenders. These credits are assigned to the production of basic grains, marketing, agricultural diversification, and agricultural cooperatives with the primary emphasis on grain production programs. Most of the loans are made for the use of fertilizers. BANDESA has agents in 29 areas of the country.

BANDESA and DIGESA work together to plan and promote credit programs to small and medium farmers. These services are applied by means of promoters in the field who have the responsibility to assist the farmer develop his investment plan and provide technical assistance. Together the farmers and the promoters develop a work plan as a base from which the farmer may apply for credit. There is a monetary limit of credit allowed for each hectare and for each crop. The farmer must accept credit for fertilizers if he wishes to receive credit for preparing the land, seeds, maintaining the crop, etc. BANDESA plans its credit flow during the year with specific

amounts set aside for each crop and region based on the planning done by DIGESA.

Work plans include information on family structure, the farmer's capital, his agricultural and livestock programs, annual and permanent crop expenditures, sources of income and a summary of debt payments. The distribution of credit is specified for inputs, land preparation, maintenance, harvest, etc. for each crop. Until now this combined action has been the basis of the development plan, and these promotion and technical assistance functions become a part of the production programs of ICTA. The thrust of BANDESA and ICTA programs has been centered on the production of basic grains and it provides little credit assistance to crop diversification or vegetable marketing.

Institute of Agricultural Science and Technology (ICTA)

Within the Agricultural Public Sector it is the responsibility of ICTA to produce the agricultural technology which the production programs deliver to the farmer. This technology transfer is organized under the concept of a production team which consists of production centers previously called "experiment stations." They produce the technology carried to the farms by the promoters in the production programs. At the same time, the agricultural promoters have the responsibility of conveying the needs of the farmers to the production centers.

To achieve the national goals of basic grain production, the production team at ICTA has put forth the following strategies.

1. To improve the traditional system, not supplant it
2. To develop technologies which offer the most security, i.e., the least risk to the farmer
3. To offer timely and adequate credit
4. To offer technical assistance
5. To coordinate production programs with the marketing programs of INDECA
6. The collection of data to evaluate the process

ICTA responds to the needs of the farmers by means of socioeconomic studies to inventory the agricultural resources of the country, catalog the costs of production, study the use of cultural practices, and evaluate the

results. ICTA also develops studies on the availability of inputs, the accessibility and quantity of credit, commercialization and marketing to identify bottle-necks which limit improved production. To date, ICTA's efforts in horticultural production have focused on crops with potential for export to the U.S. winter vegetable market in competition with Florida and Mexico. These efforts do not appear to offer a significant possibility for income growth in the Western Highlands.[11]

CROP DIVERSIFICATION PROGRAMS

Recently, there has been more interest in achieving increased incomes for the farmers of the Western Highlands. The institutions of the Agricultural Public Sector are implementing a crop diversification program. Much of the diversification program is aimed at producing high value fruits and vegetables in the Western Highlands. While some areas have been traditional vegetable producers, it is hoped that more farmers can be encouraged to diversify away from milpa (corn and beans) into horticultural production. To support this effort, there have been investments in small irrigation projects and the various institutions of the Public Sector are giving increasing attention to the production and distribution of horticultural crops.

Part of the logic of these efforts is that with the improved technology for basic grains it will be possible to divert some of the land to high value cash crop production. The USAID sponsored Small Farmer Marketing Project seeks to assist the diversification program by stimulating market access for the new producers.

DESCRIPTION OF THE SMALL FARMER MARKETING PROJECT

The Guatemala Small Farmer Marketing Project is being undertaken by a federation of agricultural cooperatives with support from the Guatemalan government with loan and grant funds from USAID. The project seeks to exploit Guatemala's apparent comparative advantage in the production of temperate climate fruits and vegetables to increase small farmer incomes and increase employment opportunities throughout the Western Highlands. The project is aimed at reducing technical and economic inefficiencies in the way the present marketing system serves the small farmer. It is expected that gains would accrue from reductions in spoilage losses and increases in

prices received by farmers. It is also expected that prices paid by consumers will be lower and the quality of produce greater. The main goal then is to reduce marketing margins and induce a greater flow of marketable produce. The means for achieving the goals are the establishment and operation of a Cooperative Marketing Association which will purchase, grade, process, and bulk produce for sale in Guatemala City.

The following activities were carried out in designing the project by USAID and collaborating institutions.

1. Collection of statistical data and description of the supply and demand situation for each of the 28 products to be marketed by the cooperative association. This effort included: estimating the volumes of imports and exports, including calculations of fresh product equivalent; estimations of production and consumption projected through 1980, estimates of quantities processed and lost during movement.
2. Determination of farm prices, typical input requirements, and preparation of farm budgets for each commodity.
3. Analysis of prices paid by consumers in the terminal market including a nonweighted average for each month during the last 4 years and the construction of fixed indexes and trend calculations.
4. Projections of import demand by the five Central American countries for each of the 28 Guatemalan products.
5. Analysis of geographic distribution, harvest seasons, and the number of farmers growing the crops given consideration under this project.
6. Calculation of marketing margins at each link in the marketing chain and determination of earnings by producers, wholesalers, and retailers.
7. A survey of fruit and vegetable producers in the highlands. About 2,500 producer-members of three cooperative federation affiliates were interviewed and the information was used as a cross-check on other data.
8. Selective interviews with individuals and small groups of producers in twenty different locations throughout the highlands to determine attitudes toward project goals and obtain opinions on marketing problems confronted and how the marketing process might be improved.
9. Interviews with fruit and vegetable processing plant managers to study the prevailing situation in the industry and problems foreseen for the future.
10. Observation of transactions in Guatemala City's Terminal Market, wholesale markets in Solola, Quezaltenango, and San Francisco El Alto, neighborhood markets, and supermarkets.

11. Extensive interviews with leaders of a two-day seminar cooperative to obtain views and opinions regarding the kind of institution that would best contribute to solving the most frequently encountered marketing problems.

12. Repeated interviews with Guatemalan officials in order to draw on their experiences in design of the project and to keep them informed of developments as they occurred.

13. Determination of the type and kind of physical facilities required and identification of equipment needs, staffing and managerial requirements.

These analyses are documented in the Agency's Project Paper and its Annexes. These analyses serve as the point of departure and as the main information base for the economic analyses of equity and risk issues in vegetable marketing. The following section describes the analyses undertaken for this case study.

OVERVIEW OF THE ANALYTICAL APPROACH

The case study was undertaken during the months of June through September in 1979. The study is an integrated research effort of economists and anthropologists. The core of the analysis is based on 8 weeks of fieldwork by an anthropologist who studied production and marketing activities in two villages. In addition to the anthropologist's analysis, his data were integrated by the economists into a simulation analysis of certain market and production risk issues, and the anthropologist's data were used to estimate the functional distribution of income in vegetable production and marketing.

ANTHROPOLOGICAL FIELDWORK

Methods

Systematic interviews were conducted with a random sample of farmers, marketeers, and truckers in each of the three field sites in Highland Guatemala during August and September 1979. These interviews were constructed on the basis of informal conversations with people in those activities and the interviews were further refined as problems and oversights appeared in the original interview schedule.

The production interviews covered cropping patterns, yields, prices received, factors used, and the costs of production. Each farmer was asked to detail the quantity and costs of materials, labor and transport at each stage of the production process: land preparation, planting (transplanting where applicable), weeding, fertilization, irrigation, fumigation, and harvesting. This information was elicited for a specific crop on a specific plot of land. Where several crops had been planted on the same plot in the past year, an interview was done for each crop, consecutively but separately. These interviews were done with farmers in Almolonga, Zunil, and Concepcion Chiquirichapa. Only the data from Almolonga and Zunil have been analyzed at this time.

The format of the marketing interviews was similar in outline, but sought to also elicit information on the marketing networks. Each marketer was asked to detail the quantity and quality of each vegetable taken on his last trip, as well as the wholesale price at which he/she bought and the retail price at which he/she sold. Another section dealt with the costs of transportation, labor, taxes, personal expenses (food and lodging), and miscellaneous and extraordinary expenses. The last section dealt with the average profits expected under various conditions, and the frequency of each situation. Moreover, each trader was asked about his/her landholdings, family situation, and marketing history.

Unlike farmers, who enjoy a break from their work in the fields, marketers proved to be a rather inaccessible group of people. When buying produce at market, marketers are extremely busy. They could spare only 10 or 15 minutes. To overcome this problem, vendors were interviewed at the destination markets early in the morning. This strategy proved advantageous. Not only was it possible to interview vendors, but it was also possible to count the number of marketers and amount of produce coming into each market on a normal day and to check selling price information over the course of the market day.

Marketer interviews were conducted with 32 vendors from Almolonga, 42 vendors from Zunil, and 33 vendors from Concepcion Chiquirichapa. These were done in the Almolonga marketplace, in the destination marketplaces, and, by appointment, in the vendors' homes.

In order to ascertain the volumes and prices of produce in the Almolonga wholesale marketplace, censuses of wholesale buyers were conducted daily during the course of fieldwork. These censuses involved a count of the quantity of each vegetable bought by each vendor, the selling destination of each vendor, and the prices prevailing that day for the produce. Besides giving an estimate of the importance of the Almolonga marketplace, this information provides an independent check on wholesale buying price information reported by marketers in interviews.

The trucker interviews asked about the financing of the vehicle, usual routes and costs, as well as the usual personal occupational history, family situation, and landholding. In all, 12 truckers were interviewed in Almolonga (8 owners of large trucks and 4 owners of pick-ups), 8 truckers in Zunil (5

owners of large trucks and 3 owners of pick-ups), and 6 truckers in Concepcion Chiquirichapa.

This systematic information is supplemented throughout this report with understanding and examples gleaned from everyday conversation with people involved in each endeavor. The insights thus developed are presented in the results section and were used to create the basis for the economic analysis.

ECONOMIC ANALYSIS METHODS

Several issues which are important to an understanding of marketing in the context of rural development form the framework for the economic analysis of potential public interventions in the marketing system for vegetables from the highland areas around Quetzaltenango. One of these factors is the extent to which the existing system can be utilized and expanded. There has been a tendency to favor large, modern systems which are designed to supplant the current distributional methods. Quite often, however, the existing marketing system has developed in response to unique conditions and constraints which make it appear inefficient. The proposed solutions ignore these constraints and are often ineffective. Before considering any of the following types of interventions, it is important to understand the rationale in the existing market systems. When this understanding exists, it is possible to consider some of the following interventions.

Public investment in infrastructure can reduce marketers' costs and give increased access to markets to small rural producers. Building or paving roads can make transportation cheaper and less dependent upon good weather. Public market buildings, grading and measuring equipment, and storage facilities can all contribute to a marketing system which better serves rural producers. However, the location and timing of such improvements are essentially political decisions, and one geographic or socioeconomic group may gain at the expense of other groups. For example, communities recently connected by roads will be able to market their goods much more cheaply than those communities not connected by roads. One infrastructure investment which many writers agree will increase economic efficiency is government development of a quick and accurate price information system. Up-to-date information on prices from all regional markets would help to stabilize the day-to-day variation in prices and would probably improve the

bargaining position of farmers vis-a-vis marketers. In Guatemala, such a service could best be provided by radio announcements; newspapers do not reach a large percentage of rural producers.

Interventions designed to improve the technical efficiency of marketing systems can have unfavorable effects when planners do not consider the characteristics of the affected area. Capital-intensive grading and processing facilities and sophisticated transportation systems require experienced management and trained workers; this human capital is often unavailable and difficult to create. If they are improperly managed, the new systems perform more poorly than the systems they were designed to supplant. When qualified personnel can be found, they are likely to have more education and be from urban areas. In this case, uneducated rural peasant labor may be replaced by capital and a smaller quantity of skilled labor. Further, the marketing decisions will be made by individuals from different areas and socioeconomic backgrounds than the producers. These differences may cause decisionmakers to be less responsive to rural producers and less concerned with horizontal linkages. The control of a marketing system by those external to the producing region can constrain economic opportunities.[9] Planners should consider linking capital-based improvements with training programs that can improve the skills of the rural population. This linkage might allow the knowledge and experience which has accumulated among "inefficient" marketers to be combined with new techniques.

Many interventions into the agricultural market are concerned with establishing a stable price. When pricing decisions are taken out of the marketplace, policy makers must consider the tradeoff between producer incomes and the ability of the urban poor and middle class to purchase nutritious foods. Political pressure from urban dwellers and other interest groups favors pricing policies which are not advantageous to farmers.[12]

Price-maintaining interventions or floor prices for crops can reduce the risk to new producers. Farmers are more likely to plant when they are sure of a market and do not fear drastic price drops. However, with constrained prices, the market loses much of its information-transmitting function. The guaranteed price may encourage inefficient as well as risk-averse farmers to enter production. If the price-controlling mechanism is a buffer-stock agency which alternately adds to and disposes of its stocks to stabilize the market price, the agency may find itself with a huge and

unmarketable surplus. Production will have been reorganized in an inefficient and economically untenable manner; such reorganization does not increase the permanent economic welfare of rural areas.

In assessing the results of interventions into agricultural markets--the gains and losses to actors in the economic system--planners must understand the nature of demand for the product in question. There is no reason to encourage major expansion in the production of a crop where demand is not price-elastic and cannot be expected to expand. Such output may require major price drops to clear the market, and this results in a transfer of welfare to food consumers and away from rural producers.

Where excessive margins or market control by outsiders exists, marketing cooperatives run, sponsored, or supported by government agencies have been viewed as attractive remedies. These cooperatives may face previously mentioned problems--shortages of trained, competent labor and reliance on a bureaucracy external to the regions. The cooperatives may also be unable to perform the dynamic, entrepreneurial role in the development process attributed to marketers by theorists.[13] In systems which anthropologists characterize as dendritic it would seem that efforts to get households to cooperate in performing more of their own marketing services would have the beneficial effect of creating an infrastructure for horizontal trade and displacing external marketing labor with underemployed members of the indigenous population. Planners must be realistic about the historical, social, geographic, and economic factors which created the dependency on outside traders. To be effective, the cooperative must address specific, existing disadvantages; otherwise they may compete with existing efficient systems. In the regions on the northern periphery of the Western Highlands of Guatemala, a cooperative would need to overcome few and poor roads, lack of a bulking center, low educational and skill levels, and risk-averse behavior by small farmers. In addition, currently-operating marketers are suppliers of necessary consumer goods produced outside the region, and supplanting them with a cooperative could increase the costs of supplying these goods.

Marketers can gain an advantage over producers when they control supplies of credit. Farmers may not be able to bargain on even terms on the market because they have obligations to marketers in return for credit services. Government credit programs attempt to eliminate this dependency by providing

credit at reasonable terms without imposing restrictions. In Guatemala, however, these programs have proved inflexible and unreliable, and farmers have continued seeking other sources of credit.[14] The study of vegetable marketers did not show any widespread market control through moneylending, although some large terminal market wholesalers, particularly those selling potatoes, grant credit in return for price discounts.

A complete marketing study would attempt to address these various economic issues with as much data as possible. For this case study, the major sources of data are INDECA, the Guatemalan government's institute for marketing, which furnished data on market prices; USAID/Guatemala, which made available all of its previous studies; The Guatemalan Institute of Agricultural Science and Technology (ICTA), which has described the traditional cropping systems in the highlands; and The Secretariat for Economic Integration of Central America (SIECA), which provided some published materials from the World Bank. With the given data limitations and the framework of issues as a backdrop, the economic analysis focused on household production, income sensitivity, and distributional analysis.

Household Production Analysis

The economists used the data developed by the anthropologist to estimate a number of measures of income and returns to factors of production. These analyses included estimation of production functions on a field-by-field basis and the estimates of household income from cropping activities by aggregating across crops, fields, and time. Annual farm budgets were computed for proto-typical farms. The budgets included cash, product, input, and labor flows. These analyses were integrated with the marketing data to produce estimates of the sources of total family income and the role of marketing activities as income sources.

Sensitivity Analyses for Sources of Income

The various sources of secondary data were augmented with estimates of yield variability from the production interviews. These data have been used to perform a number of sensitivity analyses on potential public interventions in the marketing system. These analyses concentrate on the impact of variability in yields and prices on the net income of producers. By decomposing

the relative riskiness of each crop into yield, seasonal price, and pricing within season, it is possible to rank order interventions and technologies that seek to expand and diversify crop production and that seek technical and economic efficiencies in the systems for marketing these nontraditional crops.

Distributional Analysis

The anthropologists findings and the income and sensitivity analyses were used to estimate factor shares and input-output coefficients. These were then used as weights for distributing the gains and losses from a number of proposed interventions and technologies. Because this analysis is synthetic in that it is based on estimates and data from other sources and analysis of proposed interventions, the analysis serves only to highlight issues in a "what if" sense, and is neither a prediction nor evaluation of any proposed or on-going project.

THE CASE STUDY FIELD SITES

Three municipalities were selected for this study: Almolonga and Zunil, which dominate the production of vegetables, and Concepcion Chiquirichapa, which is an important center for potato production. All three villages are in the "core" area of the highlands, surrounding the regional administrative center of Quetzaltenango.[6] Almolonga lies 5 kilometers southwest of Quetzaltenango. Zunil is another 6 kilometers away along this same unpaved road. The paved highway to the coast skirts the town of Zunil; this route is twice as long as the unpaved road through Almolonga. Concepcion is 30 kilometers north of Quetzaltenango, 2 kilometers off the paved road to San Marcos from San Juan Ostuncalco.

The three towns appear to be very similar. Each has a main square, on the sides of which are the market building, church, and municipal office. All three municipalities have about 7,000 people. Almost all of the population lives in town in both Almolonga and Zunil; half the population of Concepcion lives in rural hamlets. More than 95 percent of the population in each place is Indian, so that one often hears conversation in Quiche (Almolonga and Zunil) or Mam (Concepcion), and sees women dressed in their distinctive outfits. Each town has at least one cooperative (production

cooperative in all; savings cooperative in Zunil and Concepcion; weaving cooperative in Zunil). Each town has several primary schools and no secondary school. Moreover, the local government provides telephone, telegraph, and mail service, a medical clinic, potable water, electricity, and police.

Nevertheless, the towns have significant, though at first unnoticed, differences. Almolonga is not only the vegetable producing village par eminance, it is also the bulking center for nearby towns and the transport hub for the entire Western Highlands. In fact, 10 percent of the families in this town are truckers and another 25 percent are marketers. By contrast, in Zunil, which is also a vegetable producing village, only 10 percent of the population are marketers and less than 1 percent of the families own trucks or pick-ups. In Concepcion, a mere 2 percent of the population are marketers and 1 percent are truckers.

The distribution of land is also significantly different in the three towns. In Concepcion, perhaps 20 families in all (2 percent) are landless. In Zunil, a quarter of the population is landless, while another quarter of the population owns only milpa, the unirrigated lands where corn and beans are grown for domestic consumption. Reportedly, the inequality in landholding in Almolonga was equally as great 10 or 15 years ago. Today, however, informants in that town estimate that only 10 percent of the population is landless, largely because Almolongueños are renting parcels of land throughout the highlands. Although how and why such a great disparity in landholdings arose in Almolonga and Zunil is beyond the scope of this report, it is important to note that ever more intensive and specialized production systems are associated with an increasing concentration in the ownership of land within these communities.

None of these towns may be considered typical of other highland towns because the highland economy is so diverse. Nonetheless, each has developed, though differently, under much the same conditions that prevail in the highlands. These towns are studied because they have exhibited impressive income growth and lead the Western Highlands in the production and marketing of nontraditional crops. This study seeks to understand how the production and marketing systems work in these communities so as to develop insight into issues that may arise as efforts to diversify the production and marketing of other highland areas proceeds.

RESULTS OF THE ANTHROPOLOGICAL FIELDWORK

VEGETABLE PRODUCTION SYSTEMS

Vegetable production is undertaken on both irrigated and unirrigated land. On irrigated land, farmers can put the land into constant production and obtain several crops per year, but on unirrigated land, farmers are usually able to get at most two crops a year. In the former situation, farmers have a very uneven agricultural work cycle because they plant and tend their corn and vegetables in the same season. In the latter cases, farmers have no "dead" season, for they are always working their vegetable lands. Labor migration may occur from dryland villages, especially after a poor season for their cash crop; by contrast, villages with irrigated land never or rarely need to resort to labor migration.

Local irrigation systems are quite effective, even though rustic. In Almolonga, river water is channeled through narrow canals which run beside the vegetable fields. This system is supplemented by small reservoirs dug into the edge of each field. Because the water table in this part of the valley is extremely high, these pools fill up with water that can later be splashed onto the fields. The irrigation system in Zunil is quite similar. Here, water is carried through a rickety system of corrugated iron conduit from an old mill dam above town to the fields below. In some cases water is carried in buckets and pots to the fields.

The potable water systems installed in the towns are also used for irrigation. Where household taps are installed, people convert their front yards into seedbeds. In this way, farmers can lavish the necessary frequent care on the seedlings without the inconvenience of a special trip to the fields. Moreover, people who own no land other than their house plot often use that parcel as a vegetable field and irrigate this plot with tap water.

Almolongueños have evolved the most complex rotation and production system of crops on their vegetable lands of any farmers in the highland area. They plant four and sometimes five different crops a year on the same plot of land. They double-crop whenever possible, for example, sowing

quick-maturing radishes with onions, cauliflower, celery, and cabbage. And, they plant exotic vegetables (broccoli, brussel sprouts) and perrenials (chard, mint, rue, chrysanthemums, pinks) around the edge of their plots. These production decisions are all determined by the expected harvest price, as well as maturation periods. Thus, Almolongueño farmers plant potatoes in time to harvest in May and early June, before the harvest in Concepcion depresses prices. The amount of land devoted to potatoes in the winter months creates a scarcity in many vegetables, particularly celery, so that other local producers move into those crops, or plant one crop of potatoes and succeed it with one vegetable crop. The complexity of this system in Almolonga has now given rise to a specialist producer of seedlings. This farmer grows nothing but lettuce, cabbage, and onion seedlings to sell to others who did not have the time to grow their own.

The rotation system in neighboring Zunil is nowhere near as complex as in Almolonga. Here, many producers simply plant four crops of onions. Figure 2 (see page 70) presents a schematic for three farms in the area. The figure presents crop rotations, input, labor, and product and revenue flows for one calendar year. Moreover, farmers in Zunil grow only the more common vegetables--cabbage, onions, beets, lettuce, carrots, radishes, potatoes, and some turnips. They plant no leeks or celery, and little spinach and cauliflower. Furthermore, the quality of produce in Zunil appears to be inferior to that in Almolonga. The vegetables are smaller and the produce is less fresh. Whereas Almolongueños harvest within hours of their wholesale market, Zunileños often must harvest the day before in order to prepare the produce for their early morning market. Nevertheless, Zunileños are now experimenting with more diverse rotation schemes, trying out new crops (including gladiolas and fruit trees) and improving the quality of their produce.

Despite the inherent difficulties in vegetable production, cash-crop agriculture does create the capital for further local economic development. In all three towns, the initial capital to finance the purchase of trucks came out of agriculture. In Almolonga and Zunil, most truckers either invested their savings from vegetables in trucks or sold their land in order to buy a truck. In Concepcion, where one harvest of 1 hectare of potatoes may in a good season gross $6,000, a few people have bought trucks after a very good harvest. Thus, in the first years of local transport development, truckers are among the landed class. As marketing opportunities develop,

however, there is a trend to specialization as either producer or marketer. In Almolonga this process of specialization appears more advanced.

The spectacular success of Almolonga highlights a number of on-going processes in the highlands of Guatemala. The rural economy is everywhere a complex mix of domestic production for household consumption and wage or cash-crop activities. Where people have developed a renumerative local speciality, be it artisanry or vegetables, they have also retained control over much of the distributive process. That is, local production for sale creates other jobs in marketing and transportation. That the trucking industry has expanded more in horticultural villages, especially in Almolonga, than in any artisanal village probably results from the different nature and sector of demand. Textiles, pottery, rope goods and the like are infrequent purchases for rural people, whose incomes are very low. Vegetables, by contrast, must be moved constantly and quickly to urban centers, where income levels are higher.

THE ROLE OF MARKETING IN THE RURAL ECONOMY

The distribution of vegetables in highland Guatemala is done by country people exclusively. Residents of the producing towns, most of whom are farmers and Indians, buy produce to sell at retail or at wholesale in consuming centers. This situation contrasts with that in other countries, such as southern Peru, where townspeople go out to rural areas to buy produce that they resell in the cities. The difference is important for rural family incomes. Where marketing is an urban function, as in Peru, wholesale bulking is necessarily a local operation but the urban wholesale buyers may possess price information or other advantages at the expense of producers. Where, however, market distribution is a rural function, as in Guatemala, nearly everyone has access to this information: farmers who are marketers have personal knowledge of prices and demand, and full-time farmers have relatives who are marketers and share this information.

Moreover, rural marketing provides renumerative employment for a significant number of land-poor families. In Almolonga, over half of the vendors interviewed owned no irrigated vegetable land. Most of the rest had less than the 2 cuerdas (1,250 m^2, 1 cuerda = 625 m^2) of vegetable land, which is considered to be the minimum amount necessary for full-time farming there. Only one of the 18 traders owned as much as 5 cuerdas. In Zunil, the landless

and land-poor tend to be engaged in marketing activities. Though a quarter of the total population in Zunil is landless, nearly two-fifths of all Zunil marketers (28 of 74; 38 percent) own no land. In addition, half of the marketers (47 percent) lack sufficient milpa or sufficient vegetable land; 14 percent have some vegetable but no milpa lands; 15 percent have some milpa but no vegetable lands; 18 percent have some of each. For these people, too, marketing activities are a source of income.

Some landed families do have members who work as marketers. With sufficient milpa, the family may meet most of its subsistence requirements. But the family still has many other unmet needs. Without sufficient cash-crop vegetable land, some family members must seek other employment, such as marketing. By contrast, families with more than enough vegetable land can buy corn and other staples from the proceeds of the sale of their produce. They, therefore, have less need for alternative employment, and are less likely to become traders.

The amount and type of land a marketer owns also influences his/her specialization in trade. Some people work exclusively in marketing; others work either part-time year-round or full-time seasonally. Full-time marketers typically have little or no land and earn their entire livelihood in trade. They make two trips of 2 or 3 days every week to one consuming center, usually a large daily urban market, be it an export city in San Salvador or Mexico, the capital of Guatemala City, or a large coastal city, such as Coatepeque, Malacatan, Mazatenango, or Retalhuleu.

The time allocation of part-time marketers who own some land depends on the type of land they have (Table 1). Part-time marketers make one weekly trip to a consuming center the year round. Because they do not have enough vegetable land to dedicate themselves to farming exclusively, they farm part of the week, and market on the remaining days. These farmer-marketers usually retail produce in the weekend markets on the coast. By contrast, full-time seasonal marketers more often have just unirrigated land. These people grow corn and vegetables in the rainy season, and go into marketing in the dry months. Full-time seasonal marketers usually specialize in wholesaling large quantities of basic vegetables (carrots, cabbage, potatoes) in the major urban markets, especially Guatemala City.

TABLE 1. MARKETING SPECIALIZATION AND MARKET DESTINATION OF TRADERS (ALMOLONGA) BY AMOUNT OF IRRIGATED VEGETABLE LAND

Vegetable Land Ownership	Destination: Regional Highland and Coastal Periodic Markets (Part-time marketers)	Destination: Daily urban markets (Full-time marketers)
Landed	5	3
No Land	3	8

THE WHOLESALING OF PRODUCE IN THE LOCAL AREA

Marketers buy produce in local wholesale bulking markets or by contract in the fields (por trato). Depending on the season, between a third to a half of all produce is bulked at wholesale in the daily Almolonga market. (The Zunil market handles a much smaller volume of produce.) Even though an equal or greater volume of produce moves directly from field to destination, the prices for contract sales are set in relation to the wholesale buying prices reigning in the local wholesale market. Thus the Almolonga wholesale market plays a key role in determining the level of farm prices.

Business procedures in the Almolonga marketplace are simple to describe. About 8 a.m. each morning, farmers' wives begin bringing in loads of produce. Sometimes the women headload to market the entire amount harvested that day; other times they bring in only a basketful or two as a sample. In either case, the wholesale buyers ascertain the quantity and quality of the available produce by walking through the wholesale selling area, which is outdoors alongside the market building. As they walk through, the buyers ask producers their selling prices, sometimes stopping to bargain. Once this "exploratory" trip is completed, the buyer again walks through the market, signaling to those women whose produce he has decided to buy. The women then follow the buyer into the barn-like market building, whose space is mostly reserved for the buyers, where the women empty their baskets, take their money, and, on the way out, pay a 5-cent per basket municipal tax.

Seasonal price fluctuations are large (Table 2). The price of beets, celery, cauliflower, leek, lettuce, spinach, and turnips increase two- to three-fold between late summer (July, August, and September), when these vegetables are plentiful locally, and early spring (January, February, and March), when they are scarce. There are fewer vegetables in the dry season because many Almolonga farmers plant their land in potatoes in time for a May harvest, when prices are at their seasonal high. The yearly price cycle for onions is just the reverse--low prices in winter when many farmers plant because there is less likelihood of a poor harvest because of too much rain and high prices in summer when few farmers plant because of the great risk of crop failure.

The Almolonga wholesale market draws produce from a much wider area than its own township. Carrots are brought from the nearby hamlet of Llanos

TABLE 2. SEASONAL PRICE VARIATION OF VEGETABLES

	Month											
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Beets[1] (dozen)	15c	15c	35-40c	→	→	→	25c	20c	15c	25-35c	→	40c
Cabbage[1] (dozen)												
small					50c			75c			25c	
medium					75c			1.50			50c	
large	2.50-3.00	→	→	→	2.00	→	75c-1.00	→	→	1.25-1.50	→	→
Carrot												
small						10c						
medium						20c						
large						35c		10c	10c	10c	10c	
Celery			50-60c			10-25c		50-60c				
Cauliflower[1] (dozen)	2.00-3.00	→	→	→	→	→	50-75c	→	1.00-1.25	→	→	→
Leek	50c							25c				
Lettuce-leaf	1.00						15c	75c	1.00			
Lettuce-head	2.50-3.00						1.25	1.00			2.50-3.00	
Onions												
small	1.00							12.00				
medium	3.00-4.00							15.00				
large	7.00							20.00				
Potato[1] (100 lb)	12.00-15.00	→	→	→	→	12.00-15.00	6.00	3.00-4.00	10.00-12.00	→	5.00-6.00	→
Radish (100 doz)	5.00-6.00	→	→	→	→	→	→	→	→	→	→	→
Spinach (dozen)	25c							10-12c				
Turnip	25c							10c				

[1]These data are actual prices paid each month of 1978. They were recovered by a Zunil farmer who kept a production notebook for his own use.

de Pinal at the end of the rainy season. Cabbage, which is even more generally grown through the Quetzaltenango area, comes in all at the end of the rainy season. Some of the potato production from Concepcion Chiquirichapa is handled through the Almolonga marketplace in June and July and again in November and December.

Almolonga producers react effectively to the rapid reductions in price that occur with the arrival of large quantities of vegetables from outside the township. The prices for cabbage and carrots, for example, rise from May until November. When the harvests from Llanos de Pinal and elsewhere come in, the price quickly falls from a seasonal high of $2.50 a dozen for cabbage to a low of 50 to 75 cents a dozen, and from a high of 20 cents for carrots to a low of 7 cents. Acutely aware of these sizeable price differences, Almolongueño farmers time their production to coincide with the periods of high prices. Almolongueños grow carrots and cabbage from the beginning of the year through September or October. But all Almolongueño producers harvest these vegetables before the large quantities are harvested elsewhere. Similarly, Almolongueño producers plant potatoes in time to take advantage of the high prices they obtain before rainy-season harvests from other towns lead to lower prices. Almolonga and Zunil farmers can time their production in this way because their fields, unlike those of most of their competitors, are irrigated.

The buying strategy of Almolonga marketers also changes with seasonal movements in prices. Toward the end of summer, when the prices for most vegetables are low, marketers buy only the better produce, leaving producers of inferior produce with no market or one that is very depressed. By contrast, in the middle of winter, when prices are high, wholesale buyers take more "inferior" produce, which, though it now has a steady market, is bought at a great difference in price.

The "pulse" of the Almolonga market varies not only by season or month but also by day in the week. The number of wholesalers who buy on any day depends on the number of retail markets meeting the next day (Table 3). Sunday is the slowest day of the week because there are few Monday markets in Guatemala. The only wholesale buyers in the local market on Sunday are the few individuals who go to Mexico (Tapachula, a retail market), Guatemala City (a wholesale market for local retailers), and Quetzaltenango (the

TABLE 3. NUMBER OF WHOLESALE BUYERS IN ALMOLONGA MARKETPLACE BY DAY AND DESTINATION
(September 10-16)

Destination		Sunday (Sept. 16)	Monday (Sept. 10)	Tuesday (Sept. 11)	Wednesday (Sept. 12)	Thursday (Sept. 13)	Friday (Sept. 14)	Saturday (Sept. 15)	Subtotal
Export									
Salvador*		0	2	8	10	1	4	4	29
Mexico-Tapachula		3	4	16	8	11	27	10	85
La Mesilla		0	0	0	0	0	6	0	6
	SUBTOTAL	3	6	24	18	12	37	14	120
Guatemala City*		4	3	12	11	12	3	5	49
	SUBTOTAL	4	3	12	11	12	3	5	49
Coastal									
Champerico		0	0	0	0	2	0	0	2
Coatepeque		0	0	0	3	6	0	15	24
Colomba		6	0	0	0	0	0	0	6
Cuyotenango		0	0	1	0	0	0	12	13
Malacatan		0	0	5	0	0	30	0	35
Mazatenango		0	3	14	9	0	12	12	50
Retalhulen		0	6	1	6	2	11	10	36
S. Pedro Sacatepequez		0	0	0	18	0	0	0	18
	SUBTOTAL	6	9	21	36	10	53	49	184
Highland									
Quetzaltenango		4	12	9	9	7	9	12	62
San Francisco el Alto		0	0	0	0	11	0	0	11
Totonicapan		0	0	2	0	0	4	0	6
	SUBTOTAL	4	12	11	9	18	13	12	79
	TOTALS	17	30	68	74	52	106	80	432

regional retail market). Significantly, these are all major urban centers, with constant daily demand, and some buyers attend each Almolonga market-day to obtain produce for these centers. The Monday market is only slightly better attended, as a few wholesale buyers enter in order to replenish produce stocks in the large daily urban markets on the coast. On Tuesday, the number of buyers doubles, for most Tapachula and Guatemala City traders, as well as many more coastal retailers, enter the market. Wednesday is equally as busy because of the traders who sell in the San Pedro Sacatepequez market. Activity in Almolonga drops again on Thursday because there are few Friday retail markets. But it booms on Friday, when local retailers of produce buy for the weekend coastal markets. The number of buyers in the market on Saturday is about the same as on Tuesday and Wednesday, but the majority of these traders go to Sunday markets on the coast.

Not surprisingly, the value of produce[15] handled in the Almolonga market fluctuates with the number of wholesale buyers there (Table 4). Sunday and Monday are indeed the slowest days of the week, with perhaps an average of $1,500 worth of produce moved each day. Friday is clearly the busiest day in the market week, with at least $6,000 worth of produce bulked. The other weekdays, the value of produce ranges from a low of $3,000 on Thursday to about $4,000 on Tuesday, Wednesday, and Saturday.

In terms of the value of produce going to each demand area, the coastal markets, as a group, are as important as the export and capital markets taken together for the sellers in the Almolonga wholesale marketplace. The coastal markets take over $12,000 worth of fresh produce a week--that is, 43 percent of the total weekly value. The export and capital city markets each absorb about $7,000 worth of produce weekly (25 percent apiece). Because the timing of demand is distinct in each of these consuming areas, the flow of vegetables from the Almolonga market changes from day to day. Demand is fairly constant in the export and capital city markets, which are major urban centers, so there is, as we have seen, a fairly regular flow of produce from Almolonga to these centers. By contrast, demand on the southern coast is concentrated toward the end of the week due to the large number of Sunday markets in that region. As a consequence, Almolonga traders who work a coastal market buy only on Friday or Saturday, which gives rise to the increase in business in Almolonga on those days. The regional highland

TABLE 4. VALUE OF PRODUCE BULKED IN ALMOLONGA MARKETPLACE BY DAY AND DESTINATION (September 10-16)

Destination		Sunday (Sept. 16)	Monday (Sept. 10)	Tuesday (Sept. 11)	Wednesday (Sept. 12)	Thursday (Sept. 13)	Friday (Sept. 14)	Saturday (Sept. 15)	Totals
Export									
Salvador		-	-	2,928.65	-	99.00	834.75	-	3,862.40
Mexico-Tapachula		122.21	206.14	477.86	211.28	345.95	995.58	315.69	2,674.71
La Mesilla							260.87		260.87
	SUBTOTAL	122.21	206.14	3,406.51	211.28	444.95	2,091.20	315.69	6,797.98
Guatemala City		697.56	537.00	3,152.25*	1,181.85	1,546.45		147.27	7,262.38
	SUBTOTAL	697.56	537.00	3,152.25	1,181.85	1,546.45		147.27	7,262.38
Coastal									
Champerico**						34.55			34.55**
Coatepeque					594.95	547.17		854.23	1,996.35
Colomba		287.81							287.81
Cuyotenango				47.47				1,440.46	1,487.93
Malacatan				303.65			1,821.91		2,125.56
Mazatenango			154.31	678.97	350.65		964.35	695.73	2,844.01
Retalhulev			529.66		315.62	40.61	683.32	432.15	2,001.36
S. Pedro Sacatepequez					1,376.81				1,376.81
	SUBTOTAL	287.81	683.97	1,030.09	2,638.03	622.33	3,469.58	3,422.57	12,154.38
Highland									
Quetzaltenango		96.20	288.60	159.40	277.43	164.30	216.45	290.10	1,492.48
San Francisco el Alto						261.67			261.67
Totonicapan				39.60			89.47		129.07
	SUBTOTAL	96.20	288.60	199.00	277.43	425.97	305.92	290.10	1,883.22
	TOTALS	1,203.78	1,715.71	7,787.85	4,308.59	3,039.70	5,866.70	4,175.63	28,097.96

*This figure is greatly increased by the wholesale purchase on several hundred quintales of potatoes in the Almolonga marketplace this day. A more usual figure would probably run $1,500-$2,000.

**Data lacking for other days

markets, by contrast, are relatively insignificant. Only Quetzaltenango provides a small, steady market for produce; all the other highland markets are small, periodic (one-day-a-week) affairs. Together, these markets account for less than 10 percent of all produce by value, about $2,000 per week.

At least $30,000 worth of produce moved through the Almolonga wholesale marketplace in a week (September 10-16, 1979). This figure underestimates the total value of produce bulked out of Almolonga, for it does not include contract sales in the fields. An earlier study (INDECA, 1974: 24) estimated that farmers marketed little of their own produce. According to our survey, farmers themselves sold only 20 percent of their produce outside of Almolonga: 10 percent at retail in the coastal markets and 10 percent at wholesale--6 percent in the capital city and 4 percent in the export markets. Direct farmer sales in the capital and export markets involve few crops, mostly potatoes and cabbage. The INDECA study says that in 1974, 80 percent of all produce was sold by farmers locally in Almolonga. Farmers wholesaled 10 percent of their production in the Almolonga market; they sold an estimated 70 percent of all produce to the wholesale buyers directly in the field. If this breakdown is accurate, the Almolonga market has become a much more important outlet for local producers in the last 5 years. Almolonga farmers estimate that at least one-half to one-third of all produce now moves through their market. This shift is important because sellers in an active local market are more able than isolated farmers to obtain fair prices for their produce from wholesale buyers.

Pricing mechanisms in the Almolonga marketplace gain importance as that market comes to play a larger role in the distribution of produce. Wholesale prices are the outcome of seasonal, daily, and institutional factors. The price for specific vegetables in the Almolonga market can and does fluctuate widely from day to day, depending on the number of sellers with each vegetable and the number of buyers looking for that crop. In fact, prices commonly rise or fall 25 percent or more from one day to the next. This occurs because both buyers and sellers are free to seek prices to their advantage. Thus farmers' wives adjust their asking price to seasonal conditions, as well as to supplies on that day. If supplies are more than ample, they ask lower prices in order to be able to sell out. It is preferable to sell out

than to keep produce because so much fresh produce will come in the next day that the selling price of old produce will fall still further. If supplies are short, the women ask, and usually receive, a higher price precisely because most traders need an array of most vegetables. These two constraints--tne producer's need to clear out his stock, which is one reason for piecemeal harvests, and the buyer's need to obtain a complete array of vegetables--give rise to a number of buying and selling strategies.

An experience recounted by a farmer's wife well illustrates the evolution of individual strategies, as well as how finely tuned this market is to disequilibria. One day a few years ago, this woman brought five thousand onions to market; that is, the entire harvest of 1/2 cuerda. The market price was already high--$12 per thousand--but this woman decided to hold out because far too few onions had then come to market. Because the price was high and rising early in the morning, a number of farmers rushed to harvest and bring in onions. By midmorning, so many onions had arrived that the market was glutted, and the buying price fell to $5 per thousand. The early hold-out ended up selling out at this price, thereby "losing" $50 because of a few hours. Her policy is now much more conservative, selling at the reigning market price. But other producersellers continue to play this risky market game with wholesale buyers.

If only such market forces were at work, the daily fluctuations in the price of each vegetable should be random over the course of the market week. In fact, there are two types of structural phenomena that influence price formation in favor of full-time farmers. First, the price of celery tends to rise on Tuesday and Wednesday in response to the demands of numerous specialist buyers for the Guatemala City market. Specialist buyers who have few or insufficient contract purchases must buy all the celery they can in order to meet their obligations in the capital. They also endeavor to lower their average costs by increasing the base over which to spread their fixed costs. Their position forces prices up on those days, which especially favors full-time farmers who can time their celery harvest to take advantage of this phenomenon. As already mentioned, farmers harvest their fields in piecemeal fashion in order to spread the risk of low prices over several weeks. Significantly, celery is the only vegetable whose price exhibits this pattern, and Almolonga producers now enjoy a near monopoly on production,

so that price, given relatively steady demand, responds directly to local supply.

The second structural phenomenon is that prices tend to rise generally on Friday in response to demand for the weekend coastal markets. The coastal markets account for the increased trade on Friday and Saturday, and most of the coastal traders are part-time marketers, who work the first half of the week in their vegetable fields and the second half of the week in marketing. The demands on their time create a paradoxical situation. When they enter the market at the end of the week, they increase the demand for produce at wholesale. But many of these trader-farmers do not have the labor to harvest their own fields and still be able to buy produce at wholesale. Thus, though more produce comes into the market on Fridays, a number of producers cannot offer large quantities of vegetables precisely because they are the traders responsible for the increased demand. As a consequence, prices tend to rise, favoring the full-time farmer who can time his harvest to take advantage of this situation.

The wholesale market in Zunil is much smaller than that in Almolonga. By value, the Zunil market moves about $2,500 of produce a week,[1] that is, about one-tenth the value of produce in the Almolonga market. Approximately $1,000 worth of produce is bulked out on Wednesday and another $1,500 worth of produce on Saturday. Onions, which are a Zunil "specialty," account for one-half to three-fourths of this value (about $750); potatoes in season account for one-fifth of the value. In other words, a much smaller volume and the variety of produce is available in the Zunil market, which reflects the greater dependence on fewer vegetables in that township.

Furthermore, the Zunil market is wholly dependent on coastal traders. This market meets only twice a week, on precisely those days when traders buy for coastal centers. (Monday and Friday meetings are now being instituted.) The market meets very early in the morning, between 3 and 5 a.m., so that traders can later attend the Almolonga market, where a wider variety of produce is available. And it takes place along the road on the other side of the river from town, so that traders who buy early in the morning can, when they later pass through Zunil on their way to the coast, pick up the produce. Importantly, about one-third (15) of these traders are Zunileños; the rest are Almolongueños.

Price fluctuations during any Zunil market can be sizeable, and, unlike prices in Almolonga, which tend to fall as the hours pass, prices in Zunil may rise or fall. On September 8, the only day for which data were collected at both the beginning (3 a.m.) and the end (6 a.m.) of the market, prices rose 25 percent for beets and onions, 50 percent for cabbage and radishes, and 100 percent for potatoes. During the same time, the price for cauliflower fell 57 percent, from $1.75 per dozen at 3 a.m. to $1.00 per dozen at 6 a.m. Producers explained that prices began low in the expectation that more supplies would come in. When they did not, prices began to rise. In most instances, the prices at the end of the Zunil market were comparable to those that reigned later in the Almolonga market. The Almolonga price for cauliflower, however, equaled the seasonal price ($2 per dozen), which indicates the relative instability of Zunil prices in comparison to prices in the more developed Almolonga market.

Producers in both Almolonga or Zunil can either wholesale their produce in the local marketplace or sell an entire field by contract, por trato. Producers in Almolonga resort to contract sales only in an "emergency," when one lacks the time to do one's own harvesting or when one is ill. Unlike Almolongueños, producers in Zunil also sell standing fields of specialty produce such as parsley and coriander, which have less market in their town. Nonetheless, they can still harvest and prepare the crop for sale in the Almolonga market. More distant producers, such as those in Llanos de Pinal, do not have this option. They harvest such large quantities of particular vegetables that their only outlet is through Almolonga traders who have the contacts to dispose of lots in bulk. Mindful of their neighbors who tried unsuccessfully to wholesale produce directly in the capital, producers in Llanos de Pinal now all sell through Almolonga intermediaries.

The price for por trato sales is reportedly determined in terms of the local market price and expected trends. Thus, if the price of carrots is 20 cents a dozen and rising, the buyer may offer 25 cents for harvesting within a few weeks. The seller is free to accept or refuse any offer. When an offer is accepted, the farmer usually receives payment immediately. Only rarely and then only if the trader is known to be "honest" (completo), does the farmer extend credit to the buyer. From the traders point of view, cash purchases are preferable. Should the price rise, farmers who sold for half

down and half later, or solely on the trader's word, will ask for an upward adjustment in price.

Two factors complicate any assessment of the por trato sales for producers. First, wholesale buyers do all the harvesting. Thus these costs should be deducted from their profits. Second, the wholesale buyers are, in essence, buying futures because the crops are bought a month or more before harvest. The buyer thus runs two risks: that the crop will fail, and that the price will fall.

For these reasons, producers do not believe that por trato sales work to their disadvantage. They note that they get a sure payment immediately with no further risk, that producers who have tried to wholesale their own crops have failed, and that even experienced traders are sometimes wiped out.

Although the vast proportion of produce is bought by long-distance traders either in the marketplace or in the fields, two types of intermediaries do sometimes intervene between farmer and wholesale buyer in the distributive chain. For example, there is one man in Zunil who specializes in buying produce in the Zunil market for resale in the Almolonga marketplace that same day. Essentially, he is providing a service to Zunil producers who do not sell their produce at their market and do not want to try conditions in Almolonga. Because these producers could take their produce to Almolonga, this buyer cannot offer extremely low prices, and, because he wholesales the produce to marketers in competition with Almolonga producers, he cannot ask extremely high selling prices. For these reasons, this buyer works only certain months when specific crops are plentiful--beans in February, March and April; onions in June and November. On a good morning, he may make between $8 and $15 on a working capital of $200 (his average margin runs about 10 percent). But this business is so inherently risky, that this trader has at times lost as much as half his working capital.

Another more common example is the following. Some five or six Almolongueños specialize in buying fields of produce in Llanos de Pinal and other outlying production areas for sale at wholesale in the Almolonga marketplace. This business operates in much the same way as contract sales to long distance wholesalers in that the price for a field of produce is the same as that offered by other buyers. These specialist buyers, however, sell at the prevailing wholesale price in Almolonga, usually by contract to client

wholesale buyers. They therefore harvest only enough produce in any one morning to fulfill their contracts; they, however, still bear some risk of price fluctuations. These middlemen, who work with about $500 of capital, make about $5 a cuerda or a trip; that is, $50 a month. Their margin is about 20 percent; half of which goes to labor and transport costs.

In sum, distribution chains are very short. Apart from the two types of specialist buyers, all sales are concluded directly between the farmer and wholesale buyers. Inasmuch as the wholesale buyers in Almolonga and Zunil are the retail sellers in the highland, coastal, and Mexican markets, there is, in fact, but one intermediary between the producer and the consumer. In the Guatemala City Terminal market, there are two intermediaries--the Almolonga wholesaler and the urban retailer. Only in the Salvador export market are there sometimes three intermediaries--a Salvadorean exporter in Guatemala City, besides the Almolonga wholesaler and the Salvadorean retailer. But even in this distributive network, most produce changes hands only twice, for the largest Almolonga wholesalers themselves export the produce directly to San Salvador, where they sell to clients or relatives who live in that city.

MARKET ROUTES AND VENDOR CHARACTERISTICS

It should already be clear that discussion of vegetable distribution in Guatemala benefits from a classification of outlet markets. The most useful classification groups markets by region. The markets in each area share numerous characteristics and are, as a group, distinct from those in other areas. And, the distance of each region from the producing area sets similar constraints on trader behavior. Thus, a number of trader characteristics pattern according to route.

Markets in the highland area may be distinguished by level and periodicity. Almolonga-Zunil traders attend low-level, i.e., nonstandard (Smith, 1972) markets in the local area only because too few buyers mean very slim profits. A market, such as Cantel, which is but 5 kilometers away, attracts some vegetable sellers because it is so near the producing area. Outside this local area, Almolonga-Zunil vegetable sellers work in standard or higher-level markets. These markets may meet daily (Quetzaltenango) or weekly (Momostenango, San Francisco el Alto, Totonicapan, San Juan Ostuncalco, San Cristobal), but they all promise heavy demand. Farther away, Almolonga-

Zunil traders sell only on the major day of daily markets (Huehuetenango), that is, when greater demand lessens the risk of selling. Whatever the periodicity, these are all retail markets. Traders therefore take an assortment of vegetables by size and quality. Even so, competition from Solola vendors of inferior quality onions has forced most Almolonga vendors out of this commodity in San Francisco, Momostenango, and Totonicapan. Finally, most of these markets entail but one day away from home. Produce is bought in Almolonga on the day preceding the market day; the trader leaves for the regional market early the next morning and returns home late in the afternoon that same day.

The south coast markets comprise at least two provisioning areas; the westernmost portion is supplied by Almolonga-Zunil; the easternmost or central portion from Solola-Panajachel. The boundary between the two areas may be drawn south from S. Antonio Suchitepequez, a market attended by Zunil marketeers. The area supplied from Almolonga-Zunil includes a number of centers: Coatepeque, Malacatan, Mazatenango, Retalhuleu; Champerico, Cuyotenango, Genova, La Maquina, Pajapita, Palmar, Palmira, San Felipe, San Francisco el Zapotitlan, San Pablo Suchitepequez, San Pedro Sacatepequez, and Tumbador. The first four towns are large urban centers with daily markets. These markets are supplied year round by both full-time and part-time traders. The full-time traders often have a stall inside the market building; moreover, a family member usually works daily in the market. The part-time vendors go down only on weekends and sell from outdoor spaces. By contrast, the majority of the coastal markets are periodic, weekend affairs, attended only by part-time marketers year round. Nevertheless, all coastal markets are similar in that most produce is sold at retail to urban and rural consumers, and most vendors carry an entire array of vegetables. Unlike highland markets, there is no competition from other producing areas.

San Pedro Sacatepequez, which is geographically a highland market just on the edge of the Pacific slope, in fact operates like a periodic coastal market. All types of vegetables are bulked out of Almolonga for this market. And, the value of produce trucked out each Wednesday for this center is comparable to that shipped on weekends to other coastal centers. San Pedro is special, however, in that it is a vegetable producing area (for San Marcos) and has some wholesaling functions. Highland traders sell bulk lots

of beets, carrots, cabbage, and especially onions to country people, who take them back to sell on the plantations. It appears that the lack of paved roads fosters this business. In the coastal areas where there are paved roads, highland traders attend even the smaller markets 10 to 20 kilometers off the road. In San Marcos, however, there are few paved roads, so that native urban traders and rural residents still undertake distribution to outlying areas.

The Guatemala City market is primarily a wholesale market. Wholesalers tend to specialize in one or another commodity group. Some work with celery, fresh coriander, and parsley, which are Almolonga specialties; some deal in cabbage, carrots, and onions; others handle only potatoes. This specialization is possible because of the level of demand, and it leads to different combinations of market-farmers. The celery wholesalers, most of whom are young, landless men, work full time during the entire year. When asked by a client, they will bring in "special orders" for other produce, such as beets, lettuce, onions, and carrots. More of this produce is handled by Sololeños, who enjoy the advantage of closer proximity to the capital. Full-time seasonal traders from Almolonga, who, as previously mentioned, own little or no vegetable land, handle these commodities only in times of plenty (October-February). Other full-time seasonal traders deal in potatoes harvested during the dry season, when most production comes from Almolonga. These traders often have client buyers, both Guatemalan and Salvadorean.

The export markets include San Salvador, the capital city of El Salvador and Tapachula, a border city in Mexico. Both of these urban centers, offer constant daily demand, so that traders can go throughout the week. But San Salvador is much larger and has a much greater demand. As a consequence, Almolongueño truckers haul great quantities of produce; moreover, they specialize in cabbage and potatoes at wholesale for the San Salvador market. By contrast, the smaller Mexican cities have less demand. Almolonga traders retail produce there. They used to only wholesale it, but local residents in Tapachula petitioned their government to allow Almolonga traders into the retail business. In other words, whether traders wholesale or retail for export depends again on the volume traded.

Anyone is free to try his or her luck on any of these routes, for the markets are open to all. In fact, most people learn the business as a child

accompanying a parent or relative to market, or as a young person going with, but working independently from, an older friend. Most marketers in the capital did have prior selling experience in coastal markets, which were the major outlet markets a generation ago. But some truck helpers have today gone directly into the wholesale business in the capital, after learning the trade there through observation. In general, traders seem quite willing to help others enter the business: they invited our interviewers to join them on their next trip, offered tips on buying and selling, and the like. The only instance where traders appear to collude to prevent the entry of new marketers is the Tapachula export route. Here, a group of 22 traders is uninterested in new members, and reportedly bankrupted a group of novice marketers from Zunil who attempted to enter this market earlier this year. Nonetheless, the power of this group is not absolute. At the time of this fieldwork, one of the largest exporters to Salvador was already doing the paperwork necessary to obtain the licenses for exportation to Mexico.

GRADING OF QUALITY

Produce is classed and prepared at every stage of the distribution process. Farmers invariably do some preliminary processing: they discard all manifestly inferior produce, wash most of the tubers, and grade the harvest into rough size categories. Because potatoes should be brushed and not washed if they will be stored for any time before sale, the custom of washing potatoes for the capital city market, where retailers do not have the facilities to perform this service for consumers, involves tremendous risk. Because the farmer is preparing this produce for a specific market, he might have difficulty selling to vendors on other routes. It might be preferable to brush the potatoes clean or bag them as harvested, as is done for the export market.

The extent to which wholesale buyers further grade and prepare the produce depends on their route. Those who sell at wholesale in the export and capital city market do little preparation for presentation, in large part because they handle large quantities and have little time. That produce arriving at the terminal market in Guatemala City has apparently undergone little processing or grading has given rise to the erroneous idea that such activities are never performed.[16] In fact, processing is mostly done at the retail level, where there is more time. Celery wholesalers do sometimes

grade their produce on the morning that they sell. On all other routes, the wholesale buyers do process their vegetables. Sellers in highland markets grade beets, carrots, onions, and radishes by size and tie them into bunches. They pull the yellowed leaves off cabbage and onion plants. Sellers in the coastal markets also trim some leaves on produce (cauliflower, carrots, beets) to reduce bulk and cut the roots off onion plants. Produce is sold in all markets with its leaves, so that freshness can be readily ascertained.

Furthermore, produce is carefully packaged for shipment on all routes. Root crops that are sold with the leaves are packed into straw nets so that the leaves protect the vegetables. Delicate leafy greens and herbs--lettuce, fresh coriander, parsley, and celery--are protected from the net by a thin paper covering. Bunches of even more delicate flowers are individually wrapped in heavy paper. This packaging technique protects the vegetables from cuts and scrapes, but not from water. Unless the marketer lines the net with plastic, some produce may spoil during the rainy season. This problem is greatest on the coastal route, where vendors take buses to market. Badly covered, the produce gets wet and the leaves quickly rot in the heat. The quantity of produce that spoils in this way seems to be relatively small. In the six coastal markets visited during this study, only one vendor had lost a part of her produce because of water.

CHARACTERISTICS OF THE MARKETERS

Residence and sex of vendors, as well as amount of working capital, all vary by route. Almolonga is not only the leading producer of vegetables, it is also the leading distributor. Almolonga has three times as many traders as Zunil and six times as many as Concepcion Chiquirichape (Table 5). In relation to the local population, 25 percent of all Almolongueños (300 people) are traders, compared to 10 percent (100 people) in Zunil and less than 5 percent (30 people) in Cencepcion. Moreover, Almolongueño traders all but control the export and capital routes (Concepcion traders wholesale potatoes only in season) and are the dominant force in coastal and highland markets. Furthermore, in the coast and highland markets, Almolongueños are far more numerous in the larger urban centers--the daily coastal and regional highland markets--than are Zunileños, who work the smaller, less profitable markets. It is as if the Zunil traders "fill the holes" in the coastal marketing system left by the Almolonga traders.

TABLE 5. NUMBER OF MARKETERS BY RESIDENCE AND ROUTE

	Almolonga	Zunil	Concepcion
Export	55	6	0
Salvador	30	0	0
Mexico	25	6	0
Capital	60	3	30
Celery	25	3	0
Cabbage	15	0	0
Potatoes	20	0	30
Coastal	138	65	20
Daily	103	18	15
Periodic	35	47	5
Highland	63	22	5
Local		13	0
Regional			
Daily	15	5	5
Periodic	48	17	
TOTAL	316	96	55
No. of Routes	23	20	6

The size and composition of trading firms is surprisingly regular by route, whatever the residence of traders. More than half the sellers in the highland markets are women. They are typically abandoned wives or widows with a family to support. They eke out a living from selling in regional markets because they do not have to be absent overnight from home. Coastal and male highland traders more often go with a relative to market. Husband or wife and child go together, with each preparing and selling produce and pooling the proceeds at end of day. The capital and export traders are individual men. Nevertheless, the men who travel in the same truck usually cooperate with each other in moving or watching over produce.

Finally, the average amount of working capital also varies by route. Sellers in local highland markets take an average of $20 worth of vegetables, 10 percent of which is their own production. Sellers in the larger regional markets take approximately $45 worth of produce, all of which is bought at wholesale in the Almolonga or Zunil marketplace. Traders on the coastal routes take $75 of produce, almost all of which is bought at wholesale. The capital investment of traders to Guatemala City varies by specialty: full-time celery specialists take an average of $85 of produce per trip; full-time seasonal potato sellers, $170; and, full-time seasonal cabbage traders, $270. The amount of working capital used by these traders is actually greater because they buy entire fields for cash, taking only a part of their produce to market each time. This is also true for the exporters, who average $55 of capital on the Tapachula route, $200 on the Salvador route.

VENDOR MARGINS

Vendor margins[17] indicate the extent to which sellers can mark up the price of their goods and still sell successfully. Margins usually vary by commodity type: the mark-up on perishable produce is necessarily higher than that on dry staples, which have a longer shelf-life. Nevertheless, within a commodity type, mark-ups that are much greater than the average may indicate some form of monopoly or blockage, such as a spatial monopoly over buyers or an informational monopoly over producers. Extremely high mark-ups are a disadvantage for both the producer and the consumer: producers are presumably not receiving a fair share of the value of their produce; and consumers are unable to buy as much of the produce as they otherwise might.

Such difficulties do not characterize competitive situations, for vendors are forced by competition to reduce prices to the level where daily profits approximate the daily wage rate of alternative economic activities. Margins are consequently much slimmer.

Vendor margins are a notoriously tricky statistic to compute. In theory, the selling price remains constant throughout the selling day, so that the margin is constant. In fact, selling prices in the marketplaces do not remain constant. They are apt to drop as the day goes on. Thus, selling prices obtained at the beginning of the day do not accurately depict the actual average margins obtained by vendors. This difference is important because marketers usually report "optimum" prices, that is, the price they hoped to or actually received at the beginning of the market day. Given the nature of their business, it is extremely difficult to obtain actual changing prices, except by observation. Moreover, the custom of giving a small amount of herbs free with some purchases further complicates the computation of retail margins. In coastal markets, for example, retail customers expect, and are given, a small bunch of fresh coriander with each cabbage. The retail margin on cabbage must reflect this custom. It is worth noting that this customary "little extra" is nowhere in Guatemala as prevalent as the "dash" of Haiti or the yapa of Peru. Most transactions in Guatemala are straightforward sales of a specific quantity and quality of produce at a specified price.

Unadjusted vendor margins run about 40 percent in coastal markets (Table 6). However, the mark-up varies by vegetable. The unadjusted comparison of wholesale and retail prices for coastal markets suggests that vendor margins run about 50 percent on most produce (cabbage, cauliflower, beets, carrots, celery, radishes, spinach, leeks, and most herbs), about 25 percent on potatoes and, in some markets, onions. (The margins on some specialty produce--broccoli, brussel sprouts, turnips--could not be determined because these vegetables are rarely sold in coastal markets).

Higher quality produce has a lower percent mark-up than inferior quality produce. Table 7 presents the wholesale buying prices and the retail selling prices for three vegetables, according to size grade, in the Mazatenango market at the time of this case study. In each case, the mark-up on small or inferior produce was significantly higher than that on large or superior

TABLE 6. UNADJUSTED VENDOR MARGINS BY ROUTE

	Number of Observation	Value All Produce	Value Without Own Produce	Unadjusted Margin
Highlands				
Local	(4)	$20.55	$18.55	35%
Regional	(21)	47.36	47.36	39% (34%)[1]
Coastal				
Weekly[2]				
Daily Urban	(22)	78.85		33%
Guatemala				
Celery	(3)	85.00		35%
Cabbage	(3)	271.67		32%
Potatoes	(14)	171.14		51%
Export				
San Salvador				
Tapachula	(1) Wholesale	198.43		34%
	(2) Retail	56.35		112%

[1] Four of the six vegetable sellers censused in the Totonicapan market were Zunileños who had brought 1,000-4,000 onions. The mark-up on onions in this market is extraordinarily low--10% to 15%--because local resellers must compete with solala producer-sellers, which very much reduces the average margin of these sellers. None of the Almolonga vendors bring onions to this market, and their average margin is consequently higher, 50%, about the same as in other highland markets.

[2] San Pedro Sacatepequez is the main commercial town in San Mareos, where vegetable production has recently begun. The competition from local producers and sellers has evidently shared margins for who complain that this market is now barely worth their while.

All the potato sellers in the Guatemala City market who were interviewed are from Concepcion Chiquirichapa. Seven of the eight interviewed vendors who sell in the coastal market of Coatepeque are also from Concepcion.

TABLE 7. UNADJUSTED MARK-UP ON PRODUCE BY QUALITY (SIZE)

	Wholesale buying price ($)	Retail selling price ($)	Unadjusted margin (%)
Onions (per thousand)			
Small	4.00	6.00	50
Large	14.00	16.00	14
Cauliflower (per dozen)			
Small	.50	.10	140
Medium	1.00	.15	80
Large	1.50	.20	60
Beets (per dozen)			
Small	.03	.08	166
Medium	.08	.12	50
Large	propio [own produce]	.30	c. 50

produce. Inferior produce initially retails at 150 percent of its wholesale price, whereas the unadjusted margin on superior produce runs about 50 percent. Similarly, the mark-up on onions is, as already mentioned, below that of other vegetables; but this same price difference by size-quality obtains. This price difference according to quality is due to the nature of retail demand. Townspeople consume most of these vegetables. Those unable to buy the best produce purchase lesser grades of vegetables. This assured demand of the urban poor supports higher mark-ups because the inferior produce still costs one-half to one-third of the retail price of superior produce.

Trader margins are smaller than the unadjusted measure indicates. Most vendors operate under the necessity to sell out before going home because three-day old produce would have little price in the wholesale markets of Almolonga and Zunil, where sufficient fresh produce comes in daily. The strategies that vendors use to sell out vary with the periodicity of the market. In markets that meet only once a week the seller can only lower his price late in the market day in order to move his remaining stock. Late is, of course, a relative concept. On good days, vendors begin reducing their prices in early afternoon; on rainy days, when many rural buyers do not bother to or cannot go to market, prices may begin lower than usual and continue to drop. In any case, reducing prices to sell out is always a gamble. To sell too low means lower margins and lost profits. To delay in reducing price may mean getting stuck with produce on hand and no option but to dump it at a near or total loss. Vendors naturally prefer to realize something on their produce, so that actually dumping is relatively rare.

Daily urban markets provide highland sellers another clearance option. Marketers in these centers also reduce their price late in the day. But if just before going home they still have some produce, they can sell at drastically reduced prices--below wholesale cost--to the small number of local retailers who enter the market at this time in order to buy up odd lots of vegetables from sellers. The local retailers then sell the produce to town residents on off or minor market days, when the highland sellers do not attend. These "close-out" sales may be illustrated with the example of the largest Almolonga vegetable vendor in the market of San Felipe, a town north of Retalhuleu. This seller had brought six bultos of produce to market: 10 dozen celery, 2,000 onions, 100 dozen beets, 100 dozen carrots, 200 pounds

of potatoes, and some herbs. By early afternoon, he had sold everything but 1 dozen celery plants, 10 bunches of onion, 10 dozen beets, and 10 dozen carrots. This produce was sold to a local retailer at the flat fee of Q 3.00, which is Q 180 below the wholesale cost. Vendors who have a stall in a daily market do not sell out; they keep the produce for the next day. This day-old produce is sold at a discount to consumers.

Actual margins for coastal traders average between 20 and 30 percent of their wholesale value--about half the unadjusted average margin. Although data were not systematically collected in markets of other areas, it is most likely that gross margins similarly overestimate actual margins. Traders on all routes operate under the necessity of selling out or being stuck with unsaleable produce. They, therefore, all lower prices as time passes and clear out their wares at low prices to local scavenger buyers. In all likelihood, margins everywhere are slim.

Finally, margins vary by route (distance) and level of market (or consumer demand). The unadjusted margin in highland and coastal markets runs about 20 percent (40 percent unadjusted margin). The average margin is even lower in local highland markets (Cantel), where many producers offer some of their own vegetables, and in daily coastal markets, which attract numerous sellers. The case of San Pedro Sacatepequez is instructive in this regard. Sellers from Almolonga and Zunil compete not only amongst themselves but also with local producers. This heightened competition has driven margins to the lowest level anywhere in the distributive system. Today, highland traders complain that they can hardly make any money in San Pedro.

The gross margins on produce to the capital vary by specialty--30 to 35 percent for celery and cabbage; perhaps 50 percent for potatoes from Concepcion. The gross margin on produce for wholesale in Tapachula, and probably also Salvador, runs 34 percent, which is comparable to that in the Guatemala City. The retail mark-up for produce to Tapachula, by contrast, runs 100 percent, in large part because capital investment is much smaller.

Whereas retail margins indicate the marketer's share of the value of the produce, the complement of the margin provides an approximate measure of the farmer's share. This measure is most accurate where the entire farm-to-market chain is included. In this study, which focused on rural marketers from the producing areas, the entire distributive chain was included where

there is only one intermediary between the farmer and the consumer--the local wholesale buyers who retail the produce. This extremely short distributive chain characterizes the highland, coastal, and Mexican export routes. On these routes, it appears that the farmer usually receives two-thirds to three-quarters of the total retail value of the produce. On the capital route, two intermediaries are involved in the distribution process--the local wholesale buyer-seller and the urban retailer. Even here, the farmer probably receives at least 50 percent of the total retail value of the produce. On the Salvador export route, which involves two or three intermediaries (the local wholesale buyer, sometimes a Salvadorean exporter in Guatemala City, and the Salvadorean retailer) the farmer who receives at least 50 percent of the total retail value. The farmers' shares in the total value of produce are universally high only because the distributive chains are so short.

TRADER INCOME AND COSTS

The elementary formula for marketer profits (the product of the amount of operating capital [wholesale cost of produce] times the average percent mark-up less operating costs) provides a reasonable estimate for the amount earned on any one trip during late summer when data were collected. It fails to provide as accurate an estimate for monthly income because marketers do not always have successful trips. In the rainy season (late summer) especially, about half of all trips may be "washed out," either because water spoiled the produce or because buyers did not come to market. Although this is not a problem in the dry season, marketers report selling less produce and earning smaller profits because prices are higher. Without firsthand information on dry season incomes, annual incomes must be estimated from the available data, on the assumption that the losses from risk during the rainy season equal the slow-down in business due to higher prices during the dry season.

The estimates of income per trip were made in two ways. First, traders were asked to detail their wholesale purchases, their costs, and their sales. This information was independently checked with daily censuses in the Almolonga wholesale market and spot-checks in various highland, coastal, and Guatemala City markets. Second, at the end of the marketer interview, each trader was asked how much he or she usually made on a successful,

mediocre, and poor day and how often each condition obtained in a month. The trader estimates of expected income are reassuringly similar to the more laborious computation of average profits (Table 8).

Operating costs run approximately 10 percent of the retail value of produce on all routes. Because the amount of working capital (quantity of produce purchased at wholesale) increases by route, overall operating costs increase with route (Table 9). Both absolutely and proportionately, transport is the major expense for marketers, accounting for two-thirds to three-quarters of all expenses, with the exception of the Mexican export market (Tapachula).

Municipal taxes in the Almolonga wholesale market and in the retail markets cost an average of $1.00, which represents about 10 percent of all operating costs and 1 percent of total value. (Sizeable import taxes into Mexico raise this cost on the Tapachula route). Marketers' food costs increase with route because meals are more expensive in major urban centers in periodic country markets and because traders must buy more meals as the length of the trading trip increases. Nevertheless, food costs are kept low by eating in the market only and sharing meals. People even skip meals if their trip has entailed a financial loss. Moreover, lodging and labor costs are all but eliminated. Most traders sleep in the truck or market with their produce or in the shelter of the municipal arcade; very few rent a bed or room, and even then only at minimal cost (25 to 50 cents per night). Almost all traders carry and prepare their own produce instead of employing others to do this work. In other words, traders cut costs in every way possible, even at the expense of their own comfort.

Full-time wholesalers in the terminal market of the capital often have additional costs because they buy for and harvest entire fields of produce. A cabbage and carrot trader's account of his business well illustrates the operation and financing of this trade. A wholesaler in the terminal market sells carrots and cabbages twice each week between October and February when these are plentiful. He uses about $750 of working capital in order to buy 10 to 15 cuerdas of produce in the fields at the beginning of each month. He buys about 40 cuerdas over the course of the season. Each cuerda of produce is worth about $50 in this season, which represents a farm-gate price of 5 cents a dozen for unharvested carrots (1,000 dozen per cuerda)

TABLE 8. CABBAGE WHOLESALER'S COSTS (GUATEMALA CITY)

	Quetzals
COSTS	
Produce in field	50
½ cda. cabbage [75 doz]	
½ cda. carrots [500 doz]	
Harvest	18
6 field hands @ $3 a day	
Transport	40
Local (8)	
Extra (30)	
Return (Bus)	2
Taxes	5
100 bundles @ 5¢ ea.	
Equipment	3.25
Nets[a]	
Meals	8
4 meals @ Q1.50 each and miscellaneous	
	126.25
SALES	
Cabbage ($3.50 per carga of 4 dozen each)	65.63
Carrots ($1.75 per bundle of 10 dozen)	105.00
	170.63
NET PROFIT	44.38

[1]A cabbage trader uses up nearly 1,000 nets over the course of the three-month trading season. At 15 cents per net. This represents a total cost of Q150 and a per trip cost of Q3.25.

TABLE 9. OPERATING COSTS BY ROUTE

	Taxes	Food	Lodging	Transport	Labor	Total
Highland						
Local (3)	.20 (14%)	.18 (13%)	0	1.02 (73%)	0	1.40
Regional (13)	.82 (13%)	1.09 (18%)	0	4.28 (69%)	0	6.19
Coastal						
Daily (Urban) (14)	.94 (10%)	2.40 (26%)	.03 (0)	5.55 (61%)	.14 (2%)	9.06
Periodic (18)	1.03 (11%)	1.66 (17%)	.09 (1%)	6.47 (67%)	.26 (3%)	9.51
Capital						
Celery (3)	1.00 (8%)	4.00 (31%)	0	7.75 (65%)	0	12.75
Export						
Tapachula (2)	14.12 (36%)	7.49 (19%)	0	17.27 (45%)	0	38.88

and 33 cents a dozen for unharvested cabbage (150 dozen per cuerda). These prices are lower than the seasonal average prices because the trader undertakes the harvesting and preparation of the produce and runs all risk of changes in the market price. Field hands to harvest the vegetables cost $12 to $18 per trip; transport to Almolonga averages $8. These costs raise the per dozen value of the produce, placed in Almolonga, to 7½ cents for carrots and 50 cents for cabbage, which compares with seasonal lows of 10 cents for carrots and 75 cents for cabbage.

Inasmuch as transport accounts for a large share of all operating costs, the only way to reduce these costs would be to eliminate technical problems. But here, too, the system is efficiently organized. Even though traders work on their own account, groups of traders cooperate in renting trucks, so that the vehicles go with a full load of produce. There are several types of arrangements. Some truckers operate on a weekly schedule, going every week to the same large markets and taking the same traders each week. Other truckers operate independently. In these instances, a representative of a trading group contracts the trucker with perhaps a day's anticipation to haul the produce to market. The contracting trader bears the responsibility for amassing sufficient produce and paying the trucker. Moreover, even those small markets that cannot support the number of traders who travel in one truck are well served by the present distribution system. In the coastal area, the trucks let off one or two sellers in each of several small places, returning later in the afternoon or the next day to pick up these sellers.

Most trucks return to Almolonga or Quetzaltenango with goods from the highlands, the coast, or the capital. On the coast, people buy rice, dried fish, bananas, oranges; in the highlands they buy beans, potatoes, and other staples; in the capital they buy tomatoes, cucumbers, bell peppers, chilies, and other "hot country" vegetables. It is not the produce sellers who back-haul these commodities, however, for they simply do not have enough time to sell produce and still be able to buy. Rather, specialized buyers who go to the destination market without produce there buy (in wholesale lots) local products that are hauled back. This produce is then wholesaled to sellers in Quetzaltenango, where women from Almolonga dominate the sale of hot country vegetables, or to wholesalers in the Almolonga marketplace.

The wholesale trade in tomatoes is one of the few instances where the coastal distributive chain involves two middlemen: the specialist buyers from Almolonga who go to the Capital and bring back tomatoes, and the coastal traders who buy the produce in the local market on Friday and take it down to the coast. This is also one of the few instances where traders provide credit to one another. The major tomato wholesaler in Almolonga distributes his wares to coastal traders on Friday. Irregular and unknown buyers pay cash; other traders, probably the majority, pay on Monday, on their return from the coast. The price is determined at the time of sale and not changed, regardless of conditions in the coastal markets.

Thus, the possibility of significantly reducing costs through the reorganization of trucking is very small. Transport, like marketing, is as competitive as production, so that no one enjoys more than a temporary windfall. Competition, in part, forces traders to cut costs wherever possible, which is largely in labor, lodging, and, to some extent, food. Competition in trucking keeps costs low, makes for full truckloads out and at least partial loads on the return, and means that no traders have a lockhold on any single market. To centralize distribution would probably mean that provisioning services in many smaller centers would deteriorate and that costs in most remaining centers would rise. To demonstrate this point, it is useful to look at implied wages and returns to capital and labor.

The facts, already mentioned, that average amount of wholesale capital and average margins increase with route (highland, coastal, Capital city, and export) naturally lead to the expectation that profit levels should increase similarly. This expectation is generally borne out: (Table 10) full-time traders in the Guatemala City market earn more than part-time sellers in coastal markets, who, in turn, realize more than marketers in highland centers. Moreover, within each region, trader profits vary by type or level of market (in the Capital, with type of produce). Sellers in regional highland markets earn significantly more ($1.75 to $8.25) than sellers in local highland markets ($0.85 to $3.50) most of whom are women. Sellers in periodic (weekly coastal markets appear to earn significantly more ($5.21 to $17.25) than traders in the daily markets of that region ($3.50 to $11.11). But, the majority of Almolonga marketers in daily urban markets have permanent spaces inside the market building. In these cases,

TABLE 10. COMPARISON OF REPORTED PROFITS BY ROUTE AND PRODUCT

	Highland--Local Interview			Riskiness (Percent of Good vs. Poor Trips)			Reported Profits			
	Average Wholesale Capital	Average Costs	Average Profit	Good Sales Day	Regular Day	Bad Day	Good Sales Day	Regular Day	Bad Day	Average Profit
Highland										
Local (Cantel)	21.30 (86%)	1.40 (6%)	1.93 (8%)	33%	66%	-	3.50	.85	<?>	1.75
Regional (12)	46.39 (77%)	6.19 (10%)	8.03 (13%)	54%	46%	-	8.25	1.75	<1>	5.00
Coastal										
Daily Markets (19)	53.35 (76%)	9.06 (13%)	8.21 (12%)	50%	50%	-	11.11	3.50	<?>	7.31
Periodic Markets	72.54 (70%)	9.51 (9%)	22.26 (21%)	52%	35%	13%	17.25	6.21	<5>	11.73
Guatemala										
Celery (3)	85.00 (72%)	12.75 (11%)	20.38 (17%)	50%	50%	-	20.00	10.00	<15>	15.00
Cabbage (3)	271.67	50.05 (13%)	66.55	no answer			42.33	10.00	<29.17>	26.17
Export										
Tapachula	66.35 (50%)	38.88 (29%)	27.27 (21%)	50%	25%	25%	12.00	6.00	<15>	9.00

one family member works daily in the town market while another brings fresh produce every day or two. Though the profit (earnings) per trip are less, the weekly earnings are more than that of traders in once-a-week markets. Finally, the full-time traders in the Capital earn the most--approximately $20 per trip for celery specialists, perhaps $50 to $60 a trip for part-time general produce specialists.

Projecting these approximate figures over the course of one year, it becomes clear that traders are not earning grand sums of money. Sellers in local highland markets can be predicted to make about $100 a year; those in regional highland markets, perhaps $250; in coastal markets, $500 to $1,000, depending on the number of trips the trader makes each week; and, in the capital, between $750 to $1,500. These sums, of course, represent marketing income, which is but one element in total family income. It should be noted that these projections assume that returns throughout the year are similar to those during the time of the fieldwork. The projections accurately show the relative incomes from different routes and illustrate the fact that incomes are not exceptionally large by the standards of the local economy.

When net profits by route are compared to the prevailing wage rates in Almolonga and Zunil, it becomes clear that traders make about the same or only slightly more than day laborers. Sellers in local highland markets average about $1.75 per trip. These sellers are all women, whose only alternative, in agriculture, pays even less, between $0.75 (Zunil) to $1.50 in Almolonga, where hired female field hands are even rarer. Farmers justify the extremely low wage to women on the grounds that they cannot do the heavier chores (hoeing), even though male laborers receive the same wage ($2.00 to $3.50, depending on place) regardless of the activity.

Marketers average $5.00 per trip in highland markets and about $10.00 per trip in coastal markets. This difference disappears when labor costs are included in the equation. Marketers often go to centers in both of these areas in family groups of two or three. But, whereas selling trips to regional centers are one-day affairs, selling trips to the coast are two- or even three-day journeys. In other words, the return to labor approximates the local wage rate--and this only because traders have cut their costs to the minimum.

Full-time traders to the Capital appear to make more than just the local wage. Importantly, however, the degree of risk is reportedly greater on this route than elsewhere. Sellers in the highland and daily coastal markets seldom report a complete disaster. For them, a day may be good or mediocre, but it is never truly bad. In financial terms, they, at worst, still recover their working capital and operating costs. Sellers in periodic coastal markets do sometimes incur losses because when a market is completely rained out they have no alternative but to dump the produce. These losses are rarely sizeable. By contrast, sellers in the Capital may find themselves unable to sell more frequently, and their losses are higher.

SUMMARY OF FINDINGS FROM THE ANTHROPOLOGICAL FIELDWORK

In summary, marketing is an alternative economic activity that adds to family income, as do vegetable production, trucking, and artisanry. From a local point of view, marketing activities are coordinated with agricultural tasks, so that people take up trading when they have the most slack time. For this reason, most full-time traders are landless, most full-time seasonal traders have dry land only, and most part-time, year-round traders have some vegetable land. Prices are accurately and quickly communicated to producers, many of whom are marketers also. There are severe price difference penalties for inferior produce. Produce is quickly moved to market: much produce is sold within 24 hours of harvest; all is sold within 48 hours. As a consequence, little produce is lost to spoilage. And, finally, costs are extremely low: traders cut labor and personal costs to the minimum; marketing is so competitive that margins are small; and transport is sufficiently well organized and competitive that the small scale of trading operations does not increase costs. As a consequence, profits are low, about equal to the prevailing wage rate.

There are large seasonal fluctuations in prices, mostly caused by the harvesting of unirrigated fields, which necessarily are brought onto the market at about the same time in a pattern determined by the climate. The farmers in the Almolonga Valley have annual irrigation and are able to control their cropping pattern to take advantage of the seasonal price variations.

In this situation, it is difficult to see how changes in the marketing system could move produce as quickly and at such low cost. Any planned change in the nature of the distribution system would affect each sector of the local population differently. In all probability, public distribution would most benefit the landed and least benefit the landless and land-poor. Within the latter group, the full-time seasonal traders, who have less irrigated land and thus less cash income, would be more affected than the part-time traders to the coast.

The next section presents economic analyses on the possible distribution of gains and losses from some proposed changes in the marketing system.

ECONOMIC ANALYSES

The economic analyses performed address two sets of issues; one relates to the distribution of gains and losses to factors of production which may result from changes in the marketing system in vegetable production in the Almolonga Valley, and the other relates to sources of income instability and possible public interventions to reduce income variability. The first type of analysis is based on production function analysis of the production data obtained through the anthropological fieldwork. The second type of analysis is a simulation exercise performed with secondary data which were augmented by the data which were collected through the anthropological fieldwork.

HOUSEHOLD PRODUCTION ACTIVITIES

As has been described in the findings of the anthropological field work, the households in the Almolonga Valley are able to generate incomes from labor sources by working as farmer-entrepreneurs, farm laborers, marketers, and truckers. Some households engage in all four activities, others in only one. The allocation of household time to these activities and to consumption-related activities is governed by resource endowments and perceived incentives. The opportunity to sell fruits and vegetables has apparently induced their production and distribution. It also appears that ownership of irrigated land is perhaps the principal determinant of the households' allocations of time. The anthropological analysis has indicated that the returns to labor in the distribution of produce are about equal to the daily wage and that distribution tasks are an important source of employment for low-income persons. The first part of the economic analysis is directed at estimating the distribution of farm incomes among the various factors of production.

FUNCTIONAL DISTRIBUTION OF INCOMES IN VEGETABLE PRODUCTION

Data from 106 plots in Almolonga and Zunil were used to estimate Cobb-Douglas production functions and input/output coefficients for variable

factors of production. The 106 data records were obtained from the various croping sequences (Figure 2) for each of the 38 farms in the Almolonga Valley. Some farms had as many as four crops in the annual rotation and others had as few as two. Most farms had three crops in rotation as depicted in Figure 2. Table 11 presents the frequency distribution of crops in the various rotations.

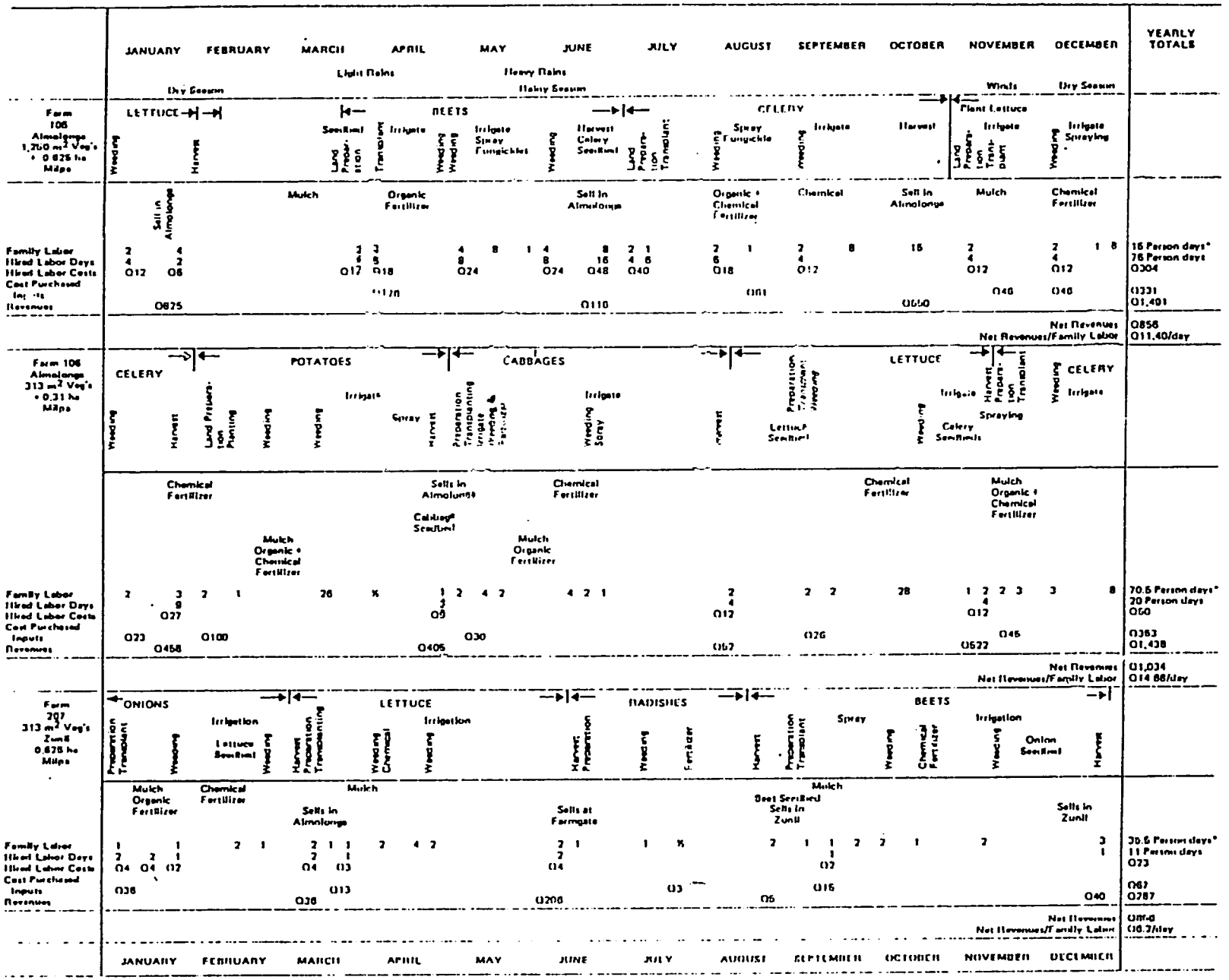
TABLE 11. DISTRIBUTION OF CROPS IN THE VEGETABLE PRODUCTION ROTATIONS USED FOR ESTIMATING PRODUCTION FUNCTIONS

Crop	Number of plots	Percent of sample
Beets	11	10.4
Cabbage	10	9.4
Carrots	9	8.5
Cauliflower	6	5.7
Celery	12	11.3
Lettuce	13	12.3
Onions	15	14.2
Potatoes	16	15.0
Radishes	8	7.6
String beans	3	2.8
Peas	3	2.8
Total plots	106	100

All inputs and outputs were converted to monetary value and then standardized to a common unit of field time (hectare-days). Family labor was valued at the going wage rate for farm labor in each of the two villages. Input/output coefficients were computed for labor and purchased inputs; these are presented for each crop in Table 12.

TABLE 12. INPUT/OUTPUT RATIOS FOR VEGETABLE PRODUCTION

Crop	Labor	Nonlabor purchased inputs	All purchased inputs
Beets	1.10	0.67	1.04
Cabbage	0.43	0.46	0.63
Carrots	1.04	0.67	1.20
Cauliflower	0.26	0.08	0.21
Celery	0.60	0.54	0.79
Lettuce	0.53	0.23	0.41
Onions	0.81	0.55	0.88
Potatoes	0.34	0.51	0.72
Radishes	1.00	0.32	0.48



*Excludes seedbed and marketing labor.

Figure 2. Calendar of cropping activities, labor use, and cash flow for three vegetable plots.

For beets, carrots, and radishes, it would appear that family labor returns were lower than the wage rate. Cauliflower appears to have been the most input efficient. The one-complement of the input/output index (third column in Table 12) could be interpreted as an index of returns to land and the farmers' labor and entrepreneurial ability. Accordingly, beets and carrots produced losses to these factors, and cauliflower and lettuce provided high returns. To explore this issue further, Table 13 presents estimates of factor shares from estimating Cobb-Douglas production functions with all 106 plots.

TABLE 13. FACTOR-SHARES ESTIMATED WITH A COBB-DOUGLAS FUNCTION

Factor	Factor-share (regression coefficient)	t-Statistic	Pr > |T|
	Regression No. 1		
All labor	0.30	2.71	.01
Purchase inputs	0.32	3.87	.001
	Regression No. 2		
Family labor	0.07	1.46	NS
Hired labor	0.15	2.87	.005
Purchased inputs	0.32	4.24	.001

NS = not significant.

Regression Number 1 aggregates family and hired labor and Regression Number 2 computes a separate factor share for family and hired labor. Under assumptions of constant returns to scale, the residual (one-complement) can be interpreted as the share of output earned by all other factors of production which were not included in the regression. In this instance those factors would be land and the farmers' entrepreneurial ability and farming skills. With these regressions, that residual appears to range from 40 to 45 percent of the farm value of produce. Regression Number 2 suggests that the returns to family labor are earned by entrepreneurial skills rather than raw labor.

The share of product earned by labor estimated with the production function was compared with the average share of revenues paid to hired labor in Almolonga and Zunil. In Almolonga the average share of revenues paid to

hired labor is 30 percent and in Zunil it is 4 percent. The Almolonga results are consistent with the production function analysis. In general, it appears that hired labor is paid a higher wage in Almolonga and that wage corresponds to the value-marginal-products of labor in vegetable production. Vegetable production appears to be an "equitable" source of income for small landholders and landless laborers. Overall, the labor market seems to be in a stable equilibrium at the prevailing wage rate and that wage rate is higher in Almolonga than in other parts of the highlands.

When the results of the factor share analysis are combined with the marketing margin analysis (Table 14), it appears that overall, 18 percent of the value of produce delivered to wholesale markets in Guatemala or for export is paid to marketing labor, 12 percent is paid to marketing costs other than labor, 21 percent is paid to production labor, 21 percent is paid to purchased factors of production, and 28 percent is paid to land and the farmers' skills. Labors share of wholesale value at the wholesale markets is at least 39 percent. To the extent that vegetables are produced by small farmers, as much as 66 percent of the wholesale value of produce may represent incomes to members of AID's target group.

THE IMPACT OF REDUCED MARKETING MARGINS ON INCOMES

We are now able to consider the impact of a marketing intervention that led to reduced marketing margins. Marketing margins can be reduced by lowering consumer prices or raising farm gate prices. With quantities held constant, lower consumer prices would represent a transfer of incomes from marketing labor to consumers because about 60 percent of the marketing margin is composed of labor costs. Reducing the margin through higher farm gate prices would transfer income from marketing labor to hired labor and small farmers, principally. In any case, any change in the marketing system that does not lead to higher levels of total value of output can at best only redistribute labor incomes and could reduce rural incomes in favor of consumers' gains.

With purchased marketing inputs representing only 12 percent of the value of produce, it seems unlikely that much could be achieved with innovations in the marketing system that were more efficient with respect to nonlabor costs. If changes in the marketing system are desired as sources of income for poor, rural persons, they must be aimed at expanding revenues.

TABLE 14. FACTOR-SHARES OF WHOLESALE VEGETABLE PRICES

Factor	Percent of wholesale price
Production labor	21
Nonlabor production inputs	21
Marketing labor	18
Other marketing costs	12
Land and farmers' entrepreneurial skills	28
	100

There appear to be two ways in which revenues could be increased by marketing innovations. One would be to expand output quantities in the presence of relatively elastic demand, another would be to develop new markets at present cost levels. The two approaches are identical in principle; they each ask the question: to what extent can the market absorb additional output? While no formal analysis of demand projections was undertaken during the case study, some analysis was performed on possible impacts of increased output.

SCENARIOS ON POSSIBLE IMPACTS OF INCREASED HORTICULTURAL PRODUCTION

Demand Growth Projections

The impacts on rural incomes that may be caused by changes to the vegetable marketing system depend largely on the demand for highland vegetables. The projections in the project plan state that domestic demand for vegetables will grow from 133,493 tonnes in 1975 to 163,719 tonnes in 1980 [Annex Table 1.1]. Aggregate personal consumption expenditures during this period were projected to rise from Q 1,698.9 million to Q 1,864.1 million [p. 13, Annex 1]. Under the assumption that vegetable supply is infinitely elastic, the income elasticity of demand for vegetables implied by these figures is 2.33. Apparently, the income growth estimate used in the project plan is a low estimate. The regression equation used in the project plan to estimate the increase in personal consumption expenditures yields results which indicate an annual growth rate of only 1.9 percent, which is much lower than recent income growth in Guatemala. For this case study we calculated the required income elasticity to absorb the increased output. This estimate used the compound annual growth rate of gross domestic product (5.8 percent/year) over the years 1965 to 1976[18] to predict the growth in personal consumption expenditures. The implied income elasticity of demand is .70. This compares reasonably with World Bank estimates for Guatemala of .50 for fresh vegetables and .60 for fruits. Nevertheless, it would appear that further analysis is required to have a more reliable assessment of the potential demand for fruits and vegetables. If income grew less rapidly than the World Banks' projection of 5.8 percent or the growth in income became biased away from sectors with a reasonably high elasticity of demand

for vegetables, it is possible that any induced output increases would have to be absorbed at lower retail prices.

Price Effects from Increased Output

In the proposal for the Cooperative Marketing Association (CMA) which is to form the backbone of the Small Farmer Marketing Project in Guatemala, incomes are to result largely from new vegetable production which would be induced by the higher and more stable prices offered to CMA members. The project paper indicates that in 1984 Q 6,990,000 worth of produce (valued at farm gate prices) will be marketed by the association, of which Q 4,464,000 would be induced by the association's services . Thus, the CMA is expected to increase member production by 176 percent. Their estimates of CMA market shares indicate that the CMA will have an overall market share of 19 percent in 1984. This means that overall fruit and vegetable supply in Guatemala will be 13.8 percent higher in 1984 than would have otherwise been without the CMA.

In order to gauge the effect of this supply increase on rural incomes, it is necessary to understand what will happen to vegetable prices if income and other demand shifters fail to shift the demand schedule to absorb the increased output. In this case, an output increase would lead to a drop in prices. The magnitude of the price changes depends on the price elasticity of demand. Estimates using low, middle, and high values from the range of elasticities which can be expected to apply are presented in Table 15. World Bank estimates of price elasticities for vegetables and fruits, respectively, are .16 and .21, and go only as high as .30 for any Central American countries.[19]

The estimates show that total revenues from vegetable farming will probably drop because of increased production not absorbed by demand shifts and would rise only 3.3 percent with a highly optimistic value for the price elasticity. Although the revenues of cooperative members are likely to rise, nonmember farmers are almost certain to receive less money for their produce if the CMA achieves its goals.

It is important to note that these are estimated changes from the equilibrium predicted to occur in this year without the CMA and not changes from current revenue levels. The project plan presents optimistic demand

TABLE 15. PRICE CHANGES AND EFFECTS ON INCOME BY ELASTICITY

Price elasticity of demand	Change in price necessary to clear the market (%)	Change in revenues of CMA members caused by the induced production (%)	Change in revenues of non-CMA members caused by the induced production (%)	Change in total vegetable revenues caused by the induced production (%)
.2	-69.0	-14.4	-69.0	-65.0
.5	-27.6	99.9	-27.6	-17.7
.8	-17.3	128.5	-17.3	-5.8
1.0	-13.8	138.0	-13.8	-1.9
1.5	-9.2	150.7	-9.2	3.3

projections, thus there is some risk that at least in a short run, the Small Farmer Marketing Project could result in a transfer of incomes from rural wage earners and small farmers (which are currently engaged in vegetable production and marketing) to marketing association members and urban consumers of vegetables. At the very least, further analysis should be undertaken on the demand side of the market for vegetables in Guatemala.

SUMMARY OF RESULTS ON DISTRIBUTIONAL IMPACTS FROM CHANGES IN THE MARKETING SYSTEM

The success of the proposed Small Farmer Marketing Project in Guatemala will redistribute labor incomes from current producers and marketers to new producers and marketers and possibly to urban consumers. The redistribution of incomes depends crucially on the growth of the gross national product, vegetable exports, and the income and price elasticities of demand for horticultural products. Since there do not appear to be excessive margins in the vegetable marketing chain and purchased inputs represent a relatively low share of the value of the produce reaching the wholesale markets, it would appear warranted to perform additional analysis on the demand side of the market for vegetables as well as further assessments of production and distribution costs for other producing regions before marketing interventions are implemented.

SIMULATION ANALYSIS OF SOURCES OF RISK

A common justification for public intervention in agricultural markets is based on the argument that both producers and consumers gain when the variance in price can be reduced. While this point continues to receive much theoretical and empirical attention, we do not join the debate. Under the assumption that the assertion is true, we directed simulation analyses to obtain estimates of the components of variance in producers' revenues.

Producers' revenues will depend on quantities produced and prices received. For each farmer, quantities produced are a function of yields which in turn depend on the cropping system, climate and weather, the use of inputs, and the incidence of pests and diseases. Prices received are a function of market phenomena. From the secondary data, it is clear that most horticultural crops have strong seasonal price variation. From the anthropological fieldwork and from secondary data provided by INDECA and the

AID mission, it is also clear that prices can vary substantially within the day and week.

For horticultural crops, marketing interventions or innovations could principally stabilize the within-season variation. The seasonal variation in prices is probably more determined by the cropping systems which are a function of climate and weather. By decomposing revenues and incomes into these three sources of variation, it is possible to make an assessment of the relative importance of three types of public interventions. If the principal source of income instability is associated with within-season price variation, then marketing interventions such as crop and price reporting services, cold storage, and processing can be effective in reducing producers' risk and possibly in improving incomes. It is this type of generic intervention that is planned for the CMA in the Small Farmer Marketing Project. If seasonal price fluctuations are more important, then there is relatively little that can be accomplished through marketing within the domestic market and finding export markets may become an important strategy. Finally, yield variation would imply that technical assistance and irrigation investments would be desirable.

The simulation analysis was based on imposing variable yields and prices on the farm budgets presented in the CMA project plan. Data from the producer surveys were used to calculate coefficients of variation on yield. Data from INDECA, the project plan, and the mission were used to compute coefficients of variation for seasonal and within-season prices. A simple simulation program was written in SAS to estimate the components of income variance.

Tables 16 to 26 present the average farm budgets from Almolonga and Zunil for the eleven horticultural crops produced there. These data were used in the simulation analysis. The data have been scaled to 1 hectare and adjusted to 1974-75 prices to facilitate comparison with the budgets presented in the CMA project plan. Table 27 presents the estimated variances for net income which are associated with the three components--monthly price, within-month prices, and yields.

With risk reduction as a criterion for intervention, it appears that a project such as the Cooperative Marketing Association has a potential for stabilizing the incomes of producers of beets, carrots, celery, lettuce, and peas. In each of these, equal or greater potential for stabilization exists

TABLE 16. AGGREGATE FARM BUDGET FOR BEETS (PER HECTARE)

		UNIT	PRICE	QUANTITY		TOTAL VALUE
1.	GROSS INCOME	DOZENS	0.13	8952.4		1205.47
2.	DIRECT COSTS					
2.1	INPUTS AND MATERIALS					
2.1.1	SEEDS AND SEEDLINGS				98.12	
2.1.2	CHEMICAL FERTILIZERS				99.53	
2.1.3	COMPOST AND MANURE				403.66	
2.1.4	INSECTICIDES AND FUNGICIDES				136.36	737.68
2.2	LABOR	DAYS				
2.2.1	SEEDBEDS AND LAND PREPARATION	DAYS	1.94	49.54	95.88	
2.2.2	PLANTING AND TRANSPLANTING	DAYS	1.74	50.60	87.94	
2.2.3	IRRIGATION	DAYS		0.00	0.00	
2.2.4	DISEASE AND INSECT CONTROL	DAYS		0.00	0.00	
2.2.5	CLEANING AND FERTILIZATION	DAYS	1.55	107.52	166.15	
2.2.6	HARVESTING	DAYS	1.79	76.95	137.55	487.42
3.	OTHER COSTS					61.90
3.1	TRANSPORTATION TO MARKET				61.90	
4.	TOTAL COSTS					1287.00
5.	NET INCOME					-81.52

TABLE 17. AGGREGATE FARM BUDGET FOR CABBAGE (PER HECTARE)

		UNIT	PRICE	QUANTITY		TOTAL VALUE
1.	GROSS INCOME	DOZENS	0.70	3397.6		2381.44
2.	DIRECT COSTS					
2.1	INPUTS AND MATERIALS					1340.93
2.1.1	SEEDS AND SEEDLINGS				103.25	
2.1.2	CHEMICAL FERTILIZERS				262.44	
2.1.3	COMPOST AND MANURE				841.92	
2.1.4	INSECTICIDES AND FUNGICIDES				133.33	
2.2	LABOR	DAYS				
2.2.1	SEEDBEDS AND LAND PREPARATION	DAYS	2.46	41.74	102.73	
2.2.2	PLANTING AND TRANSPLANTING	DAYS	1.82	19.71	35.95	
2.2.3	IRRIGATION	DAYS		0.00	0.00	
2.2.4	DISEASE AND INSECT CONTROL	DAYS		0.00	0.00	
2.2.5	CLEANING AND FERTILIZATION	DAYS	1.70	40.58	68.91	
2.2.6	HARVESTING	DAYS	1.49	59.09	88.32	295.91
3.	OTHER COSTS					83.33
3.1	TRANSPORTATION TO MARKET				83.33	
4.	TOTAL COSTS					1720.18
5.	NET INCOME					661.26

TABLE 18. AGGREGATE FARM BUDGET FOR CARROTS (PER HECTARE)

		UNIT	PRICE	QUANTITY		TOTAL VALUE
1.	GROSS INCOME	DOZENS	0.07	25647		1870.93
2.	DIRECT COSTS					
2.1	INPUTS AND MATERIALS					802.09
2.1.1	SEEDS AND SEEDLINGS				58.13	
2.1.2	CHEMICAL FERTILIZERS				200.03	
2.1.3	COMPOST AND MANURE				355.38	
2.1.4	INSECTICIDES AND FUNGICIDES				188.55	
2.2	LABOR	DAYS				
2.2.1	SEEDBEDS AND LAND PREPARATION	DAYS	1.92	76.18	145.98	
2.2.2	PLANTING AND TRANSPLANTING	DAYS	1.94	20.61	39.95	
2.2.3	IRRIGATION	DAYS	1.94	7.73	14.98	
2.2.4	DISEASE AND INSECT CONTROL	DAYS	1.95	7.80	15.19	
2.2.5	CLEANING AND FERTILIZATION	DAYS	1.80	191.53	344.76	
2.2.6	HARVESTING	DAYS	1.68	77.30	129.83	690.49
3.	OTHER COSTS					54.12
3.1	TRANSPORTATION TO MARKET				54.12	
4.	TOTAL COSTS					1526.70
5.	NET INCOME					344.22

TABLE 19. AGGREGATE FARM BUDGET FOR CAULIFLOWER (PER HECTARE)

		UNIT	PRICE	QUANTITY		TOTAL VALUE
1.	GROSS INCOME	DOLLARS	0.99	2628.2		2609.77
2.	DIRECT COSTS					
2.1	INPUTS AND MATERIALS					189.56
2.1.1	SEEDS AND SEEDLINGS				68.79	
2.1.2	CHEMICAL FERTILIZERS				72.08	
2.1.3	COMPOST AND MANURE				37.45	
2.1.4	INSECTICIDES AND FUNGICIDES				11.24	
2.2	LABOR	DAYS				
2.2.1	SEEDBEDS AND LAND PREPARATION	DAYS	2.54	30.92	78.03	
2.2.2	PLANTING AND TRANSPLANTING	DAYS	1.56	14.82	23.10	
2.2.3	IRRIGATION	DAYS		0.00	0.00	
2.2.4	DISEASE AND INSECT CONTROL	DAYS		0.00	0.00	-
2.2.5	CLEANING AND FERTILIZATION	DAYS	1.02	45.74	83.02	
2.2.6	HARVESTING	DAYS	1.23	56.69	69.49	208.64
3.	OTHER COSTS					39.01
3.1	TRANSPORTATION TO MARKET				39.01	
4.	TOTAL COSTS					477.21
5.	NET INCOME					2132.56

CELERY

TABLE 20. AGGREGATE FARM BUDGET FOR CELERY (PER HECTARE)

		UNIT	PRICE	QUANTITY		TOTAL VALUE
1.	GROSS INCOME	UNITS	0.13	24240		3209.62
2.	DIRECT COSTS					
2.1	INPUTS AND MATERIALS					1587.52
2.1.1	SEEDS AND SEEDLINGS				256.05	
2.1.2	CHEMICAL FERTILIZERS				164.07	
2.1.3	COMPOST AND MANURE				829.25	
2.1.4	INSECTICIDES AND FUNGICIDES				338.16	
2.2	LABOR	DAYS				
2.2.1	SEEDBEDS AND LAND PREPARATION	DAYS	1.78	95.85	170.78	
2.2.2	PLANTING AND TRANSPLANTING	DAYS	1.89	97.78	184.51	
2.2.3	IRRIGATION	DAYS		0.00	0.00	
2.2.4	DISEASE AND INSECT CONTROL	DAYS	1.94	10.28	19.97	
2.2.5	CLEANING AND FERTILIZATION	DAYS	1.88	103.20	193.75	
2.2.6	HARVESTING	DAYS	1.86	49.47	92.13	661.15
3.	OTHER COSTS					48.06
3.1	TRANSPORTATION TO MARKET				48.06	
4.	TOTAL COSTS					2296.74
5.	NET INCOME					912.89

TABLE 21. AGGREGATE FARM BUDGET FOR LETTUCE (PER HECTARE)

		UNIT	PRICE	QUANTITY		TOTAL VALUE
1.	GROSS INCOME	DOZENS	0.74	4244.4		3077.53
2.	DIRECT COSTS					
2.1	INPUTS AND MATERIALS					617.05
2.1.1	SEEDS AND SEEDLINGS				78.36	
2.1.2	CHEMICAL FERTILIZERS				124.81	
2.1.3	COMPOST AND MANURE				202.10	
2.1.4	INSECTICIDES AND FUNGICIDES				211.78	
2.2	LABOR	DAYS				
2.2.1	SEEDBEDS AND LAND PREPARATION	DAYS	2.41	41.03	98.87	
2.2.2	PLANTING AND TRANSPLANTING	DAYS	1.71	38.35	65.68	
2.2.3	IRRIGATION	DAYS		0.00	0.00	
2.2.4	DISEASE AND INSECT CONTROL	DAYS	1.94	4.75	9.22	
2.2.5	CLEANING AND FERTILIZATION	DAYS	1.77	50.84	89.88	
2.2.6	HARVESTING	DAYS	1.76	64.22	112.93	376.59
3.	OTHER COSTS					73.75
3.1	TRANSPORTATION TO MARKET				73.75	
4.	TOTAL COSTS					1067.39
5.	NET INCOME					2010.14

TABLE 22. AGGREGATE FARM BUDGET FOR ONIONS (PER HECTARE)

		UNIT	PRICE	QUANTITY		TOTAL VALUE
1.	GROSS INCOME	THOUSANDS	4.96	417.23		2068.34
2.	DIRECT COSTS					
2.1	INPUTS AND MATERIALS					642.35
2.1.1	SEEDS AND SEEDLINGS				156.20	
2.1.2	CHEMICAL FERTILIZERS				118.27	
2.1.3	COMPOST AND MANURE				456.77	
2.1.4	INSECTICIDES AND FUNGICIDES				111.11	
2.2	LABOR	DAYS				
2.2.1	SEEDBEDS AND LAND PREPARATION	DAYS	2.49	47.26	117.75	
2.2.2	PLANTING AND TRANSPLANTING	DAYS	1.58	78.54	124.04	
2.2.3	IRRIGATION	DAYS	1.94	10.31	19.97	
2.2.4	DISEASE AND INSECT CONTROL	DAYS	1.96	2.04	3.99	
2.2.5	CLEANING AND FERTILIZATION	DAYS	1.40	127.39	178.57	
2.2.6	HARVESTING	DAYS	1.22	114.40	139.02	583.35
3.	OTHER COSTS					37.03
3.1	TRANSPORTATION TO MARKET				37.03	
4.	TOTAL COSTS					1462.72
5.	NET INCOME					605.62

TABLE 23. AGGREGATE FARM BUDGET FOR POTATOES (PER HECTARE)

		UNIT	PRICE	QUANTITY		TOTAL VALUE
1.	GROSS INCOME	HUNDREDWEI	5.07	838.22		4250.47
2.	DIRECT COSTS					
2.1	INPUTS AND MATERIALS					1850.55
2.1.1	SEEDS AND SEEDLINGS				793.98	
2.1.2	CHEMICAL FERTILIZERS				203.49	
2.1.3	COMPOST AND MANURE				580.14	
2.1.4	INSECTICIDES AND FUNGICIDES				292.92	
2.2	LABOR	DAYS				
2.2.1	SEEDBEDS AND LAND PREPARATION	DAYS	1.98	91.31	180.77	
2.2.2	PLANTING AND TRANSPLANTING	DAYS	1.83	94.21	172.28	
2.2.3	IRRIGATION	DAYS	1.54	35.25	54.31	
2.2.4	DISEASE AND INSECT CONTROL	DAYS	1.94	20.60	40.03	
2.2.5	CLEANING AND FERTILIZATION	DAYS	1.85	55.37	102.62	
2.2.6	HARVESTING	DAYS	1.79	136.05	243.37	793.37
3.	OTHER COSTS					76.26
3.1	TRANSPORTATION TO MARKET				76.26	
4.	TOTAL COSTS					2720.16
5.	NET INCOME					1530.31

TABLE 24. AGGREGATE FARM BUDGET FOR RADISHES (PER HECTARE)

		UNIT	PRICE	QUANTITY		TOTAL VALUE
1.	GROSS INCOME	BUZELIN	0.01	23545		698.48
2.	DIRECT COSTS					
2.1	INPUTS AND MATERIALS					191.71
2.1.1	SEEDS AND SEEDLINGS				66.10	
2.1.2	CHEMICAL FERTILIZERS				21.30	
2.1.3	COMPOST AND MANURE				86.14	
2.1.4	INSECTICIDES AND FUNGICIDES				18.16	
2.2	LABOR	DAYS				
2.2.1	SEEDBEDS AND LAND PREPARATION	DAYS	2.66	20.29	53.93	
2.2.2	PLANTING AND TRANSPLANTING	DAYS	1.94	2.90	5.62	
2.2.3	IRRIGATION	DAYS		0.00	0.00	
2.2.4	DISEASE AND INSECT CONTROL	DAYS		0.00	0.00	
2.2.5	CLEANING AND FERTILIZATION	DAYS	1.94	20.20	39.32	
2.2.6	HARVESTING	DAYS	1.06	47.83	50.56	149.43
3.	OTHER COSTS					0.00
3.1	TRANSPORTATION TO MARKET				0.00	
4.	TOTAL COSTS					341.14
5.	NET INCOME					357.34

TABLE 25. AGGREGATE FARM BUDGET FOR STRINGBEANS (PER HECTARE)

		UNIT	PRICE	QUANTITY		TOTAL VALUE
1.	GROSS INCOME	HUNDREDWT	4.02	85.03		409.47
2.	DIRECT COSTS					
2.1	INPUTS AND MATERIALS					122.09
2.1.1	SEEDS AND SEEDLINGS				44.94	
2.1.2	CHEMICAL FERTILIZERS				30.21	
2.1.3	COMPOST AND MANURE				0.00	
2.1.4	INSECTICIDES AND FUNGICIDES				46.94	
2.2	LABOR	DAYS				
2.2.1	SEEDBEDS AND LAND PREPARATION	DAYS		0.00		
2.2.2	PLANTING AND TRANSPLANTING	DAYS		0.00	0.00	
2.2.3	IRRIGATION	DAYS		0.00	0.00	
2.2.4	DISEASE AND INSECT CONTROL	DAYS		0.00	0.00	
2.2.5	CLEANING AND FERTILIZATION	DAYS		0.00	0.00	
2.2.6	HARVESTING	DAYS	1.29	30.92	39.95	39.95
3.	OTHER COSTS					0.00
3.1	TRANSPORTATION TO MARKET				0.00	
4.	TOTAL COSTS					162.04
5.	NET INCOME					247.43

TABLE 26. AGGREGATE FARM BUDGET FOR PEAS (PER HECTARE)

		UNIT	PRICE	QUANTITY		TOTAL VALUE
1.	GROSS INCOME	HUNDREDWEIGHT	9.95	74.21		731.06
2.	DIRECT COSTS					
2.1	INPUTS AND MATERIALS					43.86
2.1.1	SEEDS AND SEEDLINGS				12.52	
2.1.2	CHEMICAL FERTILIZERS				31.34	
2.1.3	COMPOST AND MANURE				0.00	
2.1.4	INSECTICIDES AND FUNGICIDES				0.00	
2.2	LABOR	DAYS				
2.2.1	SEEDBEDS AND LAND PREPARATION	DAYS	3.88	15.46	59.92	
2.2.2	PLANTING AND TRANSPLANTING	DAYS	1.00	3.00	3.00	
2.2.3	IRRIGATION	DAYS		0.00	0.00	
2.2.4	DISEASE AND INSECT CONTROL	DAYS		0.00	0.00	
2.2.5	CLEANING AND FERTILIZATION	DAYS	1.00	7.73	0.00	
2.2.6	HARVESTING	DAYS	1.29	40.20	51.93	125.84
3.	OTHER COSTS					29.96
3.1	TRANSPORTATION TO MARKET				29.96	
4.	TOTAL COSTS					199.66
5.	NET INCOME					531.40

TABLE 27. SIMULATED VARIANCE COMPONENTS FOR NET INCOMES IN VEGETABLE PRODUCTION

Crop	Variance components--source of income variability (mean squares)		
	Monthly prices	Prices within month	Yields
Beets	13,100,502	13,964,819	1,088,678
Cabbage	2,968,463	598,832	926,392
Carrots	6,709,202	6,608,743	6,371,722
Cauliflower	2,234,820	979,501	2,336,867
Celery	7,834,959	7,954,760	12,086,444
Lettuce	5,167,220	5,503,663	6,278,318
Onions	2,707,743	1,001,946	1,214,763
Potatoes	4,229,217	2,091,949	1,745,639
Peas	171,955	143,584	293,051
Degrees of freedom	11	19	209

Total number of simulated budgets = 240/crop.

in improving export markets or reducing production yields. Thus, it would appear advisable for the CMA to begin working with these five crops with an emphasis on carrots, celery, and lettuce. The analyses suggest that there is little that the CMA could do by intervening in the marketing of cabbage, cauliflower, or onions.

The importance of price and yield variability is highlighted by Table 28 which presents the percentile distributions on net income for the crops used in the simulation. The table suggests that if farmers are unable to control the time at which their produce comes to market, they would tend to observe losses for more than 25 percent of the time in almost all these crops. This simulated result does not say that these are the frequencies of net losses, rather that these could be the levels of loss if farmers did not plan their cropping system to bring their harvests in at the best possible price. However, these results suggest that the CMA project will have to develop strategies for handling the risk of vegetable production. Because it seeks to induce new producers into vegetables, these risks are likely to have a higher incidence on them than or the more experienced existing producers. For example, the simulation analysis demonstrates that 14 out of 15 potato producers in Almolonga maximize net income by planting potatoes for harvest

TABLE 28. PERCENTILE DISTRIBUTION OF SIMULATED NET PROFITS FOR VEGETABLE PRODUCERS (quetzals/hectare)

Crop	Percentile net income (hectares)			
	75th	50th	25th	10th
Beets	1,664	-207	-1,491	-2,212
Cabbage	603	30	-500	-855
Carrots	1,682	-24	-1,132	-1,826
Cauliflower	1,970	1,044	70	-465
Celery	2,953	579	-799	-1,613
Lettuce	1,560	1	-998	-1,853
Onions	756	111	-352	-582
Potatoes	999	294	-238	-579
Peas	429	85	-200	-423

in April and May. The simulation analysis suggests that the cropping pattern in Almolonga is determined by the farmers' attempts to reach the potato market at its peak. Their ability to do so depends more on climate and irrigation than on the marketing system. Onions could be brought to market at peak prices, but few farmers do so. Most farmers also bring celery, lettuce, and cauliflower at or near the seasonal peak prices, but cabbage and carrots are planted simply to avoid losses.

The simulation analysis suggests that horticultural production is very risky, but that farmers with irrigation plan their cropping system to maximize income over the agricultural year. While marketing interventions could reduce some of the price risk in certain crops, it is important that marketing activities be designed with a view to the whole cropping cycle and the importance of timing in production and marketing decisions.

SUMMARY OF ANTHROPOLOGICAL AND ECONOMIC ANALYSES

The anthropological and economic analyses have identified several factors which seem to limit the potential for increasing target group incomes through a Cooperative Marketing Association for vegetables. The results of fieldwork in Almalonga and Zunil indicate the marketing is an important income source for members of AID's target group. The returns to marketing labor are close to the wage rate in agriculture. Margins are shown to vary with the capital, labor, and risks associated with different routes. In all phases of the system, however, entry is relatively open and there is definite

price competition. Further, marketing as a source of family income is compatible with different types of landholding status, irrigation methods, and cropping cycles. Given the low margins and the efficiency of marketing, as well as the demographic characteristics of the marketeers found by the anthropological research, the displacement of those currently performing marketing services may have deleterious effects.

The economic analysis estimates that two-thirds of the wholesale price of vegetables already accrues to labor from members of the target groups, and another 21 percent to farmer's production costs. Only 12 percent of the total price represents returns to marketing costs other than labor, and much of this consists of transportation costs.

The analysis of the CMA project papers' projections for supply and market share show that overall returns to vegetable production are very sensitive to the way in which the market reacts to increased supplies. Even with the demand growth projected, the success of the CMA could well result in welfare transfers from non-CMA farmers and marketeers to cooperative members and urban consumers. The demand projections themselves are crucial to the project's effectiveness, and further analysis of the expected magnitude and composition of demand shifts is found to be warranted.

Simulation analysis was used to determine the importance of different sources of risk to the profits of Almolonga and Zunil vegetable farmers. The simulations show that within-month price variation, the risk which could best be reduced by a large marketing organization, is only significant for several crops and is no more important than the risks farmers face from seasonal price variations and yield variations. The ability of the CMA to influence cropping cycles and provide long-term storage, then, is likely to be an important factor in its ability to reduce the risks associated with vegetable farming in the highlands.

The overall thrust of this analysis has been that the CMA could produce effects in the overall market for vegetables in Guatemala which have not been anticipated in the planning documents. Some of these effects might serve to neutralize or wholly negate the CMA's ability to raise incomes for its target population. Further analysis and careful design incorporating the results is recommended to improve the project's effectiveness.

ISSUES IN MARKETING SYSTEMS AND RURAL DEVELOPMENT

The following sections focus on issues which are critical in evaluating the effectiveness of marketing systems in relation to small farmers. In developing countries, marketing systems have often been accused of being either technically or economically inefficient. Both kinds of inefficiency will be examined with reference to the case study.

TECHNICAL EFFICIENCY IN MARKETING

Technical inefficiency refers to suboptimal use of resources in the provision of marketing services. Such problems are usually found when many marketers are operating with inefficient techniques in transport, packing, storing, display, and vending of agricultural products. Examples include many truckers going to market with less than full trucks, poor packing and refrigeration which result in high spoilage rates, and high transaction costs caused by poor market facilities. Other technical inefficiencies such as congested urban markets, lack of good roads and storage facilities in rural areas, and a lack of accurate and up-to-date price dissemination are caused by lack of public investment in infrastructure. Technical inefficiency limits income growth among small rural producers by creating an unnecessarily large wedge between farm-gate and retail price, thus limiting the amount of produce which the market can absorb at any given price. In Almolonga and Zunil, the field research seemed to indicate that there was little technical inefficiency in the techniques used by vegetable marketers. Trucks were usually filled, often by cooperative agreements among marketers with less than full loads, and consumer goods and inputs were often hauled back on the return trip. Spoilage rates were low on most routes, and grading took place in most transactions. Better roads, short-term storage facilities, and a better market might improve marketing efficiency, but the existing facilities are probably better in this region than in most of the Western Highlands. Because vegetable production is such a major activity and there are so many marketers, price information is relatively accurate.

ECONOMIC EFFICIENCY IN MARKETING

Economic efficiency in a marketing system can be broadly understood as allowing production and marketing to function so that the actors in the system have better and wider choices, thus allowing greater access to productive resources, outlets, education, technology, and improved forms of organization. Technical efficiency does not always produce economic efficiency in marketing systems. For example, it is possible that new roads or organizational structures could lower per-unit marketing costs but create differential access to markets and give large or fortuitously situated producers an advantage. Another trade-off can occur in employment because more technically efficient solutions can decrease the demand for marketing labor.

The marketing margin--how much of the final price of agricultural products goes to producers and how much goes to marketing services--is an important issue in evaluating economic efficiency. Efficiency depends on the individual circumstances involving costs, distances, and processing requirements of the producers and the marketers. The economic literature in rural development indicates that most planners and politicians have a popular conception of marketers as greedy, unscrupulous middlemen who make huge profits from large monopsonistic margins. The literature usually has disagreed with this assessment, and the economic analysis from the Guatemala study supports the view that marketers are receiving fair returns for providing necessary services. Seventy percent of the final price goes to the agricultural sector and 30 percent goes to marketing. Further, returns to labor for Almolonga and Zunil marketers are only slightly higher than those for agricultural workers.

In evaluating marketing in the context of rural development, it is important to understand how margins change in response to other changes in the economic system. Recent work which analyzed margin changes in a perfectly competitive environment exposed some important considerations.[20] The method for splitting the final price between agricultural production and marketing depends critically on the source of the shift. An exogenous shift in demand can be expected to increase the farmers' share if the supply elasticity in agriculture is less than that in marketing; the share will decrease if agricultural production is more elastic than marketing. The size of the margin shift depends on the magnitude of the differences in

shares and supply elasticities and on the elasticity of substitution between farming and marketing; the less substitutable they are, the larger the shift in margins will be. In Guatemala, produce is sold fresh and entry into both agriculture and marketing are fairly open; there is not a great deal of ability for substitution between marketing and agriculture in the final product.

Exogenous shifts in the supply of marketing services and of agricultural output can be expected to have opposite effects. An increase in marketing services at a given price, as a result, for example, of the construction of new paved roads in a rural area, will increase competition for an unchanged supply of agricultural products. The farmers' share of the final price will rise, and demand increases caused by the lower prices resulting from reduced margins will increase output. In Guatemalan produce, where limited substitution between marketing and agriculture is possible, this effect could be significant. An exogenous supply shift, such as the one anticipated by marketing co-op planners in response to education and technical assistance efforts, would have the opposite effect in the absence of marketing changes. The increased produce on the market would compete for a limited supply of marketing services, and marketing margins would rise. The above effects are prescribed in the case of perfect competition, but in a small producer/small marketer situation they can provide a strong indication of how the marketers' share of revenues can be expected to respond to dynamic changes in the development process.

LOCAL AND EXTERNAL TRADE ISSUES

Another important issue in understanding the marketing systems' efficiency to small farmers is the nature of its horizontal and vertical linkages. Horizontal linkages are essential in cohesive regional development; the ability to present regional demands effectively to regional producers allows greater specialization and diversity in production. Farmers can produce subsistence foods for cash and allow other producers to produce cash crops or crafts for the export market. These linkages are highly dependent on the existence of regional bulking centers which are located between smaller population centers and allow factor and output prices to stabilize across the region. In this situation, the marketers who trade in the region are

likely to be residents and be closely attuned to supply and demand situations in different parts of the region. Their knowledge can enable enough competition so that returns to marketing are not disproportionate to returns to capital and labor in other enterprises. This description is a fairly accurate representation of the conditions in Quelzaltenango.

In contrast, the northern regions of the Western Highlands of Guatemala do not have these horizontal linkages. Those marketing systems can be characterized as dendritic; the trade linkages are almost entirely oriented for import and export from the region. There is very little local bulking, and the traders who sell consumer goods to local shops are mostly from the more developed central regions. Because each locality is linked only with the external market, a true regional economy cannot develop. Farmers attempt to grow enough produce on their own farms to meet subsistence needs, but they often fail, partially because the scale of their enterprises is limited by the market. If roads and local traders existed to link these small villages and identify disequilibria in factor and output prices, then specialization and increased production would be more likely to meet subsistence needs. Without these horizontal linkages, many farmers are forced to migrate to coastal plantations for 3 to 6 months per year to generate enough cash to buy the necessities imported by traders from the central regions. The vertically-oriented system of markets which serves the area, even though it may be competitive, implicitly assigns prices to factors of production in such a way that there are no incentives for a more efficient reorganization of economic processes.

In Almolonga and Zunil, the export of vegetables to other regions is controlled by local traders who buy from different highland marketplaces and often bring in consumer goods on return trips. This system gives farmers access to markets which assign prices in accordance with their value in other production options and allows efficient reorganization.

COMPETITION AND MARKETING EFFICIENCY

Economic efficiency in marketing must be evaluated by the criterion of the existence of competition. Large firms or "cooperating" marketers can fix prices to their advantage and to the detriment of small farmers, who can be expected to sell less at lower prices in such a situation. It is important

to identify what barriers prevent new middlemen from entering the market. These barriers might be the political power of existing firms, cultural and ethnic restrictions, or lack of access to the necessary capital goods. Where marketers are able to preserve these barriers, growth which could be met by local producers instead stimulates growth in another area or country. In Quetzaltenango, market entry appears to be quite open in vegetable trading; many women who market the household's produce have only a basket and a bus ticket. Space on trucks can be rented for travel to different markets, and most of the buyers at the Terminal Market in Guatemala City will purchase from whoever has good produce at the right price.

The structure and terms of trade which develop in response to historical and social factors can be disadvantageous to small rural producers. An example of this situation is the system of trade in the coastal plantations of Western Guatemala, as outlined by Carol Smith. The plantations produce cash crops for the world export market using peasant laborers, many of whom migrate from the highlands each year. The plantations are owned by Ladinos, who live in lowland towns and conduct their international commerce outside of the markets where peasants can participate. The laborers, who are Indians, receive cash incomes which are high relative to wages available in the highlands, but a large part of these incomes must be spent for subsistence goods produced outside the region. The marketplaces which serve Indians are controlled by Ladino merchants and external food suppliers; the peasants themselves have no commercial participation. They are caught in a situation where their only choice is to work for Ladinos, and the marketing system denies the viability of any other enterprise. In Almolonga, the natural resource endowments do not favor plantation agriculture but are almost perfect for year-round vegetable production. Ladinos were never interested in using political and economic power to control this production, so Indians gained control of marketing as well as production.

EFFECTS ON HOUSEHOLD PRODUCTION ACTIVITIES

Economic literature has stressed that marketers perform dynamic functions in addition to playing brokers to static supply and demand. The economic efficiency of a marketing system is not independent of its effects on the organization of the economic processes with which it is connected.

In examining the economic behavior of rural producers in less developed countries, the household is often the most appropriate decision-making unit to analyze. It is important to understand how the marketing system affects not only the commodity being analyzed but all of the productive activities of the household. In Almolonga and Zunil the marketing of vegetables has provided for increased opportunities and greater specialization. Marketing itself is an enterprise which is compatible with the household's production of subsistence and cash crops. Some farmers market 2 days each week, and some farm full-time for half the year and work as marketers full-time for the rest of the year. Some marketers have been so successful that they have concentrated on marketing and given up farming, often selling their land as a result. The services performed by these marketers add to the value of the produce; marketing services therefore add to the overall wealth created by Almolonguenos.

The marketing system associated with plantation agriculture in the lowlands of western Guatemala is geared to large-scale producers. Although the system is efficient at exporting cash-crop production, it is inefficient in encouraging new producers and diversification of production into the goods consumed by the local population. The marketing system has allowed producers to make gains through specialization and diversification. Many varieties of vegetables which were not produced until the past decade are now grown in the region. Almolonga's high percentage of production in the recently-growing celery market serves as an example of this change; because producers had knowledge of the market conditions and access to dependable market channels, they have been able to take advantage of high prices.

Marketing can also affect economical efficiency by the kinds of production methods it encourages. In Almolonga, where vegetable marketing is centered, there has been a greater inflow of knowledge and use of pesticides, herbicides, fertilizers, and new seed types. The communication and contacts with other parts of the country and input producers has been encouraged by the developed and competitive marketing system. If new technologies are capital-intensive or are very difficult to use, they may give large or educated producers a decided advantage. In this situation, the rural poor are prevented from receiving the benefits of economic development.

EFFECTS OF RISK AND PRICE INSTABILITY

Small farmers, especially those engaged in subsistence agriculture, tend to be extremely risk-averse. Some risks such as drought, flood, and political instability are exogenous to the marketing system. To the extent that the marketing system can limit the risks that farmers face because of price instability, it can be efficient in encouraging greater production and increasing incomes. Price fluctuations which increase the farmers' risk of not capitalizing on his time and resource investment in his crop include day-to-day, season-to-season, and year-to-year fluctuations. Economic theory has shown that society never benefits from price instability, although under different circumstances either consumers or producers may benefit at the expense of the other.[21] Analysis of Almolonga and Zunil production data shows that there is day-to-day variation, and there is even greater variation in seasonal prices. In the case of daily variation, short-term storage facilities could be used to reduce risk by smoothing out the supply-hitting retail markets and stabilizing prices. Seasonal instability is caused by climatic conditions such as lack of rainfall. Farmers in Almolonga, who have a high and easily accessible water table, use this variation to their advantage. They time their production so that they harvest at times of tight supply and increase the value of their produce.

If there are market intermediaries who have considerable market power, the middleman's response to price instability depends on his goals for the market. An intermediary serving the interests of producers would stabilize prices to both producers and consumers. A middleman serving only to maximize his own profits would stabilize consumer prices but pay differential prices to producers and buy much more when prices are lower. Less would be produced in the second case, and the consumer price would be higher. In fact, where no real source of price instability exists, it can be advantageous to monopolistic-monopsonistic middlemen to create such uncertainty. This analysis is only applicable to storeable products, however, and is most likely to be valuable in analysis of basic grains or export crops where such market power is more likely to exist.

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16. Dwayne Jelinek, Marketing Report--Institutional and Organizational Analysis, 1978.

17. The margin or mark-up is the percentage difference between wholesale and retail prices, obtained by dividing the retail price by the wholesale price and then subtracting the base 100 percent, which represents the wholesale price.

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APPENDIX A

LITERATURE REVIEW

The following is a review of literature relevant to the role of marketing in developing countries. First, viewpoints on the role of rural marketing in the broader context of development will be discussed. Particular attention will be paid to understanding the bases and effects of public interventions. Then applied economic literature on the dynamics of distribution of returns to marketers and farmers will be examined. This will be discussed in the context of works considering the connection between public interventions and societal welfare.

Harold Riley, writing in 1972, emphasized that the marketing system takes on increasingly important functions during the development process (1). Rising incomes will cause an increase in the proportion of consumer expenditures for marketing services. Factors such as specialization of labor, greater geographic separation of production and consumption, and the use of new technologies all contribute to the evolution of a more complex marketing system. Marketing functions are defined to include exchange activities associated with the transfer of property rights, the physical handling of products, and the institutional arrangements for facilitating these activities.

Marketing is the link between agricultural producers and consumers, and it is the primary mechanism for coordinating production-distribution activities and communicating information between farmers and food consumers. Earlier writers stressed that marketers do much more than link buyers and sellers in a static determination of production and consumption; marketing has a dynamic role in stimulating production and in identifying and developing new markets (2,3). It can foster the entrepreneurial activity which creates innovation and technological change in rural agriculture.

Riley states that "effective and efficient marketing systems are not likely to develop automatically in the development process, hence public policies are needed to facilitate marketing changes." A systematic approach to diagnosing marketing system performance and problems is proposed. First, the food production and distribution system should be examined in the context of an urban center and its related supply area. Then the system can be analyzed to identify potential improvements. These improvements must then be understood in terms of their effects on input markets and consumer goods distribution, and the resulting system evaluated relative to the old system

and in the context of broader development goals. These goals include maintaining a specified growth rate in per capita GDP, improving the quality and quantity of employment, supplying an abundant, nutritious, reliable food supply at economical prices, and increasing farm incomes both absolutely and relatively.

The discussion of specific problems in the marketing system serving Cali stressed the technical inefficiency inherent in the marketing system. Lack of organization, poor choice of available technologies, and low management capacity were said to be causing an unsatisfactory system. Riley stresses that for fruits and vegetables, the marketing system could promote overall efficiency by encouraging geographic concentration of producers. Riley concludes that improvements in the marketing system, mostly of a technical nature, would allow a reduction in consumer prices and improved marketing service over a ten-year period.

Riley recognizes the inherent conflict between rural agricultural incomes and the availability of economical and nutritional foods to the urban poor. In considering public interventions, it should be realized that private marketing firms are not always inefficient and unfair to producers and consumers. If there are substantial economies which may be achieved by publicly administered distribution problems, the implications for private sector investment and for overall employment in the distribution system must be considered.

In conclusion, Riley identifies distrust of intermediaries and lack of technical assistance, training, credit, and infrastructure as formidable barriers to the development of efficient and progressive marketing systems in developing countries. He calls for long-range national programs in marketing, including the creation of research and development capacity. Public and semi-public enterprises have an important role in creating a technically and economically efficient distribution system.

Fox and Weber directed their attention to ways in which micro-level marketing research can support rural development projects (4). They begin by identifying problems with current research approaches. Irrelevance is fostered by forcing the competitive, static model on assumed homogeneous behavior on the part of farmers and marketing agents. Most research has a top-down orientation which starts with the urban and export markets and

works backwards to the interface of the distributive system with rural producers. Rural development schemes are often based on popular beliefs about excessive margins, exploitative middlemen, and uninformed farmers; these beliefs are often misconceptions or oversimplifications. Government interventions have proved inefficient and at times counterproductive. Many programs have attempted major structural and technological changes without paying adequate attention to making traditional marketing forms more effective. Engineers and marketing technicians have tended to overendorse capital-intensive technologies and underemphasize the development of local skills and management capacity; this has produced underutilized capacity.

Fox and Weber focus much more specifically on the rural producing area than Riley (1972). They bring out the important point that the rural system is not only a chain of supply to urban and export markets; linkages with other rural systems are important. Marketing activities must be viewed in terms of interrelationships involving economic, social, geographic, and technical variables. The endogenous relationships in this framework are the interactions of rural households and rural markets. Research must consider all household outputs; these include not only livestock and crop products but also labor and nonagricultural products and services. They propose a system for multidisciplinary study of marketing systems similar to Riley's, although with a focus more specifically on rural producers. The evaluation of growth and equity impacts are stressed; the prescription of policy and programs which result in major changes to the rural marketing system are outputs of the research. It is important that this work be multidisciplinary, and it must take place in rural areas. Collaboration between foreign and domestic researchers can have the highly beneficial by-product of local capacity for on-going marketing research and extension support.

Narendran focused attention specifically on strategies to make the marketing system responsive to the needs of problems of small farmers (5). She defines a small farm as one which is marginal to the commercial economy. She concurs with the previously reviewed works in identifying mobilizing as well as coordinating functions in the marketing system. In the context of rural development, marketing is a major channel for capital improvement and a means of integrating traditional agriculture into the market economy. She also offers an important insight not emphasized in Riley or Fox and Weber;

marketing is an important source of income and employment in many rural economies.

Narendran writes that specific effort is necessary for marketing to serve peasant farmers because they are not attractive as clients. Their agricultural production is too oriented to subsistence, and risk-immunizing behavior if often the norm. The marketable surplus is small and unstable. Yet the assurance of a market outlet is essential in allowing farmers to choose commercial production and to reduce risk.

Narendran's framework of questions for evaluation of marketing performance focuses on a set of equity, efficiency, and development issues similar to that of the works reviewed earlier. Her discussion of deficiencies found in rural marketing systems is fairly specific and much more complete than any encountered elsewhere.

1. Lack of Information - Small farmers can not get access to reliable price information. Public information systems have proven too slow and too inaccurate. Lack of good information leads to high risk and high margins.
2. Management Capacity - There is a need for higher volume, capital-intensive marketing techniques, but there are not enough educational and training opportunities to provide the skilled labor necessary to use them.
3. Insecure Market Outlets - Small farmers face a risk of having no buyers at all for their production.
4. Post- Harvest Losses - Wastage and spoilage rates as high as 20 to 30 percent are often reported before agricultural products reach final markets. Deterioration of quality and poor processing reduce the value of production.
5. Lack of Infrastructure - Few and poor rural roads, congested markets, and heavy urban traffic increase the costs of providing marketing services. Weather constraints in markets and transportation increase risk. Lack of consistent sales units and grades and limited access to credit services also make marketing less efficient.
6. Government Interventions - Government-sponsored or controlled coops can be insensitive to the needs of the rural poor, and can also be more incompetent and inefficient than the marketing channels they replace.
7. Pricing Policies - Political pressures cause governments to limit agricultural prices. The basic food needs of low-income urban populations, the interests of urban labor unions, and anti-inflation goals all represent such pressures.

8. Low Priority in Development Strategy - Relatively little capital, assistance, and technical expertise have gone to marketing.

9. Marketing Research - The sheer lack of knowledge about marketing processes is a constraint in formulating effective policy.

Narendran feels that multidisciplinary research through case studies will provide basic data on existing marketing problems and patterns and provide insight in relating this information to structure of the rural economy. These studies will also fill gaps in the literature.

Specific attention should be paid to the following trade-offs:

1. low unit marketing costs vs. increased availability of marketing outlets for small farmers
2. producer coops vs. private trade
3. public sector intervention vs. private trade
4. market efficiency vs. employment
5. small farmer net income vs. consumer prices.

Policy can be made more effective by concentrating in the use of incentives to achieve goals, increasing the speed, accuracy, and reach of market information communication, and encouraging self-help groups for small farmers. Particularly needed are policies which provide or encourage development of infrastructure essential to the marketing system.

Riley and Weber, writing in 1979, provide an assessment of some of the marketing research and feasibility studies conducted in the preceding decade (6). They report that there has been an unrealistic optimism regarding the transferability of technologies from highly developed to less developed countries, and that there has been a bias toward the adoption of capital intensive techniques. Development planners have often misjudged the compatability of new infrastructure with the existing patterns of production, distribution and consumption. The lack of skilled labor and management capacity available to marketing projects has been underemphasized or not been taken seriously as a constraint.

Broad-based studies have not shown excessive margins taken by marketing intermediaries. Price differences are often reflective of differences in transportation costs. Studies of African rural marketing systems show that inefficiency is created by poor and incomplete information transfer. Most

researchers have stressed the need to examine marketing in a broader context than analysis of a competitive distributional sector.

Earlier emphasis on the need for applied research is repeated. Riley and Weber build on the analytical frameworks presented in previous works and present a more specific agenda of research tasks for examination of marketing systems. The following are their units for analysis.

First, there must be an understanding of the organizational structure of the marketing system at the farm, assembly, and processor levels. This includes knowledge of what services are performed at each level, and the price spreads, operating costs, and investments of the system.

There must also be analysis and categorization of procedures for arranging transactions and coordinating product flows, differentiated by major products, for each of the above stages.

Examination and verification of evidence that instability and lack of coordination have resulted in high levels of risk and uncertainty is another necessary task. The major causes of the risk should be identified.

Riley and Weber also stress the importance of understanding the nature and probable course of demand for the goods produced and marketed by the system. This may include analysis of trends in population growth, the level and distribution of income, and urbanization patterns.

More attention should also be paid to the back flow of products and agricultural inputs to rural consumers. What linkages exist between small communities? Is the system which markets rural products outside the producing area effective and efficient in bringing other products back into the area?

The preceding reviews have summarized essential points found by researchers attempting to obtain a broad understanding of the role of marketing in developing countries. Some of these points have been discussed more analytically in the report section which links broader issues with the results of the case study. We now turn to two articles which use neoclassical economic analysis to examine the behavior of marketers and producers. The work of Gardner examines the distribution of returns to marketing and to agriculture in a perfectly competitive framework (7). Bieri and Schmitz then look at the welfare effects of different kinds of marketing associations and their strategies to reduce inefficiency caused by price instability (8).

Anderson, Hazell, and Scandizzo then discuss important considerations in the design of interventions which reduce risk and uncertainty by maintaining stable prices (9).

Gardner examines the conditions arising from simultaneous equilibria in the markets for retail food, farm output, and marketing services. His analysis is based on a one-output, two-input model. Perfect competition is assumed, and agriculture and marketing are treated as aggregates. The model which is developed is able to generate quantifiable predictions about how shifts in food supply and demand will affect the farmer's share of retail price and of retail food expenditures. It is shown that markups must change when either supply or demand shifts so as to remain compatible with market equilibrium. How the markups change depends critically on the source of the disequilibrium.

The paper develops production functions for agricultural output and marketing services, and a retail demand function. Disequilibria are introduced through exogenous shifters in these equations. For example, food supply might be shifted by weather, marketing service supply by a tax on transportation, and demand could be shifted by an influence such as rapid population growth. The model requires knowledge of the elasticity of substitution between farming and marketing, the own-price elasticity of demand for the food item in question, the own-price elasticies of supply and relative income shares of both farming and marketing, current prices and quantities, and the elasticities of supply and demand with respect to their exogenous shifters.

Gardner shows that the sign of the change in farmer's share of final price caused by a demand shift depends on the supply elasticities of farming and marketing. If agricultural supply is less elastic than marketing supply, the farmer's share of final price will rise. If farm supply is more elastic, the farmer's share will fall. The magnitude of the change depends largely on the elasticity of substitution between farming and marketing in the production of the retail food item; the less substitutable they are, the larger the magnitude of the change in margin. This result has an intuitive economic explanation; if a change in final price brings more of an increase in food suppliers than in marketers, marketing services will be scarce relative to food and consequently returns to marketing will increase (or decrease by a lesser amount) relative to farming.

Similar analysis is applied to the effects of a supply shift for food, such as that caused by excellent weather during a growing season. For all normal values for price and supply elasticities, a shift of the supply curve to the right will cause an increase in the marketing margin. As supply of the food product increases, both the farm-gate and retail prices will tend to fall. The increase in physical output, however, will create a demand for more marketing services, causing the price of these services to rise and increasing their share of final output. A supply shift to the left, for instance, one caused by unexpected flooding, would have the opposite effect; marketing margins would fall as marketers compete to handle the reduced quantities available. The magnitude of the shift in the margin will be large for large differences between the own-price demand elasticity and the marketing supply elasticity. For the elasticity of substitution between farming and marketing, small values imply large shifts, and vice versa.

Gardner points out that it is likely that in the short run, capacity constraints in marketing could cause the supply elasticity to be very small, causing volatile shifts which will readjust as capacity increases. Also, external economies of scale which reduce the price of marketing services can decrease margins as output expands.

The effect of an exogenous supply shift in marketing is analogous to the effect of farming supply shifts. If the supply elasticity for food is greater than the own-price elasticity of demand, increases in marketing supply result in decreased margins. Decreases in supply result in relative scarcity of marketing services, causing increased margins. The elasticity of substitution again plays an important role in determining the size of the change in margin.

The farmer's share of the total food dollar is not the same as his share of final price. The use of marketing services relative to food can increase even when marketing margins decrease if there is a high degree of substitutability between marketing and farming. For this to be true, the elasticity of substitution must be greater than one. This is much more likely to be true for processed and packaged foods than fresh produce.

Gardner has shown conclusively that very different effects on marketing margins occur from shifts in demand, shifts in agricultural supply, and shifts in marketing supply under perfect free-market conditions. Where both