

Part-time Farming in Grenada

Final Report

Gregory Hitz  
June, 1981

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[447-3465]

## Preface

The list of persons who helped in this study is too long to recite completely. The support of Stahis Panaguides of the CAS and Raphael Samper of USAID, however, are especially appreciated. Neil Ferraiuolo and Joe Garret of the JS Bureau of the Census helped prepare the questionnaire, select the sample, and train the interviewers. Dennis Noel of the Ministry of Agriculture in Grenada also provided much needed assistance in completing the survey. Cathy Gleason and Mary Joe Kennan of USAID and Linda Atkinson of USDA provided very helpful assistance in data processing and analysis. The continuing suggestions and guidance of John Moore, Filmore Bender, Bob Chambers and Dean Tuthill, all of the University of Maryland, are also very much appreciated. Finally, the debt to the work and patience of both the interviewers and the households interviewed is gratefully acknowledged.

**Best Available Copy**

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## CHAPTER 1 INTRODUCTION

Economic development literature stresses the importance of a multi-sectoral approach to project planning and implementation. The recent interest by development planners in part-time farming is an extension to the household level of the multi-sectoral approach to rural development. In the same way that area intensive rural development programs both consider agricultural and non-agricultural sectors, both farm and nonfarm activities of the household must be considered in development programs at the farm level.

The objectives of this study of part-time farming in Grenada are: 1) to generate data on the level and sources of farm household income, 2) to determine factors affecting the allocation of labor to farm work and other work, and 3) to consider the relationships between off-farm work, farm practices, and credit demand.

This report is organized as follows: Chapter 2 presents a brief summary of the agricultural sector in Grenada. Chapter 3 reviews recent research on part-time farming in the United States and other countries. Chapter 4 presents theoretical models explaining household labor allocation to farm work and other work and develops a measure of technical efficiency which can be related to off-farm work. Chapter 5 reviews the procedures of data collection in the Grenada survey. Chapters 6 through 9 present a review of the data and an application of the theoretical models considered in Chapter 4. Chapter 10 presents a summary and conclusions from the study.

## CHAPTER 2 THE AGRICULTURE SECTOR IN GRENADA

The present situation and prospects for development for the agricultural sector of Grenada are considered in this chapter.

### 2.1 General

Grenada is located in the Windward islands, 150 miles southwest of Barbados and 90 miles northwest of Trinidad. The total area of the country is about 133 square miles. Population in 1978 was about 110,000.

The rate of population growth (1.9 percent from 1970 to 1978) is limited by high rates of immigration to the United States, Canada, and England. Immigration provides through remittances an estimated one-fifth of the value of gross domestic product and has also lessened somewhat employment pressures in Grenada. Current estimates, however, indicate unemployment of about 12 to 16 percent of the labor force.

The gross national product per capita in 1978 was US\$480. The per capita income of the farming population was estimated at less than two-thirds of the average income. Inflation in 1978 was about 14 percent.

### 2.2 Agricultural output

Agricultural output accounts for slightly less than 30 percent of gross domestic product at factor cost. Commodity exports in 1978 (US\$17 million) were about half the value of commodity imports (US\$36 million). Most of the remainder was covered by the value of tourism receipts (US\$17 million).

Agricultural exports in 1978 of nutmeg and mace (US\$5.4 million), cocoa (US\$10.0 million), and bananas (US\$3.9 million) accounted for practically the entire value of commodity exports. Domestic agriculture accounted for slightly more than one-third the value of sector output at factor cost.

About 60,000 acres of the total land area of 85,000 acres is in farms. About 35,000 of the 60,000 acres is planted in permanent crops; 5,000 acres in other crops; and the remainder in pasture, forest, or is uncultivated. There are about 15,000 farms in Grenada.

### 2.3 Principal crops

Production of vegetables in Grenada, mostly on small farms, totaled about 15 million pounds in 1977. Root crops (sweet potatoes, yams, eddoes, dasheen,

cassava) account for about two-thirds of the total vegetable production. Other vegetables produced include tomatoes, carrots, pigeon peas, beans, and peppers.

An increase in the planting area on small farms and improved cultivation practices could result in an increase to about 40 million pounds of vegetable production according to a recent World Bank report. Technical assistance in multiple cropping has been provided Grenada by the Caribbean Agricultural Research and Development Institute (CARDI). The United States Agency for International Development (USAID) is the principal source of funding for the project. A second regional project funded by USAID provides assistance in strengthening the data collection and planning capabilities of the Ministries of Agriculture in the region. This second project is administered by the Secretariat of the Eastern Caribbean Common Market.

USAID is also a principal funding source for small farmer credit programs administered on the regional level by the Caribbean Development Bank (CDB) and on the local level by the Grenada Agricultural and Industrial Development Bank (GAIDC). These credit programs are discussed in more detail below.

Vegetables traditionally were produced in Grenada on small farms while the principal export crops (banana, cocoa, and nutmeg) were produced on larger estates. Much of the production of export crops has shifted to small farms as estate agriculture declined with less favorable product and input cost ratios (especially with regard to labor costs) of the late 1960's. Production of bananas on small farms now accounts for about a third of total annual output of 30 million pounds.

Export marketing of bananas is well coordinated by a growers association (The Grenada Banana Cooperative Society). The association also distributes subsidized fertilizer to growers, provides insecticides, and has an extension service almost as large as that of the Ministry of Agriculture.

The British Development Division (BDD) provides considerable assistance to producers with a five-year banana development project. The project provides funds for increased use of subsidized fertilizer, pesticides, and extension services. Demonstration plots in the principal growing areas show farmers the results of recommended practices. Improvements in existing low yields of 35 tons per acre could increase annual production to 40 million pounds.

Grenada provides about 20 percent of the world's nutmeg. Since 1975, nutmeg and mace, both products of the same tree, have together accounted for a larger share of the value of export receipts than either bananas or cocoa. The recent export volume of 6 million pounds has reached the level of exports common prior to the hurricane in 1955 which destroyed most of the crop.

Export marketing is the responsibility of the Grenada Cooperative Nutmeg Association. Production of nutmeg and mace is expected to increase with continued planting, maturation of existing plantings, and improved cultural practices.

Cocoa is grown by more farmers and accounts for a greater share of planted acreage than either nutmeg or banana. Production in 1977 by about 9,000 growers totaled 4.1 million pounds. Export marketing is well organized by the producers association which also distributes subsidized fertilizer, chemicals, and planting materials to growers.

A cocoa rehabilitation project financed by the Canadian International Development Association (CIDA) is intended to increase yields (existing yields average from 100 to 200 pounds per acre) by better disease control and replanting with higher yielding seedlings.

Production of coconuts has declined from 12 million nuts in 1965 to 2 million nuts in 1976. The local copra processing factory now imports copra from neighboring islands. Production of cane has also declined from about 27 thousand tons in 1957 to 5 thousand tons in 1977. Grenada in 1978 produced 580 tons of sugar and imported 2,500 tons.

In addition to crop production, most small farmers in Grenada keep some form of small livestock on the holding (poultry, sheep or goat, rabbits, and occasionally swine and cattle). Livestock production, except for several commercial poultry producers, is carried out on a small scale and is dispersed throughout the island. Parasite control programs and a livestock research station are planned by the government.

For many small farmers in Grenada, off-farm earnings are as important a component of household income as crop and livestock sales. Brierley, in his survey of small farms in Grenada, found that almost 40 percent of his sample with farms between 1 and 15 acres earned more than half their household income from off-farm work. Off-farm work was considered by Brierley, however, to be "frequently an unsatisfactory arrangement for successful farming, since time and interest are divided between the place of work and crops, usually to the detriment of the latter."

#### 2.4 Constraints

Principal constraints to further agricultural development in Grenada include ineffective land use policies, inefficient marketing of local food crops, and inadequate government extension and credit services. Work off-farm by small farmers is related to each of these issues.

(a) Land use policy has become of special importance with the acquisition by the previous government of economically or politically troubled estates. Some of the land acquired was distributed under a "Land for the Landless" program in parcels of less than a quarter acre, large enough only for a home and small garden plot. Division of an estate into small parcels resulted in some cases in elimination of part-time jobs for farmers in the areas but did not provide for farms of sufficient size to allow full-time farming. The present government has inherited from the past government about 3,000 acres of land in 25 to 30 farms and is faced with the question of what to do with the land. Recent World Bank reports (1975, 1979) suggest that land use policy in Grenada "requires a fundamental modification that will halt such fragmentation and define what constitutes a viable economic unit. Such a policy should also recognize the importance of consolidating small holdings into viable units." The objective of the land use policy should be

"urgent action in creation of a substantially large group of average size family farms (25 to 100 acres) with the promotion of an elite of efficient farms that can play a leadership role in the farming community."

The new Government in Grenada has chosen instead to continue to operate acquired estates as integral units. The course selected may be more compatible with existing part-time employment patterns in the affected areas than that recommended by the World Bank report.

(b) Export marketing of banana, nutmeg, and cocoa is well organized by the three separate producer associations. Domestic marketing is not so well organized. Marketing is by the farmers themselves or by hucksters who collect and carry produce by truck or bus to markets. The largest market is in St. Georges with 200 to 300 vendors selling produce on Fridays and Saturdays. Fruits and vegetables are sold by unit or bundle, not weight. Product quality generally is poor and storage moderate. Market gluts are frequent for many fruit and vegetable crops. Such uncertainty in marketing accounts for a considerably higher element of risk in agricultural production for local rather than export markets.

A large share of grapefruit, guava, carrots, and minor spices produced in Grenada are exported by small boats to neighboring islands (Trinidad especially). Again, inadequate port facilities, rough handling, and poor storage facilities reduce product quality and price.

A marketing board for domestic crops and non-traditional export crops was created in 1973 but lacks adequate staff, facilities, and a clear sense of purpose. The present Government has assigned the board responsibility for importing sugar and rice in bulk and with exporting some agricultural products. The new responsibilities provide purpose but may lessen the attention of the staff to problems of marketing domestic agricultural output.

Problems in marketing crops for the local market may also be associated with work patterns of the household. Gluts and shortages increase risks associated with production of crops for the local market. High risks encourage farmers to diversify their earning activities by increasing the share of income earned from alternative sources. Export crops (with established and efficient markets) and off-farm work both provide income stability to small farmers who have very limited abilities to assume risk.

(c) Extension services are provided both by the producer associations and by the Government. The banana and cocoa producer associations both have field staff. The nutmeg association has several technical staff but no extension workers. The Government extension staff consists of about 30 persons of which about half are trained and experienced field staff. Substantial assistance in staff training has been requested of and provided by external assistance agencies.

The effectiveness of extension services is limited by inadequate training and support given the extension workers, as mentioned, but also may reflect procedures which are not adequately compatible with off-farm work of the farm households. Recommendations for intensive crop cultivation practices, which may demand a greater share of work time to on-farm work than the household is willing or able to provide, will not be followed. Both the time needed for marketing and time needed for crop production need to be considered. Time and place, as well as content, of extension demonstrations are important. Demonstrations on-farm when the farm producers are working off-farm will be ineffective. Extension demonstrations may be more effective if offered sometimes at the job site (processing plants, market place, estates, etc.).

(d) Agricultural credit services are available from commercial banks and a Government bank. Disbursements of agricultural credit by commercial banks in Grenada at the end of 1978 totaled about ECS6.5 million. Disbursements of agricultural credit by the Government bank, GAIDC, at the end of 1978 totaled an additional ECS3.0 million.

The GAIDC was established in 1965 and receives most of its funds from the CDB. Two credit programs funded by the CDB are directed towards small farm development. The Farm Improvement Credit Scheme is for longer term farm sized improvement projects. The recently initiated Agricultural Production Credit Scheme is for shorter projects and has less strict collateral requirements. Loans are also available for rural nonfarm firms under small industry credit programs funded by the CDB.

A recent assessment report of the CDB indicated that except for the FIC program, disbursement of CDB funds in Grenada has moved slowly. As of June 1979, for example, only ECS74,000 of a scheduled total of ECS400,000 in the small industry credit program had been disbursed. Slow disbursement was considered to be due to inadequate staff and poor loan promotion programs.

Loan repayment is another very serious problem. The value of GAIDC loans in arrears at the end of 1978 was about 45 percent of the value of the loan portfolio. An earlier USAID study reported that as of September 1977, 35 of the 40 loans made from CDB funds were in arrears. According to a recent World Bank report, however, management reorganization and additional administrative assistance from the CDB have improved financial management of the bank.

The effectiveness of credit programs may also be affected by the mix of on-farm and off-farm activities of the farm households. The low volume of farm credit use, for example, may reflect high transactions costs (commuting costs to the bank, delays, etc.) for farmers, ready availability of subsidized inputs through the producer associations, and also, the availability for purchase of farm inputs of cash earned from work off-farm.

## 2.5 Summary

In this chapter, a general review of the agricultural situation in Grenada was presented. Prospects for increased production of principal domestic and export crops were considered. Constraints to development of the sector were identified. The relationships between the constraints and work patterns of the farm households were also considered.

The next chapter provides a review of recent research on part-time farming and discusses factors which affect the allocation of household labor to farm work and other work.

## CHAPTER 3 RECENT RESEARCH

A review of part-time farming in the United States and other countries suggests a number of variables which affect the level and source of farm household income.

### 3.1 Off-farm work in the United States

Off-farm work is important for farm households in the United States both in terms of the number of days worked and the share of household income from nonfarm sources.

The share of farm operators working off the farm 200 days or more each year increased from about 6 percent in 1943 to slightly more than 30 percent in 1974. About 40 percent of the farm operators in 1974 worked at least 50 days or more off the farm.

Off-farm work is important to farmers in all farm size groups. Small farm operators work off the farm more than large farm operators although more than a quarter of the operators of larger farms with gross sales of \$40,000 and over have off-farm jobs.

The share of farm household income from nonfarm sources has increased substantially in the last 30 years. In 1950 income from nonfarm sources provided 30 percent of the total personal income of the U.S. farm population. By 1977 nonfarm income provided almost 60 percent of the total farm population income.

Nonfarm income of the farm population increased steadily from \$6 billion in 1950 to \$25 billion in 1977 while income from farming increased only slightly during the same period from \$14 billion to \$18 billion.

Short-term changes in the share of nonfarm income mainly reflect changes in commodity prices while the trend over the longer term suggests structural changes in U.S. agriculture.

The share of nonfarm income increased from 1960 through 1971, fell in 1973 and 1974 as commodity prices rose sharply, and then increased again in 1976 and 1977 as commodity prices declined.

Over a longer period, the limited growth in demand for food and increased labor productivity in agriculture have resulted in a transfer of labor out of farming.

The farm population in the United States has declined from 15 percent of the total population in 1950 to less than 5 percent in 1970. The number of farms has declined in the same period from about 6 million to about 3 million. Off-farm work is considered as a part of this evident transfer of labor out of agriculture. Farm families with social and economic ties to rural

communities can continue with off-farm jobs to enjoy a farming life but without the dependence on a farming income.

The combination by farm households of farm work and other work lessens the differences in income levels between the farm and nonfarm population and between households with small farms and households with big farms. In 1973 high commodity prices and the continued growth of off-farm income resulted on an average income for the U.S. farm population which for the first time since before the depression exceeded the average income of the nonfarm population.

Income of the farm population from nonfarm sources also lessens the disparity of income between households which would occur if farming were the only source of income for the households. In other words, farm size (as measured by value of sales) is not a particularly good indicator of farm household welfare in the United States. Households with small farms (annual farm sales of less than \$2,500) earned a higher total income than did households with considerably larger farms. Only households with annual farm sales of \$40,000 and over earned a substantially higher total income than households in the smallest farm sales class. Low income farms must be distinguished from low income farm households.

The size of the farm is inversely related to the proportion of the farm household's income from nonfarm sources. In 1977, 22 percent of the income of households in the largest farm sales class came from nonfarm sources. For households in the smallest farm sales class, the nonfarm income share was over 90 percent.

The nonfarm income share has increased for each of the size categories since 1960. For households with annual sales of \$40,000 and over, the nonfarm income share has doubled, increasing from 11 percent in 1960 to 22 percent in 1977. The nonfarm income share of households with farm sales of less than \$2,500 increased from 77 percent to 91 percent in the same period. (The effect of inflation should be considered, however, in relation to changes over the years in which farms are included in which categories. Inflation moves any farm through categories as time progresses.)

To review briefly, off-farm employment and income in the United States is important both in terms of days worked and share of household income. The share of farm household income from nonfarm sources has increased substantially over the last several decades and has lessened the disparity in income within the agricultural sector and between agricultural and non-agricultural sectors. The implications of the increasing importance of off-farm work for farm households is noted by Carlin and Larson (1977):

"The interaction of farm people with the nonfarm economy has done more to improve the status of farmers than have changes within the

farming sector. Even though expanding farming operations may improve the incomes of many farm people, such opportunities are usually limited. Perhaps the best approach toward improving the well-being of low income farm people lies in further (off-farm work) rather than in public programs that directly affect the farming sector."

### 3.2 Off-farm work in other countries

A number of studies have recently been carried out reviewing the experiences of developing countries with off-farm work. Off-farm work is of interest in rural development planning for several reasons.

First, as shown in the United States, farm size may not be the best indicator of income for the farm household. Consideration of the varied sources and levels of income is important for targeting beneficiaries of assistance programs.

Second, as was suggested in the introduction above, the whole pattern of a household's activities must be considered in considering a change in a single subset of activities.

Traditionally, micro-analysis of the farm household has focused on farm production. Farm production policies which do not recognize the existing combination of farm and nonfarm activities of the household are likely to fail where a substantial share of the household time and income is centered in off-farm enterprises. This is an especially important consideration when the client targeted for assistance is the small farmer who is more likely to have a greater proportion of his income from off-farm activities.

The importance of off-farm work for farm households in other countries is reported by a number of recent studies.

In their study of rural nonfarm work in East Asia, Meyer and Larson (1978) suggested that for many households unable to increase income by expanding farm size or improving farm productivity, off-farm work was the most effective means of increasing farm household income.

In Japan the share of off-farm income of total farm household income has increased from 50 percent in 1960 to 71 percent in 1975. In Taiwan the off-farm share increased in the same period from 13 percent to 43 percent. The share of off-farm income of total household income increased in each farm size category in both Japan and Taiwan.

As in the United States, households with small farms in Taiwan and Japan earned proportionally more income from off-farm sources than households with large farms. The increase in off-farm earnings of all farm households, resulted in a convergence of incomes within rural areas and between rural and urban areas.

Meyer and Larson concluded: "It appears that off-farm work has had an impressive, positive impact on the poverty problems of rural areas in these countries."

Chin (1979) compared the structure of farm household income in Taiwan with a sample of small farmers in 1960-62 and in 1970-72. He found the share of off-farm income of total household income to have increased dramatically during the period. Chin, in agreement with the findings of Meyer and Larson, noted that "in spite of the rapid growth in agricultural productivity, the fact remains that the primary means by which the sample Taiwan farm households raised their real income levels was through allocating family labor to nonfarm activities." Chin also observed that the introduction of new agricultural techniques and substitution of purchased inputs for the on-farm work of the household allowed for more work off-farm. The expansion of off-farm work provided incentives for farmers to adopt labor-saving agricultural techniques. He concluded that "the provision of nonfarm opportunities to earn income in close proximity to the farm may make a substantial contribution to raising rural incomes where the size of the farm is small. A strategy for raising rural incomes which focuses on raising agricultural productivity, even if successful, may well prove inadequate."

In a recent study of on-farm work in Indonesia, Hart (1977) interviewed 87 rural households monthly for 12 months. The farm and nonfarm activities of households grouped by wealth were compared. Both the amount of time worked and the type of work were different for the different groups.

Household members in the wealthiest of the three groups worked about 25 hours a week while members in poorer households worked about 36 hours a week. The wealthier households controlled more land and other assets and consequently spent more of their income earning time in own-production work. Less wealthy households spent more of their income earning time in wage work.

In a multi-purpose observation survey of rural households in the Philippine province of Laguna, Evenson (1978) analyzed household time allocated to leisure, home production and income earning activities. Income earning activities included work for wages off the farm, farm work on marketed crops, work on marketed handicrafts, and other work for income. Home production activities included child care, house repair, cleaning and other chores. Leisure, including sleeping and recreation, was the residual.

On the average, fathers in the sample households worked about seven hours a day in income earning activities and less than one and a half hours a day in home production work.

Mothers spent less time working for income and more time working at home: about two and a half hours a day working for income and seven and a half hours a day working in the home.

Children in the household accounted for a large share of the income earning work and home production work of the household. On the average, the work time of children represented almost a third of both the household income earning work and the home production work.

Evenson concluded that analysis of the full income of the household, a sum of the value of both income earning activities and home production activities, is necessary to appreciate the important role of women and children in household economics.

In a village study in the same province of the Philippines, Hyami (1978) compared labor use of rural households with large farms, small farms, and no farms. He found that work participation rates were not significantly different for the different groups although in all groups the participation rate for men was higher than for women. The proportion of time spent working for wages was, as expected, higher for households without land. On the average, households spent half their work time in self employment (mostly farm work) and half their work time in wage work.

The working population was fully employed only during the wet season when labor requirements for weeding and harvesting were high. On the average for the full year, working household members were employed about 14 days a month compared to a full employment rate of 20 days a month.

Smith (1979), using a subset sample of data collected in the Laguna study by Evenson, analyzed the response in off-farm work time of household members to changes in off-farm wages. Average household income was about U.S. \$1,500 of which 13 percent was from off-farm earnings. Smith found that husbands were quite responsive to off-farm wage rates and that farmers with small holdings were found to have a more highly elastic response to changes in off-farm wages than farmers with large holdings.

Farm size, as expected, was negatively related to off-farm worktime. Other variables related to off-farm work were the size and age distribution of the family, farm income, and level of non-earnings income.

In his study of three villages in Northern Nigeria, Norman (1973) found that the wage for off-farm work varies from one-third to one-half of the on-farm wage (calculated simply by dividing the net returns of each by the days worked in each). Off-farm work on the average represented more than a third of the farmer's total work days but only about 25 percent of the farmer's income. Again, the share of off-farm income of total income was larger for small farmers than for larger farmers.

The amount and type of off-farm work varied among the three villages. In the more isolated village farm households tended to spend more time working off the farm and more of the off-farm work was in traditional activities.

Peak season farm labor shortages were identified as a critical constraint to improved farm production in all three villages. Yet even during periods of peak farm labor requirements, farmers continued to spend a considerable amount of their time working off the farm.

Norman concluded that off-farm work was not attractive but was necessary to supplement farm earnings, especially during periods of the year when food stocks were low.

A survey by the Off-Farm Employment Project of the University of Michigan (Byerlee, 1977) showed that off-farm work by farm households in Sierra Leone varied considerably over the course of a year. Off-farm work accounted for about 20 percent of male working time during the slack season for farm work but only 2 percent during the peak season for farm work.

The survey data from Nigeria and Sierra Leone, as summarized by Meyer (1978), suggest a fluid labor market in which farmers attempt to adjust their nonfarm labor market supply over a fairly wide range in response to agricultural labor demands. The studies also indicate the important contribution of off-farm income to maintaining at least a minimum level of household consumption during periods of low farm production and income.

Several studies of multiple job holding in the Caribbean are cited by Zuvekas (1978).

In a survey of sugar estate workers in Barbados, Handler (1965) found that 80 percent of the workers interviewed had at least three other income producing activities. Momsen (1970) found that almost two-thirds of the farmers in Barbados and over two-thirds of the farmers in St. Lucia reported some off-farm work. Mill (1976) reported that practically his entire sample of small holder farmers in Dominica worked part-time on the sugar estates during the five-month harvest season. A government survey of farmers in Antigua (1977) reported that only 10 percent of the farmers worked full time on the farm. Of the remaining farmers, more than half reported spending more time in off-farm work than in on-farm work.

In his survey of small farmers in Grenada, Brierley (1974) found that 39 percent of his sample of farmers with holdings of between 1 and 15 acres obtained at least half their income from off-farm work or non-earnings income.

Edwards (1961) discussed the ways in which farm households combine farm work and other work in his excellent study of small farming in Jamaica:

"The farm people worked off their farms to supplement their farm incomes; usually they worked to meet their day-to-day living and farming expenses, but occasionally the income was reserved for unusual expenditures such as buying a bed or a piece of land. Some of the off-farm work was undertaken in slack periods and so did not compete with farm work, but there were exceptional instances when the pressing need for cash forced the people to neglect their farms at critical times. There were also situations where, although there was work to be done at home, the outside work (which appeared more remunerative) was undertaken. Either labor was hired to replace the farmer's own or the farm was given that much less labor."

Comitas (1973) studied the combination of farming, fishing and other work by households in three coastal villages in Jamaica.

In one village with scarce farm land, day fishing was common with part-time farming tended to in the early morning or evenings. If a farmer inherited land, he could expand his operation and switch to night fishing. But "...rarely does the farmer accumulate enough land to be able to concentrate completely on agriculture. Since fishing is more flexible than agriculture with regard to time and labor allocation, the changes necessary for a new equilibrium are made in that occupation."

In another village where off-farm jobs are common, farming and fishing, while necessary, are both fitted around the wage work of the households. Fishing is carried out in the early mornings and the farm work is done in the evenings or on the weekend. "While fishing and cultivation are necessary pursuits, they must be practiced to cause the least interference with wage employment."

Comitas summarizes his findings by noting that:

"A worker can be involved in as many as six different economic statuses: Subsistence cultivator, commercial agriculturalist, wage laborer, own-account artisan or tradesman, subsistence fisherman, and commercial fisherman. In most cases, no one alternative is sufficiently lucrative for individual full-time specialization, and therefore, occupational multiplicity can become a necessity. It is the obtained occupational balance which offers maximum individual and household security with minimum risk in a basically limited environment."

An important implication for policy is that "...action programs, aimed at the socio-economic amelioration of such people, but based on uni-occupational models more typical of developed countries, start with limited chances for success."

### 3.3 Summary

It is useful here to review common findings and conclusions from the studies discussed above.

Most obvious is that in all of the studies, off-farm work was found to be a significant source of income for farm households and generally of greater importance to households with smaller farm holdings. Off-farm income was found to contribute to a more equal distribution of income between households with small and large farms, between farm and nonfarm households, and to even-out income for a single household over time.

Most of the research emphasized the household as the basic decisionmaking unit in labor allocation. The importance to the household of both its income-earning activities and its subsistence activities was indicated.

The household was found to be responsive to changes in farm and off-farm opportunities. The particular combination of farm work and other work carried out by the household reflected farm productivity, off-farm wages and job availability, the risk perceived in alternative combinations of farming and other work, and a number of other farm and family characteristics.

## CHAPTER 4 MODELS OF LABOR ALLOCATION AND TECHNICAL EFFICIENCY

Two theoretical issues are considered in this chapter. The first is concerned with estimating the determinants of off-farm work by the farm operator. The second is concerned with developing a measure of technical efficiency which can be related to the level of off-farm work.

### 4.1 Factors affecting the level of off-farm work

#### a) Graphic model

An initial framework for the analysis of household labor allocation is suggested by Robbins (1930), Hicks (1956), and Becker (1965) in formulation of the work-leisure model (Meyer, 1978). The basic model for a single person household is represented in Figure 1 with income on the vertical axis and hours of leisure on the horizontal axis.

A farm production function is represented by line ABC. The shape of the curve represents a work organization in which the most productive tasks are done first. Because of limited land resources, each additional hour of work on the farm yields less of an increment to earnings than the previous hour of work. If the person worked AM hours, and spent OM hours in leisure, his earnings from his farm work would be OQ.

An off-farm production function is represented by line DEB. The line, whose slope represents the off-farm wage rate, is straight since it is assumed that the wage rate will not decrease with additional hours of work. The off-farm production function DEB is located tangent to the farm production function ABC at B indicating that for hours worked to the left of B (more than AM hours working), earnings per hour are greater from off-farm work than from farm work.

Utility curve I represents alternative combinations of earnings and leisure for which the person is indifferent. Any point on utility curve I would be preferred to a point on curve II since a higher level of either or both earnings and leisure is indicated.

The optimal number of hours worked is AL. Tangency of the off-farm production function DEB with utility curve I shows the highest level of utility possible. Of total hours available, AM is spent in farm work, ML in off-farm work, and LO in leisure.

Specification of the model can reflect the effects on earnings and labor allocation of changes in wages from work on-farm and off-farm, level of non-earnings income, and job search costs. The effect of a change in off-farm wage is shown in Figure 2. An increase in the off-farm wage is shown with the new wage line D'E'E' which is drawn with a steeper slope than the previous wage line DEB.

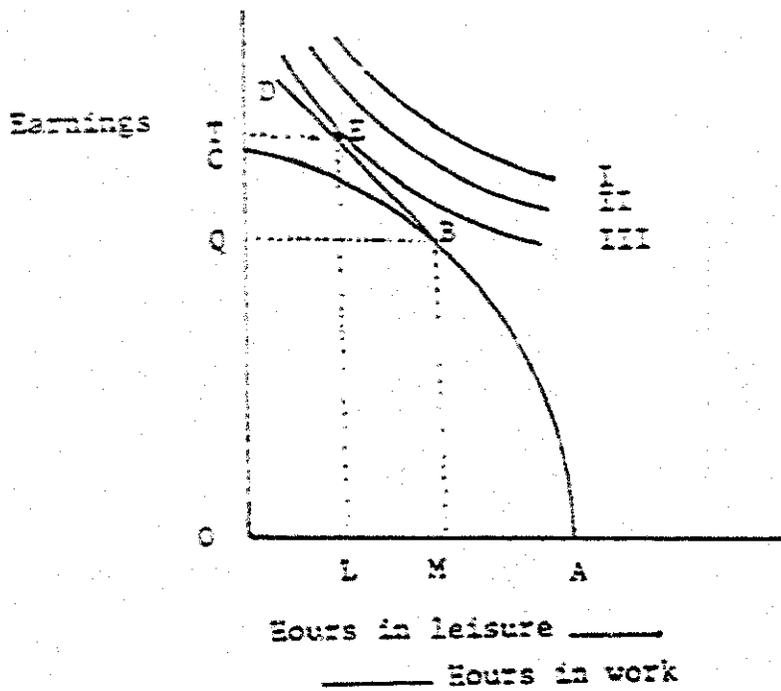


Figure 1. Basic Labor Allocation Model

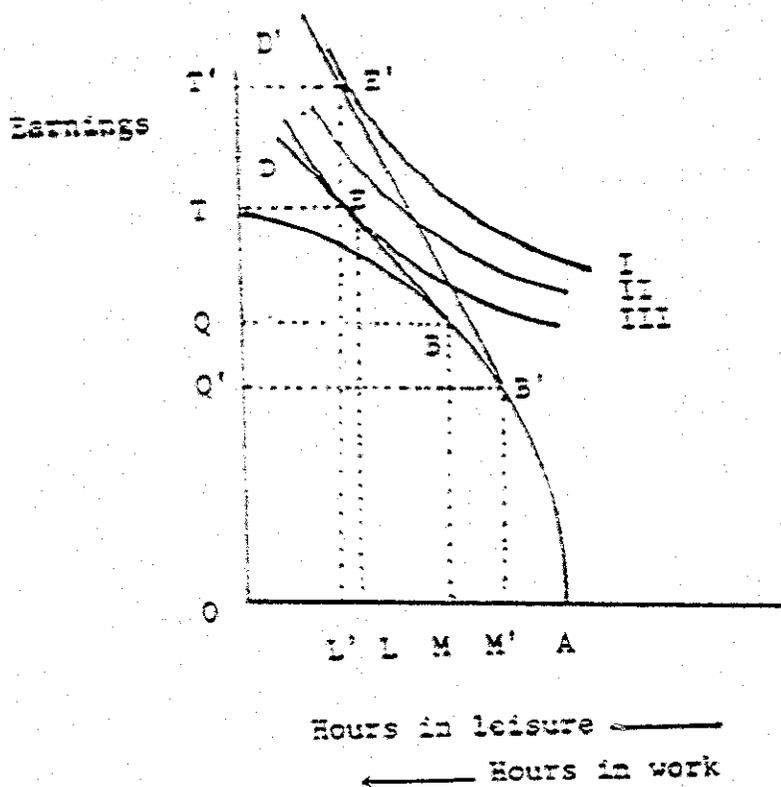


Figure 2. Labor Allocation Model with Increased Off-farm Wage

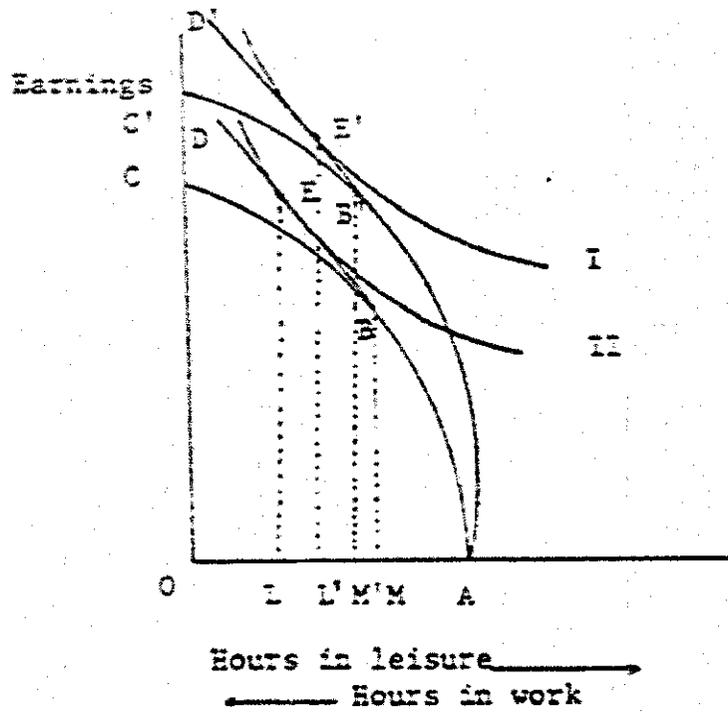


Figure 3. Labor Allocation Model with Increased On-farm Wage

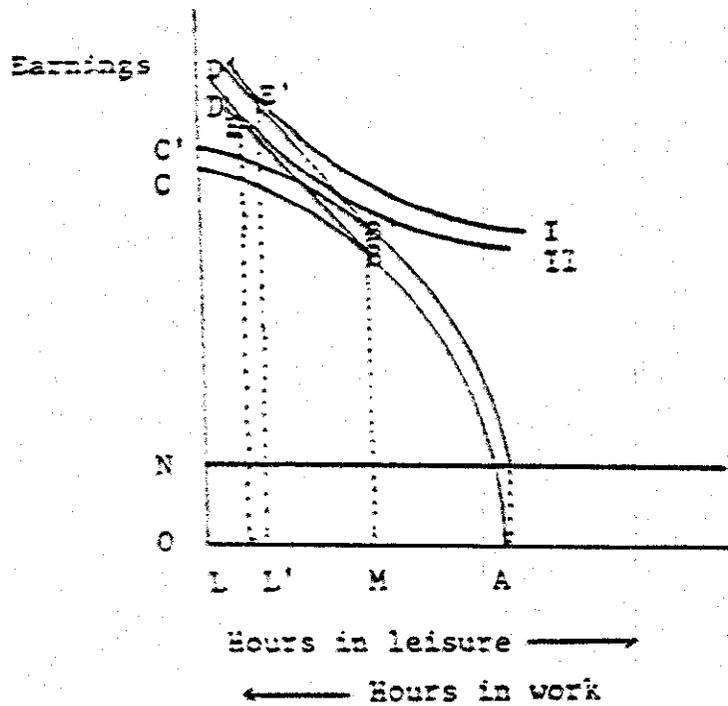


Figure 4. Labor Allocation Model with Increased Non-earnings Income

An increase in the off-farm wage rate has two effects (Evenson, 1978). The first is the conventional income and substitution effect on leisure which, with the utility curves as shown, results in an increase in the total hours worked from OL to OL'. The substitution effect of the wage rate increase has outweighed the income effect in this example.

The second effect is the displacement effect on the proportion of labor time allocated to the farm and to off-farm work. The increase in the off-farm wage rate, represented by the steeper slope of the wage line and a shift to the right in the point of tangency with the farm production function, results in a decrease in the number of hours worked on the farm from AM to AM' and an increase in the hours worked off the farm from ML to M'L'. Even if the income effect had outweighed the substitution effect, the displacement effect would likely result in a positive labor supply response to an increase in the off-farm wage rate.

An increase in the on-farm wage rate (due to increased farm prices, for example), is shown in Figure 3 by shifting the farm earnings function from ABC to AB'C'. The constant off-farm earnings function is drawn tangent to AB'C' at B'. The slope of the off-farm earnings function is the same as before since the off-farm wage has not changed. There is no substitution effect, then, since there is no change in the opportunity cost of on-farm time. There is an income effect, however, since leisure is assumed to be a normal good. Leisure will increase from OL to OL'. On-farm work will increase from AM to AM'. Off-farm work will decrease from ML to M'L'.

Finally, the effect of a change in non-earnings income is shown in Figure 4. The value of non-earnings income ON is represented by a parallel shift in the possibilities curve from ABD to AB'D'. Since there is no change in relative wages, the off-farm earnings function is drawn tangent to AB'D' at B' which is directly above B. There is no change in the amount of labor allocated to on-farm work (AM). Leisure increases, however, from OL to OL', and off-farm work decreases from ML to M'L'.

#### b) Algebraic model

The effect of a change in wage rates, non-earnings income and other exogenous variables on hours of work can also be shown in algebraic terms (Smith, 1978, and Sexton, 1975). An algebraic model is presented here to demonstrate the effect of a change in wage rate on hours of work off-farm. The hours of work and wage from on-farm work are assumed to be fixed. The problem is then to allocate the remaining time to off-farm work and to leisure.

Utility is defined as a function of leisure (L) and purchased goods (X). Income (Y) is the sum of earnings from on-farm work (WH) and from off-farm work (W'E'):

$$(1) \quad U = U(L, X)$$

$$(2) \quad Y = WH + W'E'$$

Full income (I), where V represents non-earnings income and T represents the total time available, is expressed as:

$$(3) \quad I = WE + W'(T - E) + V$$

Income (I) can be used to purchase goods (PX) or can be foregone in order to obtain leisure (W'L):

$$(4) \quad I = PX + W'L$$

The budget constraint can thus be expressed as:

$$(5) \quad I = WE + W'(T - E) + V - W'L - PX$$

The constrained maximization problem is to maximize the utility function subject to the budget constraint. The following Lagrangian function (F) is formed:

$$(6) \quad F = U(L, X) + \lambda(WE + W'T - W'E + V - W'L - PX)$$

The first order conditions, setting the partial derivatives of the Lagrangian with respect to L, X and  $\lambda$  equal to zero, are as follows where  $U_L$  represents the partial derivative of utility with respect to leisure and  $U_X$  the partial derivative of utility with respect to purchased goods:

$$(7) \quad U_L - \lambda W' = 0$$

$$(8) \quad U_X - \lambda P = 0$$

$$(9) \quad WE + W'T - W'E + V - W'L - PX = 0$$

The effect of a change in the exogenous variables on the equilibrium values of the endogenous variables is shown by total differentiation of (7, 8 and 9) where T, E and P are all assumed to be fixed:

$$(10) \quad U_{LL}dL + U_{LX}dX - W'd\lambda - \lambda dW' = 0$$

$$(11) \quad U_{XL}dL + U_{XX}dX - P d\lambda = 0$$

$$(12) \quad E dW' + T dW' - E dW' + dV - W'dL - L dW' - P dX = 0$$

Since E is fixed and  $T = E + E' + L$ ,  $dE'$  equals  $-dL$  and substitution of  $dE'$  for  $dL$  yields:

$$(13) \quad -U_{LL}dE' + U_{LX}dX - W'd\lambda = dW'$$

$$(14) \quad -U_{XL}dE' + U_{XX}dX - P d\lambda = 0$$

$$(15) \quad W'dE' - P dX = -E'dW' - E dW - dV$$

This last set of equations can be expressed in matrix form as follows:

$$(16) \quad \begin{bmatrix} U_{LL} & U_{LX} & -W' \\ U_{XL} & U_{XX} & -P \\ -W' & -P & 0 \end{bmatrix} \begin{bmatrix} dE' \\ dX \\ d\lambda \end{bmatrix} = \begin{bmatrix} dW' \\ 0 \\ -E'dW' - E dW - dV \end{bmatrix}$$

The solution for change in the off-farm wage rate (dH') by use of Cramer's rule is shown as follows:

$$(17) -dH' = \frac{\begin{vmatrix} \lambda dW' & U_{LX} & -W' \\ 0 & U_{XX} & -W' \\ -H'dW' - HdW - dV & -P & 0 \end{vmatrix}}{\begin{vmatrix} U_{LL} & U_{LX} & -W' \\ U_{XL} & U_{XX} & -W' \\ -W' & -P & 0 \end{vmatrix}}$$

Expansion in terms of cofactors, where D<sub>ij</sub> is the cofactor of the element in the i<sup>th</sup> row and the j<sup>th</sup> column of the numerator and D is the determinant of the denominator, yields the following:

$$(18) -dH' = \frac{dW'D_{11} + (-H'dW' - HdW - dV) D_{31}}{D}$$

Rearrangement and changing the signs of (18) yields the following expression:

$$(19) dH' = \left[ -\frac{D_{11}}{D} + \frac{H'D_{31}}{D} \right] dW' + \frac{HdW}{D} + \frac{dV}{D} \frac{D_{31}}{D}$$

A change in non-earnings income (V) on hours of work off-farm (H'), with wages (W and W') fixed, yields:

$$(20) \frac{\partial H'}{\partial V} = \frac{D_{31}}{D}$$

A change in off-farm wage (W') on off-farm hours (H'), with on-farm wage (W) and non-earnings income (V) fixed, yields:

$$(21) \frac{\partial H'}{\partial W'} = -\frac{\lambda D_{11}}{D} + \frac{H'}{D} \frac{D_{31}}{D}$$

Or, by rearrangement:

$$(22) -\lambda \frac{D_{11}}{D} = \frac{H'}{W'} - \frac{H'D_{31}}{D}$$

Or, with substitution from (20):

$$(23) -\lambda \frac{D_{11}}{D} = \frac{H'}{W'} - \frac{H'}{V} \frac{H'}{D}$$

Substitution of (20) and (23) into (19) yields the following:

$$(24) \quad dH' = \left[ \frac{\partial H'}{\partial W'} - \frac{H' \partial H'}{\partial V} + \frac{H' \partial H'}{\partial V} \right] dW' + \frac{H' \partial H'}{\partial V} dW + \frac{\partial H'}{\partial V} dV$$

Or, by further rearrangement:

$$(25) \quad dH' = \left( \frac{\partial H'}{\partial W'} \right) dW' + \left( \frac{H' \partial H'}{\partial V} \right) dW + \left( \frac{\partial H'}{\partial V} \right) dV$$

Expression (25) shows that the change in the number of hours worked off-farm is associated with the change in the wage rate of on-farm work, wage rate of off-farm work, and level of non-earnings income.

### c) Environmental variables

The variables discussed thus far in the graphic and algebraic labor allocation models have focused principally on earnings from farm work, other work, and non-earnings income. Other farm and household variables, sometimes called environmental variables, also affect the allocation of household labor to farm work and to other work.

Farm size is considered an important factor affecting the level of off-farm work. The larger the farm, the better the household is able to earn a sufficient income from farm work. The smaller the farm, the more necessary is work off the farm.

The age and education of the operator are also related to the level of off-farm work. Age is expected to be negatively related to off-farm work hours since employers prefer younger workers. Also, land is accumulated as the farmer is able to save, and invest in land, his earnings from off-farm work. Land is considered more secure than other investments in providing for a steady retirement income. Education is expected to be positively related to off-farm work hours.

An empirical model of household labor allocation which incorporates the variables suggested here is presented below in Chapter 5. In Section 4.2 below, a measure of technical efficiency which can be related to the off-farm work of the household is developed.

### 4.2 Measuring technical efficiency

An approach to measuring technical efficiency is suggested by Farrell (1957) and Timmer (1971). Two types of efficiency are considered. The first, allocative efficiency, is concerned with equating a factor's marginal cost and its marginal revenue product. The second, technical efficiency, is concerned with achieving the greatest possible output from a given set of inputs.

A comparison among firms of allocative and technical efficiency with two inputs (factors) is shown in Figure 5. Each firm produces one unit of output and faces the same relative factor costs. Linear homogeneous production

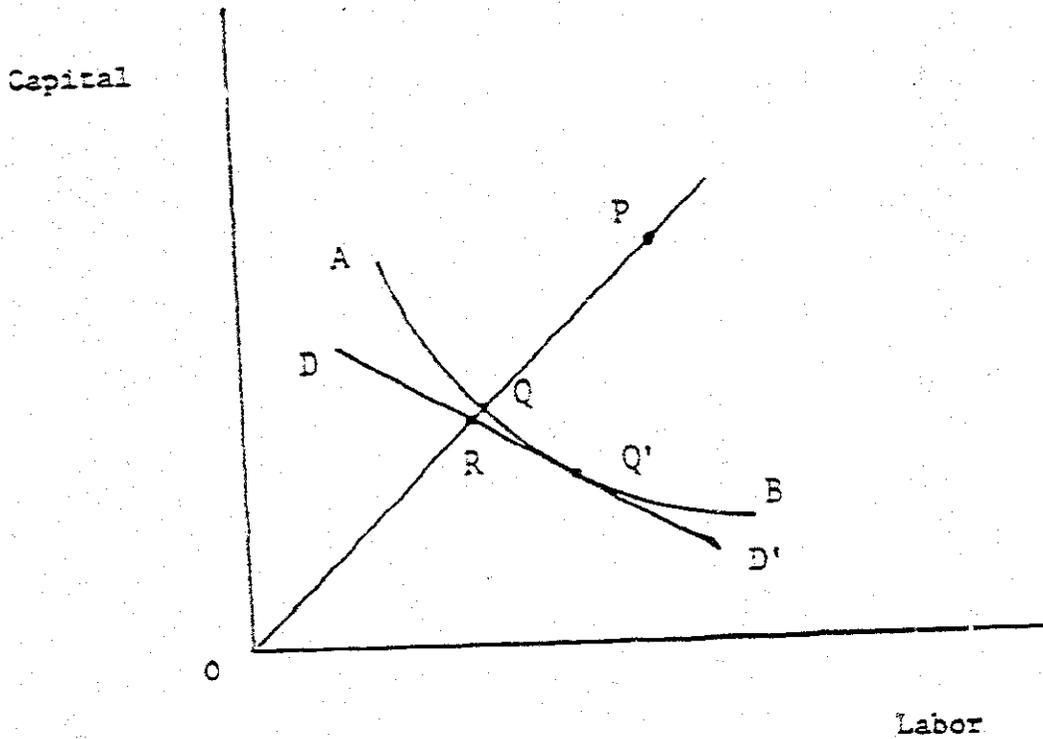


Figure 5. A Comparison of Allocative and Technical Efficiency among Firms Producing One Unit of Output

functions are assumed. AB is the envelope of observations for all firms; no firm can produce a unit of output with a mix of inputs to the southwest of AB. The two firms Q and Q' are both technically efficient. Firm P is technically inefficient because it uses more inputs than either firm Q or Q' to produce the same unit level of output.

The relative technical efficiency of the firms can be noted by comparing their positions relative to the envelope, or efficiency frontier, AB. The degree of inefficiency of firm P, for example, is measured by the ratio OQ/OP.

Allocative efficiency can also be shown in Figure 5. Line DD represents relative factor costs for all firms and is tangent to the production frontier curve AB at Q'. Thus, only firm Q' is both technically and allocatively efficient. Since DD is an isocost curve the same output produced by firm Q is produced by firm Q' at a lower cost. The cost of production for firm Q is OQ; a measure of its allocative inefficiency is OR/OQ.

The approach used in this paper is similar to the technique of Farrell described above. A Cobb Douglas production function is assumed, however, instead of linear homogeneity. Linear programming techniques are used to estimate a frontier Cobb Douglas production function. An index of technical efficiency is defined relative to the frontier production function. The logic of the approach is as follows:

The following expression represents a general Cobb Douglas production function:

$$(1) \quad y = \sum_{i=0}^n x_{ij}^{a_i} e_j$$

The following terms are defined: Output of firm j, ( $y_j$ ); use of factor i by firm j, ( $x_{ij}$ ); factor elasticity of input i, ( $a_i$ ); and a random disturbance term which contains also a systematic component of technical efficiency, ( $e_j$ ). In logs (capital letters) the expression is as follows:

$$(2) \quad Y_j = \sum_{i=0}^n a_i X_{ij} + E_j$$

By constraining the error terms to one side of the estimated production surface, an envelope is created such that estimated production with given resource use must be greater or equal to actual production by the firm.

$$(3) \quad \sum_{i=0}^n \hat{a}_i X_{ij} = \hat{Y}_j \geq Y_j$$

The estimated output equals actual output only for the frontier efficient firms. All other firms have a smaller output for resources used than the technically efficient output of the frontier firms.

Expression (3) must be constrained so that the envelope lies as close as possible to the set of observations. In order not to give undue weight to extreme observations the sum of the error terms, rather than the sum of the squared error terms, is minimized:

$$(4) \sum_{j=1}^n E_j$$

The estimation technique, then, is to minimize (4) subject to (5).

$$(5) \sum_{i=0}^m \hat{a}_i X_{ij} \geq Y_j$$

In order to use linear programming to estimate the frontier production function, (4) must be expressed as a linear function of  $a_i$  and  $X_{ij}$ . This is done by summing over the observed firms:

$$(6) \sum_{j=1}^n E_j = \sum_{j=1}^n \sum_{i=0}^m \hat{a}_i X_{ij} - \sum_{j=1}^n Y_j$$

For any given data set,  $Y_j$  is a constant and can be dropped from the equation. For ease of computation, the rest of the equation is divided by the number of observations ( $n$ ) yielding the linear estimation problem:

$$(7) \text{ Minimize: } \sum_{i=0}^m \hat{a}_i \bar{X}_i$$

Subject to:  $\sum_{j=1}^n \sum_{i=0}^m \hat{a}_i X_{ij} \geq Y_j$

In expanded form the expression (7) is as follows with the first line the objective function and the following lines the constraint system:

$$(8) \text{ Minimize: } \hat{a}_0 + \hat{a}_1 \bar{X}_1 + \dots + \hat{a}_m \bar{X}_m$$

Subject to:  $\hat{a}_0 + \hat{a}_1 X_{11} + \dots + \hat{a}_m X_{m1} \geq Y_1$

.

.

.

$\hat{a}_0 + \hat{a}_1 X_{1n} + \dots + \hat{a}_m X_{mn} \geq Y_n$

An index of efficiencies can then be derived by calculating the ratio for each firm of  $\hat{Y}_j / Y_j$ .

The empirical model corresponding to this frontier efficiency estimation technique is presented below in Chapter 5.

#### 4.3 Summary

In this section a theory of household labor allocation and a measure of technical efficiency were presented. The application of the models discussed in this section using data collected in the survey of rural farm households in Grenada is presented in Chapters 6 through 9 following the discussion in Chapter 5 of the survey procedures.

## CHAPTER 5 DATA COLLECTION

Data for the study were collected in two survey trips to Grenada. The first study, carried out in February and March 1979, identified a sample of farm households in three farming areas of Grenada. Production and income data for these households were collected for the rainy season months from July to December.

The second survey, carried out in July and August 1979, collected data on production and income of the same households for the dry season months from January to June. Additional data were collected during the second survey on credit use of the households.

Data collection procedures of the study are described in this chapter in three sections: preparation, implementation, and tabulation.

### 5.1 Preparation

Steps in survey preparation include sample selection, preparation of the questionnaire, informal field testing and modification, and selection and training of the interviewers. Staff members of the General Surveys Branch of the U.S. Bureau of the Census assisted in all phases of survey preparation.

a) The intended sample respondent was a farm operator whose household controlled (owned or rented) at least one acre of land. The sample was selected purposefully (non-randomly) in order to provide sufficient variation for analysis of variables associated with different levels of off-farm work.

Three areas to be censused were selected. The criteria for selection of the area were that small farming be a common activity in the areas, that the areas have recognizable boundaries for listing the households, that the number of farm households in all three areas total about 150, and that the areas have different types of nearby off-farm jobs.

The three areas selected are in Willis (urban and tourism jobs), Upper Capital (estate jobs), and Grand Roy (fishing). The location of the three areas is shown on Map 1. Detailed maps of the survey areas, provided by the Ministry of Health in Grenada, are shown in Appendix 3.

b) The questionnaire was designed so that data on family characteristics and farm size could be collected for every household in the three areas. Additional data on farm production and sales, operating costs, labor allocation to farm work and other work, and sources of household income were collected only for households with at least one acre of land. The two visits to these farm households were planned in order to explore possible variation in seasonal work patterns.

# GRENADA

ELEVATION (Feet)

2000 and Over

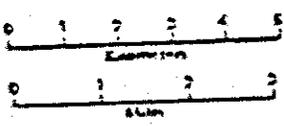
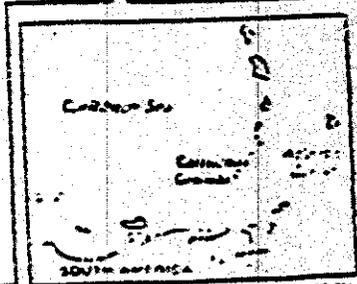
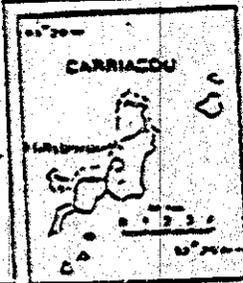
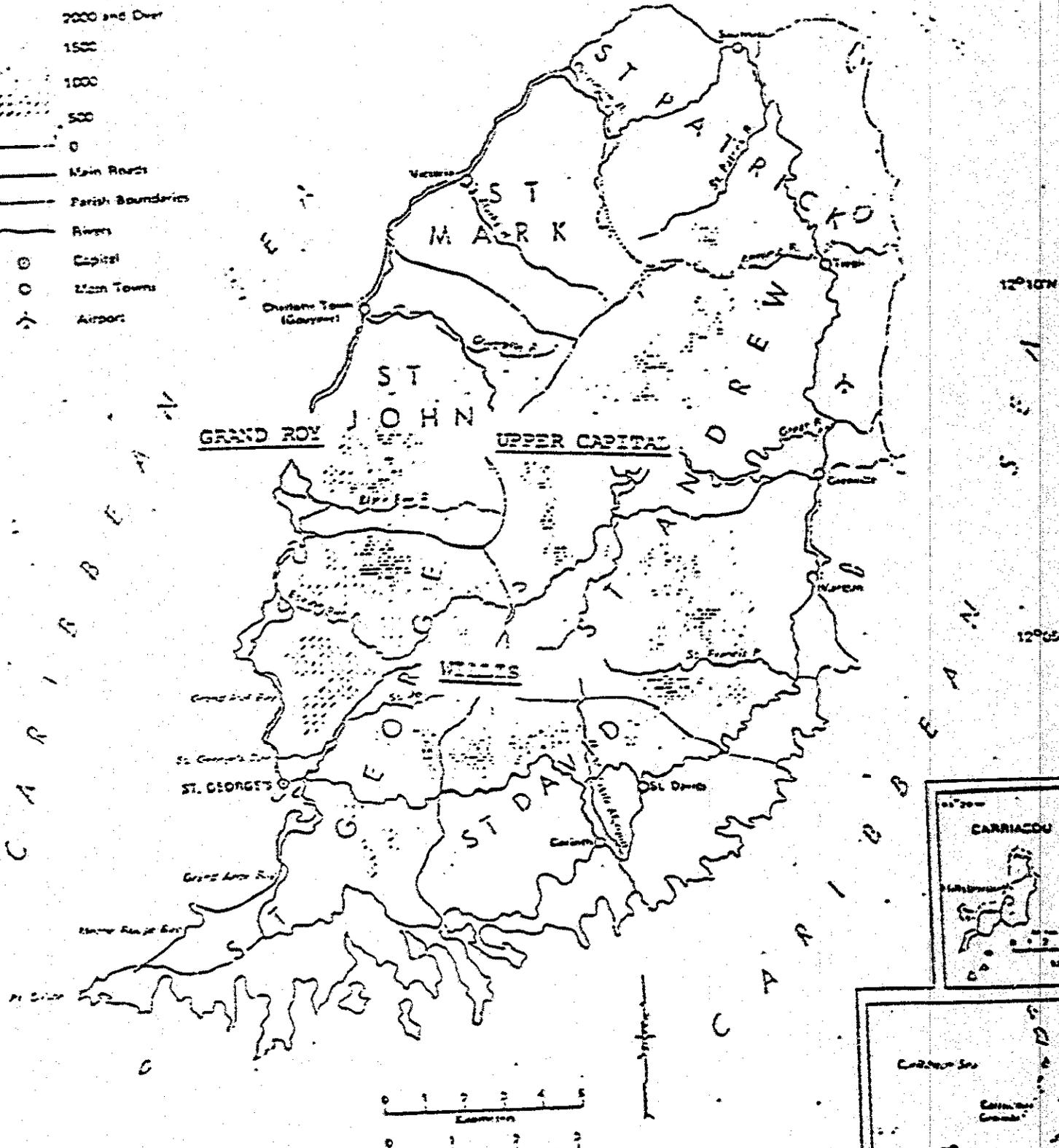
1500

1000

500

0

-  Main Roads
-  Parish Boundaries
-  Rivers
-  Capital
-  Main Towns
-  Airport



The boundaries shown on this map do not imply endorsement or acceptance by the United States and its officials.

61°45'W

61°40'W

Source: Department of Defense, Defense Intelligence Agency

September 1974

MAP 1  
GRENADA

Informal field testing of the questionnaire in Grenada indicated several problems. The most serious problem was in the length of the interview (over three hours in several cases). The questionnaire was revised in Grenada with the assistance of the Ministry of Agriculture.

The questionnaires used for the first and second survey visits were similar except that baseline data on household and farm characteristics were not collected during the second visit. A copy of the questionnaire used is presented in Appendix 6.

c) Six local interviewers were to be hired and trained to work during both the first and second survey visits. Four of the interviewers were to work full time for one month during each survey. The two others were to serve as alternates. Only four interviewers were approved by the Government, however. These four were trained in three half-day sessions prior to initiating the first survey. District agricultural extension officers, who helped introduce the survey team to farmers in the three areas, were also trained during the first survey visit. These officers replaced two of the original interviewers in the second survey visit. Training for the second survey visit lasted four full days. Interviewers were paid by the hour plus a slight incentive bonus based on the quality and quantity of interviews carried out.

### 5.2 Implementation

Interviewing for the first survey visit began in early February and ended in mid-March. Sketch maps provided by the Ministry of Health served as the basis for bounding the sample areas.

With the initial sample boundaries, the maps indicated a total of about 250 possible dwelling units. The boundaries had to be expanded, however, to include in the sample a sufficiently large number of households with at least one acre of land.

The number of farm households in the areas as initially bounded was too small for two reasons: the proportion of dwelling units indicated on the sketch maps which were actually occupied and the proportion of the occupied units with at least one acre of land were both less than expected.

The total number of dwelling units indicated in the survey maps as finally bounded was 407. Of these 407 units, 102 were non-interviews. Most of the non-interviews (91 cases) were because the unit was vacant, was used for some purpose other than a dwelling, or had been demolished or moved. In 8 cases, the unit was occupied but appropriate respondents were unavailable while the survey team was in the area. In only 3 cases were interviews refused.

Of the 305 households in the three areas, slightly less than half (142 households) control less than half an acre of land ('non-farm households'). The remainder of the households (163 households) have at least an acre of land ('farm households'). Responses were not available from both survey visits for six of the farm households, however, so the number of households in the full sample of farm households totaled 157.

The survey team (four interviewers, the local extension officer and the researcher) worked together in each area for slightly more than a week. Interviewing was conducted in the afternoons and early evenings 3 or 4 days during the week and all day both Saturday and Sunday. Driving time from St. George's to the survey areas averaged about half an hour each way.

During both survey trips, field interviews were observed informally and every questionnaire was reviewed each morning from the previous day's interviews. The interviewer was asked to return to the household to collect missing data if necessary.

The number of farm interviews completed in a day during the first survey visit depended on the number of farm and non-farm households contacted and, of course, the characteristics of the household and farm. The maximum number of farm interviews completed in a single day per interviewer was 4. The average length of farm household interviews was about an hour and forty-five minutes. Non-farm household interviews, which consisted only of listing household data and farm size, usually required less than 15 minutes. The interview time for the farm households during the second visit averaged about an hour.

Data in the following chapters of this report refer to farm households with at least one acre of land. Table 5-1 provides a summary of the limited data collected from households with less than an acre of land and provides a comparison with characteristics of farm households included in the sample. Although the sample was selected non-randomly, data in Table 5-2 suggest that the farm size distributions for the country and for the sample are quite similar.

### 5.3 Tabulation

After the interviewing of the first survey visit was completed in mid-March, data from the questionnaires for non-farm households were transcribed to coding sheets. Questionnaires for farm households were transcribed to coding sheets in Washington. Computer tabulation of the data was done in Washington by the USAID data management section.

The second survey questionnaire was precoded and data were punched directly from the questionnaires. Data tabulation was again carried out with the assistance of the data management section of USAID.

Table 5-1

## Characteristics of Farm and Nonfarm Households

Item	Nonfarm households	Farm households
<u>Area</u>		
Willis (number)	33	35
Upper Capital (number)	43	49
Grand Roy (number)	66	79
Total (number)	142	163
<u>Household characteristics</u>		
Average age (years)	30.5	31.8
Average education (years) <u>1/</u>	6.4	6.3
Household size (number)	4.3	5.2
<u>Principal work</u> <u>1/</u>		
On own farm (percent)	8.8	28.3
On other farm (percent)	11.6	6.8
Nonfarm (percent)	32.8	25.5
School (percent)	10.2	9.6
No work (percent)	36.0	30.0

1/ Persons 15 years and older.

Source: Survey results

Table 5-2  
Number of Households in Sample  
by Farm Size 1/

Size of farm	Survey data		Country data	
	number	percent	number	percent
less than 1 acre	142	47.5	6485	45.8
1 to 4.9 acres	128	42.8	6052	42.9
5 to 24.9 acres	25	8.4	1352	9.6
over 25 acres	4	1.3	234	1.7
Total	299	100.0	14096	100.0

1/ Sample survey data includes nonfarm households in the category of households with less than an acre of land.

Source: Computer printout and Max Ifill, FAO/LNDP Caribbean Regional Office, Land Use Planning in Grenada, 1978.

## CHAPTER 6 LEVEL AND SOURCE OF HOUSEHOLD INCOME

In this chapter data are presented which describe the level and sources of income for sample households with at least an acre of land. A target group of these sample households for which assistance is considered a priority is defined, and the characteristics of the target group are evaluated. Findings are summarized at the end of the chapter.

### 6.1 Target group defined

Designation of a target group is considered useful in assuring delivery of services to intended beneficiaries. In 1969, USAID was directed by Congress to focus its foreign development assistance on programs benefiting a target group population with annual per capita incomes of less than US\$150. From 1968 to 1978, the U.S. Consumer Price Index increased 78 percent so that the equivalent target level of per capita income at the beginning of the survey period in Grenada was US\$270. The equivalent per capita target income level in EC dollars is EC\$720.

The average household income of the sample is EC\$5,820. Average per capita income for the sample, with an average household size of 5.2 persons, is EC\$1,120. The distribution of household income by per capita income is shown in Table 6-1. Target households (households with per capita incomes of less than EC\$720) account for about 45 percent of the sample households. These target households earned about 15 percent of the total household income of the sample.

The low incomes of the target households reflect a number of differences between these households and non-target households in the control and use of land and labor resources. In the following discussions, the control and use of household resources is considered first for the sample as a whole, and second for the target (low-income) and non-target (high-income) households.

### 6.2 Farm and Labor resources

#### 6.2.1 Farm resources

Land and family labor are the principal resources of the small farm households in Grenada. Data on farm size, tenure and land use are provided in Table 6-2. The average farm size for the sample households is 4.5 acres. About 80 percent of the farms in the sample are between 1 and 5 acres, 15 percent between 5 and 25 acres, and 5 percent are over 25 acres.

For the sample as a whole, about 70 percent of the land controlled by the household is owned, 20 percent rented (payment in cash or cropshare), and 10 percent shared with another household.

Target households have on the average less land, and non-target households more land, than the sample average. The average farm size for target households is 2.5 acres, less than half the average farm size of non-target households of 6.2 acres. The tenure of target and non-target

Table 6-1  
Distribution of Income  
by Per Capita Income level<sup>1/</sup>

Per capita income (ECS)	Number of Households	Percent of Households	Percent of income
less than 300	32	20.4	4.2
300 to 600	27	17.2	7.3
600 to 900	23	14.6	10.5
900 and over	75	47.8	78.0
Target households	70	44.6	15.6
Non-target households	87	55.4	84.4
All households	157	100.0	100.0

<sup>1/</sup>Net household income includes earnings of the operator and rest of household from off-farm work, net value of farm production including the value at market prices of home consumption, remittances, and other non-earnings income. Per capita target income level is ECS720.

Table 6-2  
Land Size, Tenure and Use  
of Target and Non-Target Households

Land size, tenure and use <sup>1/</sup>	Target households	Non-target households	All households
<u>Acres</u>			
owned	1.6	4.6	3.2
rented	0.6	1.0	0.8
other	0.3	0.6	0.5
total	2.5	6.2	4.5
idle	0.6	1.4	1.1
<u>Percent</u>			
owned	64.0	74.2	71.1
rented	24.0	16.1	17.8
other	12.0	9.7	11.1
total	100.0	100.0	100.0
idle	24.0	22.6	24.4

<sup>1/</sup>Land rented refers to land rented in net of land rented out by payment in cash or crop share. "Other" land refers to land shared with family or others.

household landholdings also differs. Target households own on the average a lower share of the holding (two-thirds) than non-target households (three-quarters). Thus, a large share of the landholdings of the target households is of a less secure tenure; more of the land is rented or shared with another household. The average share (one-fourth) of the holding left idle is about the same for target and non-target households.

### 6.2.2 Labor resources

Differences in the labor resources of the target and non-target households are not as apparent as the differences in farm size and tenure. Table 6-3 provides data on household characteristics of the sample.

The average age of farm operators included in the sample is 53 years. The operator has spent on the average 5 years in school. The average household in the sample has 5 persons, 3 of whom are of working age. The average farm operator in the target population is slightly younger, less well educated, and has a larger household with fewer persons of working age than does the average farm operator in the non-target population.

These characteristics may reflect a traditional pattern noted in earlier studies in which savings are accumulated from off-farm work or work abroad and invested in land. As the farmer gets older, his farm becomes larger. Age, size of holdings, household dependency ratios, and per capita income are thus correlated.

### 6.2.3 Resource use

The differences between the target and non-target households in the amount of land and labor resources controlled affect the use of resources. The cropping and farm income of the target and on-target households are considered first. The allocation of household labor in target and non-target households to farm work and other work is considered second.

#### (a) Farm production and income

The number of target and non-target households producing the three traditional export crops (nutmeg, cocoa, and banana) is indicated in Table 6.5. Over 90 percent of the households reported production of at least one of the crops; many households produced all three of the crops. Nutmeg was produced by 80 percent of the households, cocoa by 60 percent of the households, and banana by 50 percent of the households.

The proportion of target households reporting production of the export crops is less than the proportion of non-target households with the crops. Nutmeg, for example, is produced by about 75 percent of the target households and by about 85 percent of the non-target households.

Generally, export sales, and crop sales in total, account for a smaller share of farm output value for the target households than for the non-target households. Sales of bananas, however, as shown in Table 6-7, account for a slightly higher average

Table 6-3  
Characteristics of Target and Non-Target Households

Household characteristics	Target households	Non-target households	All households
Age of operator (years)	52	54	53
Education of operator (years)	4.7	5.2	5.0
Persons in household (number)	6.1	4.4	5.2
Persons aged 15 to 65 (number)	3.1	2.9	3.0
Dependency index (ratio)	.49	.34	.42

Table 6-4  
Residence of Target and Non-Target Households

Residence	Target households	Non-target households	All households
<u>Number of households</u>			
Willis	13	21	34
Upper Capital	22	26	48
Grand Roy	35	40	75
<u>Proportion of households</u>			
Willis	38.2	61.8	100.0
Upper Capital	45.8	54.2	100.0
Grand Roy	46.7	53.3	100.0

Table 6-5  
Number and Proportion of Target and Non-Target Households  
Producing Export Crops

Crop <sup>1/</sup>	Target households	Non-target households	All households
<u>Number of households with crop</u>			
Nutmeg	53	73	126
Cocoa	37	57	94
Banana	32	48	80
<u>Proportion of households with crop</u>			
Nutmeg	75.7	83.9	80.3
Cocoa	52.9	65.5	59.9
Banana	45.7	55.2	51.0

<sup>1/</sup>Nutmeg includes mace. Proportion of households refers to the proportion of households in the relevant income group who produced the crop.

Table 6-6  
Value of Farm Output Components by Target  
and Non-Target Households  
(ECS/household)

Output	Target households	Non-target households	All households	Corrected index
Nutmeg	403	1,935	1,252	58
Cocoa	109	845	517	40
Banana	257	564	427	143
Other crop sales	272	1,273	826	n.a.
<hr/>				
Total crop sales	1,042	4,617	3,023	n.a.
Total home use	589	1,172		126
Total crop value	1,631	5,789	3,935	70
Total farm value	1,689	5,886	4,015	72

1/ Crop and farm value figures include value of home consumption. Value of nutmeg sales includes sales of mace. Farm value includes value of livestock. Corrected index compares target and non-target households by deflating, non-target value for higher farm size and proportion of growers with crop. Example for nutmeg: the proportion of target households with nutmeg is 90% of the proportion of non-target households with nutmeg. Farm size of target households is 40% of the farm size of non-target households. Thus,  $1,935 \times .9 \times .4$  equals 697.  $403 \div 697$  equals index value of 58. Lack of data prevented computation of index for other and total crop sales. Crop and farm values corrected only for farm size differences.

Table 6-7  
The Proportion of Farm Output Components  
by Target and Non-Target Households

Output	Target households	Non-target households	All households
Nutmeg	23.9	32.9	31.9
Cocoa	6.5	14.4	12.9
Banana	15.2	9.6	10.6
Other crop sales	15.1	21.6	20.6
<hr/>			
Total crop sales	61.7	78.4	75.3
Total crop value	96.6	98.4	98.0
Total farm value	100.0	100.0	100.0

share of output in the target households than in the non-target households. The value of home consumption accounts for one-third of the value of farm output in target households and one-fourth of the value of farm output in non-target households.

The average value of farm output for the target households (ECS1,689), as shown in Table 6-6, is about one-fourth the average value of farm output for the non-target households (ECS5,886). Although a major share in the difference is due to the smaller farm size and differences in cropping patterns, differences in yield per acre are also present.

Per acre input expenses and output value are presented in Table 6-8 for the sample of farm households. Annual expenses for fertilizer and for hired labor each accounts on the average for about ECS100 per acre. Total production expenses per acre, including seeds, feed, and transport are about ECS240 and represent about 20 percent of the value of farm output per acre (ECS1,208).

The lower income target households spend slightly less per acre for inputs (ECS229) than do the higher income non-target households (ECS251). The value of output per acre, however, for target households (ECS866) is less than two-thirds the value of output per acre for the non-target households (ECS1,484). The yield per dollar of production expense for the target households is also less than for the non-target households.

The lower output value of the target households reflects limited commercialization: limited use of purchased inputs and higher share of output consumed on-farm. Limited commercialization reflects also the lower proportion of farm output from traditional export crops. The smaller average farm size of the target households means that the space taken by the house and yard leaves less of the holding available for crops. Since subsistence crops for the household have first priority, less space is available for commercial production. Target households are also on the average younger and larger than non-target households, demand a greater share of production for consumption, and thus leave less marketable surplus.

The less secure land tenure arrangements of the target households may also discourage investment in permanent commercial crops (nutmeg trees, for example, require seven years to reach maturity). What investments in tree crops that have been made by the younger operators of the target households are less likely to have matured.

To summarize, target households on the average have a lower proportion of farm output value from permanent crops and a lower share of farm output sold. Although input expenses per acre are approximately the same for target and non-target households, the value of farm output per acre for the target households is less than two-thirds the value of farm output per acre for the wealthier, non-target households.

(b) Labor allocation

The use of household labor also differs between target and non-target households. The number of full-time and part-time farm operators is shown in Table 6-9. Less than half (43 percent) of the farm operators in the sample worked full-time on their own farms. Over half (57 percent) of the farm operators thus worked at least part-time off-farm. Over a third of the farm operators in the sample (34 percent) worked more than 20 hours a week off-farm. The proportion of the target operators with off-farm work (53 percent) was slightly less than the share of non-target operators with off-farm work (60 percent).

The hours of work on-farm and off-farm by the farm operator and the household are shown in Table 6-10. On the average, farm operators work 39 hours a week: 24 hours a week on-farm and 15 hours a week off-farm. Operators in the target households work fewer hours per week on the average (36 hours) than operators in the non-target households (41 hours). The proportion of work time by the operators on-farm (about two-thirds) and off-farm (about one-third) is approximately the same for both groups of households.

Differences between target and non-target households are more pronounced when the household as a whole is considered. The average hours per week of on-farm and off-farm work by all members of the target households (65 hours) is about one-fourth less than the average hours of work per week by the non-target households (82 hours). The target households also spend less of their work time off-farm. Thus, the average off-farm hours of work by the target households (26 hours) is about 40 percent less than the average off-farm hours of work by the non-target households (37 hours).

(c) Wages

The estimated average wages for work on-farm and off-farm by the target and non-target households are presented in Table 6-11. On-farm wage is calculated by dividing the value of farm output by total hours of labor input on-farm by the operator, the rest of the household, and hired labor. The off-farm wage of the operator is calculated by dividing his average weekly off-farm earnings by his hours of work per week off-farm (operators without off-farm work are excluded in estimating the average off-farm wage).

The farm operators in target households of the sample earn a lower average wage for both work on-farm and off-farm than the farm operator in non-target households. The average wage earned by farm operators in target households for on-farm work (EC\$0.90/hr) is less than half the wage of operators in non-target households for work on-farm (EC\$2.25/hr). The average off-farm wage of operators in the target households of the sample (EC\$1.10/hr) is less than a third of the off-farm wage of operators in the non-target households (EC\$3.67/hr).

The average off-farm wage is higher than the average on-farm wage for both target and non-target households. For all households (with work off-farm), the average wage for work on-farm (EC\$1.70/hr) is about two-thirds of the average wage for work off-farm (EC\$2.45/hr).

Table 6-8  
Cost of Inputs and Value of Output Per Acre  
by Target and Non-Target Households

Item	Target households	Non-target households	All households
Fertilizer expense per acre	108	88	97
Labor expense per acre	84	106	96
Total expense per acre <sup>1/</sup>	229	251	241
Value of output per acre	866	1,484	1,208
Value of output per dollar expense	3.8	5.9	5.0

<sup>1/</sup>Total expenses include expenses for fertilizer, labor, transportation, feed, seed, and other miscellaneous cash operating costs. Output value includes crop and livestock output value.

Table 6-9  
Part-Time and Full-Time Farm Operators  
by Target and Non-Target Households

Type of farm operator	Target households	Non-target households	All households
Number of households			
Full-time on-farm	33	35	68
Part-time on-farm	37	52	89
less than 20 hrs/wk off-farm	15	20	35
at least 20 hrs/wk off-farm	22	32	54
All households	70	87	157
Proportion of operators			
Full-time on-farm	47.1	40.2	43.3
Part-time on-farm	52.9	59.8	56.7
less than 20 hrs/wk off-farm	21.4	23.0	22.3
at least 20 hrs/wk off-farm	31.4	36.8	34.4
All households	100.0	100.0	100.0

Table 6-10  
Hours of Work On-Farm and Off-Farm  
by Target and Non-Target Income

Hours and proportion of work	Target households	Non-target households	All households
Hours of work per week			
by farm operator	36	41	39
on-farm	<u>23</u>	<u>25</u>	<u>24</u>
off-farm	13	16	15
Hours of work per week			
by full household	65	82	71
on-farm	<u>39</u>	<u>45</u>	<u>40</u>
off-farm	26	37	31
Proportion of work			
by farm operator	100.0	100.0	100.0
on farm	<u>63.9</u>	<u>61.0</u>	<u>61.5</u>
off-farm	36.1	39.0	38.5
Proportion of work			
by full household	100.0	100.0	100.0
on-farm	<u>60.0</u>	<u>54.9</u>	<u>56.3</u>
off-farm	40.0	45.1	43.7

Table 6-11  
On-Farm and Off-Farm Wages of Operators  
in Target and Non-Target Households  
(EC\$/hour)

Wages or operators	Target households	Non-target households	All households
On-farm wage	.90	2.25	1.70
Off-farm wage <sup>1/</sup>	1.10	3.67	2.45

<sup>1/</sup>Excludes operators without off-farm jobs.

Source: ISO hard copy. 149 cases.

### 6.3 Household income

Differences between target and non-target households in wages and hours of work are reflected of course in the source of household income. Data on level and source of income for households in the sample are presented in Table 6-12.

The average household income for the sample, as stated earlier in this chapter, is ECS5,821. The average net value of farm output (ECS3,132) accounts for slightly over half the total average household income. Off-farm earnings of the operator (ECS1,426) account for another quarter of the total. The remaining quarter share of total household income is split about evenly between average off-farm earnings by the rest of the household (ECS616) and average non-earnings income (ECS646; mostly remittances from friends and relatives living abroad).

The average income of the target households (ECS2,034) is less than a fourth of the average income of the non-target households (ECS8,868). Most of the difference is due to the difference in net farm income. And most of the difference in net farm income is due to the difference in farm size. The yield per acre for the target households is about 60 percent of the yield per acre for the non-target households. The total value of farm output for the target households, however, is only a fourth of the value of farm output for the non-target households.

The difference in off-farm earnings accounts for about a third of the difference between target and non-target household incomes. Total off-farm earnings by target households are only one-fifth of the total off-farm earnings of the non-target households.

### 6.4 Summary

In this chapter, a low-income target group is defined as households with average per capita incomes of less than ECS720. About 45 percent of the sample of farm households are thus defined as target households.

Land and labor resource data of these low-income target households were compared to those of the higher income non-target households. Target households were found on the average to control fewer acres of land and have less secure tenure than non-target households. Differences between the target and non-target households in labor resources were less apparent. The farm operator in target households was, on the average, slightly younger and less well educated than the farm operator of the non-target households. The average target household was slightly larger, and the proportion of the household of working age slightly lower, than the averages for non-target households.

These farm and household data may reflect a pattern in which savings from off-farm work and farm work are accumulated and invested in land as the farmer gets older. Older operators may, therefore, be more likely than younger farmers to have larger farms, more secure tenure, higher farm income, fewer young children, smaller households, and higher per capita incomes.

Table 6-12  
 Level and Source of Income  
 for Target and Non-Target Households

Source of household income	Target households	Non-target households	All households
<u>Level of income</u>			
Off-farm work of operator	361	2,283	1,426
Off-farm work of rest of household	265	899	616
Non-earnings income	231	980	646
Net farm income	<u>1,178</u>	<u>4,705</u>	<u>3,132</u>
Total	<u>2,035</u>	<u>8,867</u>	<u>5,820</u>
<u>Proportion of income</u>			
Off-farm work of operator	17.7	25.7	24.5
Off-farm work of rest of household	13.0	10.1	10.6
Non-earnings income	11.4	11.1	11.1
Net farm income	<u>57.9</u>	<u>53.1</u>	<u>53.8</u>
Total	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>

Cropping patterns of target and non-target households also vary. Average income received from sales of banana, cocoa and nutmeg is important, however, for both target and non-target households. Over half the sample households sold banana, almost two-thirds sold cocoa, and over three-quarters sold nutmeg. The proportion of target households with these crops is less than the proportion on non-target households with the crops.

Sales of crops and livestock account for a smaller share of the value of farm output for the target households than for the non-target households. A greater share of the farm production value of the target households is consumed on-farm. Also, yield per acre of the target households, measured by the value of output per acre of land controlled by the household, is less than two-thirds the yield per acre of the non-target households.

Over half the sample of farm operators work at least part-time off-farm. Over a third of the operators work more than 20 hours a week off-farm. Farm operators in target households work, on the average, slightly fewer hours a week off-farm than farm operators in non-target households. Average on-farm hours of work by the operators are about the same for both groups.

The total average hours of work on-farm and off-farm by all members of the target households is about a quarter less than that of non-target households. The proportion of work time off-farm for the target households is also less. The average off-farm hours of work by all members of the target households was about 40 percent less than the average hours of work off-farm by members of non-target households.

Wages for on-farm and off-farm work of the target households were also less than the wages of the non-target households. Differences in wages and hours of work are reflected in levels of household incomes. The average household income for the sample is EC\$5,821. Net value of farm output accounts for about half the average household income and off-farm earnings of the farm operator for another quarter share. The remaining quarter share of household income is split between off-farm earnings by the rest of the household and non-earnings income.

Average income of the target households is less than a fourth of the average income of the non-target households. Differences in farm income make for most of the difference between target and non-target incomes. Over one-third of the difference in average income between target and non-target households, however, is due to differences in off-farm income.

In the next chapter, farm and household characteristics affecting off-farm employment and income are considered.

## CHAPTER 7 FACTORS AFFECTING OFF-FARM HOURS OF WORK

Farm and household characteristics associated with alternative patterns of work on-farm and off-farm are considered in this chapter. In the first part of the chapter, environmental and income variables suggested by the theoretical model developed in Chapter 4 are described. In the second part of the chapter, regression analysis further evaluates the suggested effect of the identified variables on labor allocation to farm work and other work.

### 7.1 Descriptive analysis

Income and environmental factors are expected to affect work patterns. Income variables include wages from work on-farm and off-farm and the level of non-earnings income. Environmental variables include farm size, age and education, and other farm and household characteristics. Hours of work on-farm and off-farm by households in the sample are associated with environmental variables in Tables 7-1 to 7-4. Associations among work patterns and income variables are presented in Tables 7-5 and 7-6.

#### 7.1.1 Environmental variables

Farm size appears generally to be positively related to on-farm hours of work and negatively related to off-farm hours of work. Table 7-1 shows that as farm size categories increase, the average hours of work on-farm generally increase, and the average hours of work off-farm generally decrease. For example, the average work time off-farm for operators with between five and twenty-five acres of land is about half the work time off-farm of operators with smaller holdings of between one and two acres of land. Hours of work on-farm do not seem to vary with farm size as much as hours of work off-farm.

Hours of work off-farm by the farm operator seem also to vary with the availability of household and hired labor on-farm which can substitute for the on-farm labor of the operator. The more hours of household or hired labor on-farm, the more hours of work off-farm by the farm operator. Table 7-1 shows off-farm work by the farm operator is generally positively related to on-farm work by the rest of the household and expenses for hired labor.

The effect of farm size and the availability of hired and household labor on the proportion of work time off-farm and on-farm is shown in Table 7-2. For the sample as a whole, off-farm work accounts for about a third of the work time of the farm operator. Generally, the smaller the farm, the larger the share of work time spent off-farm. For example, farm operators with holdings of between one and two acres spend on the average about half their work time off-farm. Farm operators with larger holdings of between five and twenty-five acres spend on the average only about a fourth of their work time off-farm.

On farm availability of hired and household labor also affects the proportional allocation of work time. Table 7-2 shows a greater share of

Table 7-1  
Household Hours of Work Per Week  
by Selected Farm Characteristics

Characteristic	Number of households	Operator hours			Household hours <sup>1/</sup>		
		on-farm	off-farm	total	on-farm	off-farm	total
<b>Farm size (acres)</b>							
1 to 1.9	54	22	17	39	39	32	71
2 to 4.9	74	25	15	40	42	34	76
5 to 24.9	25	24	9	33	47	22	69
25 and over	4	23	12	35	48	66	114
<b>Work per week on-farm by rest of household (hours)<sup>2/</sup></b>							
0 to 9	77	22	13	35	24	27	51
10 to 49	65	25	16	41	49	33	82
50 and over	15	25	18	43	99	58	157
<b>Annual labor expense (ECS)</b>							
0 to 99	68	23	12	35	38	30	68
100 to 199	22	26	15	41	38	34	72
200 to 499	31	23	16	39	42	40	82
500 and over	36	24	17	41	51	28	79
All households	157	24	15	39	40	31	71

<sup>1/</sup>Sum of on-farm work by all household members, including farm operator

<sup>2/</sup>Excludes farm operator

Table 7-2  
 Proportion of Household Work Time  
 by Selected Farm Characteristics  
 (percent)

Characteristic	Number of households	Operator hours			Household hours <sup>1/</sup>		
		on-farm	off-farm	total	on-farm	off-farm	total
<b>Farm size (acres)</b>							
1 to 1.9	54	56	44	100	55	45	100
2 to 4.9	14	63	37	100	55	45	100
5 to 24.9	25	73	27	100	68	32	100
25 and over	4	66	34	100	42	58	100
<b>Work per week on-farm by rest of household (hours)</b>							
0 to 9	77	63	37	100	47	53	100
10 to 49	65	61	39	100	60	40	100
50 and over	15	56	42	100	63	34	100
<b>Annual labor expense (ECS)</b>							
0 to 99	66	63	37	100	56	44	100
100 to 199	22	63	37	100	53	47	100
200 to 499	31	59	41	100	51	49	100
500 and over	36	59	41	100	65	35	100
All households	157	61	39	100	56	44	100

<sup>1/</sup> Includes work of farm operator.

operator work time spent off-farm with increased availability of hired and household labor on-farm.

The age of the operator affects his work patterns. Table 7-4 shows that the farm operator over 60 years of age on the average spends less than half the average work time off-farm of younger farm operators. Average on-farm hours of work by the operator increase in age categories less than 60, then decrease in categories above 60. These data provide some additional evidence of a rural pattern in Grenada in which farmers gradually accumulate lands, increase hours of work on-farm, and reduce the number of work hours off-farm. Preference of employers for younger workers may also affect off-farm work by older farmers. Also, the expected returns from job search costs diminish with age.

Education is shown to be positively associated with off-farm work time in Table 7-3. Farm operators with at least six years of schooling spend an average of twice the work time off-farm as operators with less than four years of schooling. Education may be a proxy for other variables. A more ambitious person might be more likely to stay in school longer. Also, education standards have improved so that younger persons will likely be better educated than older persons. Youth and ambition may actually be the variables associated with off-farm work. However, education may in itself also affect off-farm work since the need for "book learning" may be greater in off-farm work than in on-farm work.

Residence is also associated with allocation of labor to farm work and other work. Proximity to urban employment and markets in St. George's is advantageous for both farm and off-farm enterprise. Since collection stations for the three principal export crops are well distributed throughout the island, however, proximity to St. George's may be a greater convenience for commuting to work than for marketing farm products. In any case, farm operators in Willis, the sampling area closest to St. George's, work on the average about twice as many hours a week off-farm as do farm operators in the other two sampling areas (Upper Capital and Grand Roy). On-farm hours of work are about the same in all three areas.

#### 7.1.2 Income variables

Average hours of work by the farm operator on-farm and off-farm are associated with on-farm wage rates in Table 7-5. The on-farm wage rate wage, as noted in Chapter 6, is calculated by dividing the gross value of output by total hours of labor input on-farm by the operator, household, and hired labor. The average on-farm wage for farm operators in the sample is EC\$1.70 per hour. Generally, as on-farm wage increases, average off-farm hours of work by the farm operator decrease. The difference is slight, however, and for the highest category of on-farm wages, average off-farm hours are considerably higher than the average for the sample. The high on-farm wage calculated for these farm operators with few on-farm hours of work reflects perhaps more the returns from land and input expenses than the quality of on-farm labor of these operators. For these operators, farming may be the

Table 7-3  
Household Hours of Work Per Week  
by Selected Household Characteristics

Characteristic	Number of households	Operator hours			Household hours <sup>1/</sup>		
		on-farm	off-farm	total	on-farm	off-farm	total
<b>Age of operator</b>							
less than 30	12	19	18	37	25	34	59
30 to 60	94	27	18	45	49	38	87
60 and over	51	20	8	28	32	22	54
<b>Education of operator (years)</b>							
0 to 3	51	23	10	33	32	18	50
3 to 6	73	24	16	40	41	33	74
6 and over	33	24	18	42	59	51	110
<b>Residence</b>							
Willis	34	25	24	49	53	51	104
Upper Capital	48	24	13	37	44	27	71
Grand Roy	75	23	11	34	35	26	61
<b>All households</b>	<b>157</b>	<b>24</b>	<b>15</b>	<b>39</b>	<b>40</b>	<b>31</b>	<b>71</b>

Includes work of farm operator.

Table 7-4  
 Proportion of Household Work Time  
 by Selected Household Characteristics

Characteristic	Number of households	Operator hours			Household hours <sup>1/</sup>		
		on-farm	off-farm	total	on-farm	off-farm	total
<b>Age of operator</b>							
less than 30	12	51	49	100	42	58	100
30 to 60	94	60	40	100	56	44	100
60 and over	51	71	29	100	59	41	100
<b>Education of operator (years)</b>							
0 to 3	51	70	30	100	64	36	100
3 to 6	73	65	35	100	55	45	100
6 and over	33	57	43	100	54	46	100
<b>Residence</b>							
Willis	34	51	49	100	51	49	100
Upper Capital	48	65	35	100	62	38	100
Grand Roy	75	68	32	100	57	43	100
All households	157	61	39	100	56	44	100

Includes work of farm operator.

Table 7-5  
Household Hours of Work Per Week by Operator  
Wage and Non-Earnings Income

Operator Wages	Number of households	Operator hours			Household hours			1/
		on- farm	off- farm	total	on- farm	off- farm	total	
<b>On-farm wage (ECS)</b>								
0 to .94	38	24	24	48	51	41	91	
.95 to 1.89	21	25	23	48	52	51	103	
1.90 to 2.84	20	22	21	43	34	36	70	
2.85 and over	10	11	50	62	16	59	75	
<b>Off-farm wage (ECS)</b>								
0 to .94	35	22	31	53	38	49	87	
.95 to 1.89	20	20	29	49	43	50	93	
1.90 to 2.84	8	24	24	48	39	29	68	
2.85 and over	26	24	17	42	51	38	89	
<b>Non-earnings income</b>								
0 to 299	58	21	26	47	43	44	88	
300 to 599	7	23	17	41	39	53	92	
600 to 899	10	29	21	50	38	28	66	
900 and over	14	22	32	55	50	50	99	
<b>All households</b>	<b>89</b>	<b>22</b>	<b>26</b>	<b>48</b>	<b>43</b>	<b>44</b>	<b>87</b>	

1/ Includes operator labor.

Table 7-6  
Proportion of Household Work Time  
by Wage and Non-Earnings Income

Operator Wages	Number of households	Operator hours			Household hours			1/
		on-farm	off-farm	total	on-farm	off-farm	total	
<b>On-farm wage</b>								
0 to .94	38	50	50	100	56	44	100	
.95 to 1.89	21	52	48	100	50	50	100	
1.90 to 2.84	20	51	49	100	49	51	100	
2.85 and over	10	18	82	100	21	79	100	
<b>Off-farm wage</b>								
0 to .94	35	41	59	100	44	56	100	
.95 to 1.89	20	41	49	100	46	54	100	
1.90 to 2.84	8	50	50	100	57	43	100	
2.85 and over	26	57	43	100	57	43	100	
<b>Non-earnings income</b>								
0 to 299	58	45	55	100	49	51	100	
300 to 599	7	56	44	100	42	58	100	
600 to 899	10	58	42	100	58	42	100	
900 and over	14	40	60	100	50	50	100	
<b>All households</b>	<b>89</b>	<b>46</b>	<b>54</b>	<b>100</b>	<b>49</b>	<b>51</b>	<b>100</b>	

1/ Includes operator labor.

residual occupation. The return to the few hours in farming is high, but it may be the hours that set the wage rather than the wage that sets the hours.

The average off-farm wage earned by farm operators in the sample is about ECS2.45 per hour. Table 7-5 shows that off-farm hours of work by the operator are apparently negatively related to the off-farm wage. Similar findings by Meyer (1978) in his study of off-farm employment in Taiwan were considered the result of either a backward bending supply curve for off-farm labor by the operators or structural characteristics of the rural labor market.

A backward bending supply curve results when the income effect of an increase in wages outweighs the substitution effect. The farmer chooses with an increase in his wage to spend more time in leisure. The negative relation between wages and hours of work off-farm may also result from limited demand for off-farm labor. Operators are unable to work as many hours as he would like at the higher wages. In Grenada, jobs working in a shop or driving a taxi are characterized as secure, long hours, and low pay. Construction work may pay better but is only infrequently available. The higher wage of construction work in part compensates for its limited security.

Finally, Table 7-5 shows little relationship between off-farm work and non-earnings income. The average hours of work by the operator off-farm are the same for households with non-earnings income of less than ECS300 per year as for households with non-earnings incomes of more than ECS300 per year.

## 7.2 Regression analysis

In the first part of this chapter, a number of income and environmental variables were associated with work off-farm and on-farm by the farm operator and his household. The data indicated that off-farm work by farm operators in the sample seemed positively associated with his years in school, and availability of household and hired labor on-farm. Off-farm work was generally negatively related to farm size, age, and distance from St. George's. The effect of income variables on off-farm work was not as expected. Off-farm hours of work appeared to be positively associated with a higher wage on-farm and lower wage off-farm. The effect of non-earnings income on off-farm work was indeterminate.

The combined effects of these wage variables on off-farm work of the operator are considered in this section with multiple regression analysis. The variables used in the regression analysis, and the results expected from review of the theoretical model developed in Chapter 3, are defined below. Results of the regression are then presented.

### 7.2.1 Definition of variables

Variables of the regression model are defined as follows:

- OPOF The dependent variable of the regression is the number of hours worked per week by the farm operator off-farm.
- WGON The on-farm wage for the farm operator is estimated by dividing the value of farm output by the sum of weekly on-farm work hours of the operator, household labor, and hired labor.
- WGOFF The off-farm wage of the farm operator is calculated by dividing off-farm earnings of the operator by the weekly hours of work off-farm.
- REMI The level of non-earnings income, from remittances, pensions, and other sources.
- HHWK Hours of work by the rest of the household on-farm per week.
- PDWK The annual expense for hired labor on-farm work of the operator.
- SIZE Acres of land controlled by the household.
- AGE Age in years of the operator.
- EDUC Education in years of schooling of the operator.
- UC, GR Dummy variables representing residence respectively in Upper Capital and Grand Roy. The third area, Willis, is closest to St. Georges, a major employment center.

### 7.2.2 Review of model

Analysis of the labor allocation model described in Chapter 4 suggests the following relationships:

a) The dependent variable, the number of hours per week that the farm operator works off-farm (OPOF), is expected to vary inversely with the wage rate for on-farm work (WGON). An increase in the on-farm wage rate has the effect, as shown in Figure 3 of Chapter 4, of rotating the on-farm earnings function from ABC to AB'C'. The point at which continued on-farm work (OPON) returns less than off-farm work shifts from B to B'. Off-farm work decreases from ML to M'L'. Thus, the model would predict that off-farm hours of work and on-farm wage rate are negatively related.

b) Analysis of the model also suggests that the off-farm wage rate (WGF) and hours of work off-farm are positively related. As indicated in Chapter 3, both the usual income and substitution effects, and displacement effect need to be considered. An increase in the off-farm wage is shown in Figure 2 of Chapter 4 as a shift in curve ABD to AB'D'. If on-farm hours stay the same, the effect of the change depends only on the relative strengths of the income and substitution effects on the trade-off between leisure time and work off-farm at the higher wage.

The displacement effect is shown as a shift in the point at which the off-farm earnings curve is tangent to the farm earnings curve. An increase in off-farm earnings shifts this point from B to B'. The displacement effect, coupled with the substitution effect, is considered likely to outweigh the income effect and lead to an increase in off-farm hours of work as a result of an increase in the off-farm wage rate.

c) Analysis of the model indicates also that non-earnings income (REMT) and off-farm work are likely to be negatively related. Non-earnings income is represented in Figure 4 of Chapter 4 by a parallel shift upward of the combined on-farm and off-farm earnings function. An increase in non-earnings income will not affect on-farm hours of work since relative earnings from work on-farm and off-farm do not change. Increased non-earnings income does allow for more leisure time, however. Off-farm work is shown in Figure 4 to decline from ML to ML'.

d) Environmental variables affecting the hours of work off-farm by the farm operator which were described in Chapter 4 included age, education, farm size, and other household and farm characteristics. Operator age (AGE) is expected to be related negatively to off-farm hours of work due to preferences of employers for younger workers, low expected payback for older farmers from job search costs, and traditional rural life cycle patterns of Grenada. Education (EDUC) is expected to be positively related to off-farm work due to the more formal training requirements of non-farm jobs. Education may also be a proxy for other variables (ambition, family, wealth, etc.) which may be positively associated with off-farm work. Farm size (SIZE) is expected to be related negatively to off-farm work. The larger the farm, the larger the labor requirements and larger the income which can be derived from work on-farm. Hours of work on-farm by the rest of the household (HHWK) and hired labor (PDWK) are, as substitutes for on-farm work of the operator, both expected to be positively related to the hours of work by the operator off-farm.

Finally, the dummy variables representing the two sampling areas (of a total of three areas) further from St. George's are expected to be negatively related to off-farm hours of work since commuting cost to the principal non-farm labor market is higher for these two communities.

### 7.2.3 Results of Tobit analysis

All farms with between 1 and 25 acres of land and complete data on variables included in the model are included as cases in the regression

analysis. Coefficients of the regression model are estimated using maximum likelihood techniques instead of the usual least squares method. The least squares estimation assumes a continuous dependent variable. In the case of off-farm hours of work, however, observations are non-negative but "bunch up" at zero.

Tobit analysis is considered a more appropriate technique for estimating the relationship between the limited dependent variables, off-farm hours of work by the farm operator, and the independent explanatory variables suggested above. The LIMDEP package on the TROLL computer system of the United States Department of Agriculture was used in estimating the coefficients of the model. Results of the estimation are presented in Table 7.7.

The signs of the estimated coefficients for the environmental variables are generally as expected. Off-farm hours of work by the farm operator are estimated to vary positively with his education and available household labor on-farm and vary negatively with his farm size, age, and the commuting distance from St. George's.

Estimated coefficients for the wage variables are inconsistent with the allocation model. Off-farm hours of work by the operator are estimated to vary positively with on-farm wage and negatively with off-farm wage. The results may reflect institutional characteristics of the rural labor market in Grenada which could not be considered in the simple allocation model of Chapter 4.

Farming for many of the farm operators interviewed may be the residual occupation. The highest estimated wages for on-farm work correspond to households where the operator works long hours off-farm leaving few hours for work on-farm. As suggested above, the high estimated on-farm wage likely reflects returns to land and capital rather than any particular qualities of on-farm labor by these operators. Also, the negative relationship between off-farm wage and off-farm hours may reflect more the compensation for irregular availability of better paying jobs than the relative strengths of the income, substitution and displacement effects which were considered in the allocation model.

The estimated effect of non-earnings income was as predicted by the allocation model but was statistically insignificant. The estimated coefficients for the two wage variables and for age and education of the operator were at least twice the respective standard error of the coefficient. The estimated elasticity of off-farm hours of work by the operator indicates that an increase in the age or education of the operator is associated with a much greater than proportionate change in off-farm hours of work.

### 7.3 Summary

Analysis of the labor allocation model presented in Chapter 4 suggests that off-farm work by the operator is affected by the wage from work on-farm and off-farm, level of non-earnings income, and a number of environmental variables including his age, education, availability of hired and household labor on-farm, and residence.

The survey data show that the associations between hours of work off-farm and the environmental variables were generally as expected. Off-farm hours of work were found generally to increase with the education of the operator, the amount of available household and hired labor on-farm, and the proximity to principal non-farm jobs in St. George's. The off-farm hours of work by the operator were shown generally to decrease, as expected, with his age and greater farm size.

The associations between off-farm work and the wage variables were not as expected and are considered to reflect more the institutional characteristics of the rural labor market in Grenada than the simple analytics of the allocation model. The high wage for on-farm work of operators who spend few hours working on-farm perhaps reflect the residual nature of farm work for these operators. The high off-farm wages for operators with limited hours of work off-farm similarly may reflect compensation for the irregular availability of the better paying construction and many tourism jobs. The effect of non-earnings income on hours of work off-farm by the operator was not significant.

Table 7-7  
 Factors Affecting Off-Farm Work  
 Limited Dependent Variable Estimation Model

Name of Explanatory variable	Estimated regression coefficient	Standard error of estimate	Ratio of coefficient to error	Estimated coefficient elasticity
WGON	.122	.037	3.30	1.45
WGF	-.077	.031	-2.50	-1.11
KEM	-.002	.002	-1.03	-0.17
EHWK	.265	.140	1.89	0.56
PDWK	—	—	—	—
SIZE	-.016	.014	-1.12	-0.01
AGE	-.435	.183	-2.37	-3.01
EDUC	3.235	1.326	2.44	2.13
UC	-9.795	7.028	-1.39	—
GR	-11.088	6.794	-1.63	—
Constant	19.883	14.554	1.37	—

Dependent variable: Hours of off-farm work per week by operator (OPOF)

Number of cases: 138

Sigma: 26.3

Source: TROLL 8780

## CHAPTER 8 OFF-FARM WORK AND FARMING EFFICIENCY

In this chapter, the apparent relationships between off-farm work and farming efficiency for the sample of farm households are examined.

### 8.1 Descriptive analysis

#### 8.1.1 Farm input use and efficiency

Off-farm work is related indirectly to farming efficiency by its direct effect on input usage. In the first part of this chapter, the effects of varying levels of input usage on output are examined, the association between off-farm work and input usage is considered, and, finally the data relating off-farm work and output efficiency are presented. In the second part of the chapter, a measure of technical efficiency is estimated for the sample households and associated with work patterns and other household and farm characteristics.

Tables 8-1 and 8-2 show the relationships between labor and cash inputs and farm output per acre. As could be expected, both gross and net output increase with increased inputs of on-farm labor by the farm operator and the rest of the household.

The average value of net output per acre on farms where the operator works on-farm less than 5 hours per acre per week (EC\$580) is less than half the average value of net output per acre on farms where the operator works on-farm at least 15 hours per acre per week (EC\$1,368). The average net return per acre for the sample is EC\$967. The operator works on the average about 11 hours on-farm per acre per week. The rest of the household contributes in total about 8 hours of labor on-farm per acre per week.

The average farm input expense for households in the sample is also generally related positively with output value. Table 8-2 shows the relationship for the sample between annual expenses for hired labor, fertilizer, and other expenses, and output per acre.

The average annual expense for hired labor for the sample is EC\$96. Over half the farmers in the sample spend less than EC\$75 per acre for hired labor. Average net output on these farms (EC\$829) is less than three fourths the net output on farms where expenses for hired labor are EC\$75 or more (EC\$1,157).

Average annual fertilizer expenses per acre and average output per acre for households in the sample are also apparently positively related. Average expense for fertilizer per acre for farms in the sample is EC\$97. Again, over half the households in the sample spend less than EC\$75 per acre. Average net output on these farms (EC\$773) is about two-thirds the net output on farms where expenses for fertilizer are EC\$75 per acre or more (EC\$1,208).

Table 8-1  
Gross and Net Output Per Acre  
by Hours of Household Labor On-Farm

Household labor use	Number of farms	Gross output per acre (ECS)	Net output per acre (ECS)
Operator labor on-farm			
(hrs/ac/wk)			
0 to 4.9	47	785	580
5 to 9.9	46	1,114	888
10 to 14.9	24	1,460	1,208
15 and over	40	1,663	1,368
Rest of household labor			
on-farm (hrs/ac/wk)			
0 to 4.9	92	976	788
5 to 9.9	28	1,315	1,090
10 to 14.9	13	1,463	1,151
15 and over	24	1,837	1,412
<hr/>			
All households	157	1,208	967

Table 8-2  
Gross and Net Output Per Acre  
by Expenses for Farm Inputs

Hired input use	Number of farms	Gross output per acre	Net output per acre
<b>Hired labor expense</b>			
per acre (EC\$)			
0 to 24.9	66	1,007	876
25 to 49.9	10	749	613
50 to 74.9	15	926	767
75 and over	66	1,545	1,157
<b>Fertilizer expense</b>			
per acre (EC\$)			
0 to 24.9	33	756	672
25 to 49.9	31	809	666
50 to 74.9	23	1,262	1,063
75 and over	70	1,580	1,208
<b>Total purchased</b>			
inputs per acre (EC\$)			
0 to 49.9	25	544	521
50 to 99.9	24	936	860
100 to 149.9	15	718	597
150 and over	93	1,536	1,174
<hr/>			
All households	157	1,208	967
<hr/>			

Table 8-3  
On-Farm and Off-Farm Work by Full-Time  
and Part-Time Farm Operators

Type of operator	Number of households	Hours per week of work by operator		
		on-farm	off-farm	total
Full-time on-farm	<u>68</u>	<u>26</u>	<u>0</u>	<u>26</u>
Part-time on-farm	<u>89</u>	<u>23</u>	<u>26</u>	<u>49</u>
less than 20 hours/week off-farm	35	27	9	36
20 hours/week off-farm and over	54	20	37	57
<b>All households</b>	<b>157</b>	<b>24</b>	<b>15</b>	<b>39</b>

Table 8-4  
Household Labor On-Farm  
by Full-Time and Part-Time Farm Operators

Type of operator	Number of households	On-farm hours of work per acre per week		
		operator	rest of household	total
Full-time on-farm	68	11	5	16
Part-time on-farm	89	11	10	21
less than 20 hours/week off-farm	35	11	6	17
20 hours/week off-farm and over	54	10	12	22
<b>All households</b>	<b>157</b>	<b>11</b>	<b>8</b>	<b>19</b>

### 8.1.2 Off-farm work and input use

Tables 8-1 and 8-2 above showed that for households in the sample, as expected, there was generally a positive relation between inputs of labor and cash and the value of farm output per acre. Tables 8-3 and 8-4 provide data on the relation between off-farm work and inputs of labor. Table 8-5 provides data on the relation between off-farm work and cash inputs.

Table 8-3 shows a negative association between hours of work by the operator on-farm and his total hours of work off-farm. As was shown above in Chapter 6, in about 60 percent of the sample households the farm operator works at least part-time off-farm. These operators spend slightly fewer hours per week working on-farm (23 hours) than operators who do not work off-farm (25 hours). Also, farm operators who work more than 20 hours a week off-farm spend less time in on-farm work than operators who spend less than 20 hours a week in off-farm work. These data suggest a negative relation between hours of work off-farm and hours of work on-farm.

The negative relationship between work off-farm and on-farm is not apparent, however, if on-farm work per acre is considered. Data showing the average hours of work on-farm and off-farm by the farm operator and the rest of the household are shown in Table 8-4. On the average, the operator and the rest of the household worked respectively 11 and 8 hours per acre per week. The table shows no difference on a per acre basis between the on-farm hours of work by operators with off-farm work and the on-farm hours of operators without off-farm work. On-farm work per acre per week by the rest of the household is greater in the households where the operator works off-farm.

Average expenses per acre for farm inputs by full-time and part-time farm operators are shown in Table 8-5. The average expenditures per acre for hired labor by part-time operators who work more than 20 hours a week off-farm are more than twice the expenditures per acre for hired labor by operators with off-farm jobs who work less than 20 hours a week off-farm. The data suggest the possible substitution of hired labor for the on-farm labor of the operator.

Average fertilizer expenses per acre are higher for farm operators with off-farm work (EC\$106) than for farm operators without off-farm work (EC\$86). Expenses for fertilizer are about the same for both groups of part-time farm operators.

Expenses for other inputs (feed, seed, transport, etc.) are higher, on the average, for part-time farmers (EC\$53) than for full-time farmers (EC\$40). Part-time operators with more off-farm work have higher expenses for these other inputs than operators with less off-farm work.

Total crop expenses per acre, the sum of expenses for labor, fertilizer, and other cash inputs, are on average about 15 percent higher for the part-time operators than for full-time farm operators. Total expenses per acre for the part-time operators with more than 20 hours a week off-farm are over a third more than total expenses per acre for part-time operators with less than 20 hours a week of work off-farm.

8.1.3 Off-farm work and output efficiency

The average values of gross and net output per acre for full-time and part-time farm operators in the sample are shown in Table 8-6. The average values of output per acre of part-time farmers are about 15 percent higher than the output per acre of the full-time farmers. Average gross output value of farms where the operator works at least 20 hours a week off-farm is about 20 percent than the average for farms where the operator does not work off-farm; average net output is about 15 percent higher.

These data suggest that off-farm work by the operator may contribute to somewhat greater farming efficiency if measured on a per acre basis. Slightly higher labor inputs from the rest of the household and slightly higher expenses for farm inputs (especially hired labor) appear to compensate for any reduction in on-farm hours of work by operators with off-farm jobs.

8.2 Regression analysis

8.2.1 Output per acre

The results of regression models explaining the level gross output and net output per acre are presented in Tables 8-7 and 8-8. The common set of independent variables used in the two regressions is as follows:

- SIZE      Acres of land controlled by the household
- EDUC      Years in school by the operator
- AGE        Age of the operator
- PDWK      Annual expenses for hired labor
- FERT      Annual expenses for fertilizer
- HHWK      Hours of work per week on-farm by the household, excluding the operator
- EXPT      The share of banana, cocoa, and nutmeg of total farm output value
- OPOF      Hours of work per week off-farm by the operator
- OPON      Hours of work per week on-farm by the operator

Table 8-5  
Expenses for Farm Inputs  
by Full-Time and Part-Time Farm Operators

Type of operator	Number	Expenses for inputs per acre per year (ECS)			
		labor	fertilizer	other	total
Full-time on-farm	<u>68</u>	<u>96</u>	<u>86</u>	<u>40</u>	<u>222</u>
Part-time on-farm	<u>89</u>	<u>97</u>	<u>106</u>	<u>53</u>	<u>256</u>
less than 20 hours/week off-farm	35	55	106	30	191
20 hours/week off-farm and over	54	122	106	71	299
All households	157	96	97	48	241

Table 8-6  
Gross and Net Output Per Acre  
by Full-Time and Part-Time Farm Operators

Type of operator	Number of households	Gross output per acre	Net output per acre
Full-time on-farm	<u>68</u>	<u>1,115</u>	<u>894</u>
Part-time on-farm	<u>89</u>	<u>1,279</u>	<u>1,023</u>
less than 20 hours/week off-farm	35	1,198	1,007
20 hours/week off-farm and over	54	1,332	1,033
All households	157	n/a	967

UC, GR Dummy variables represent residence in two sampling areas furthest from principal urban market in St. George's

In both models, off-farm work by the operator is estimated to be positively related to the value of output per acre. Output per acre is also estimated to be positively related to expenses for hired labor and fertilizer, hours of the operator and the rest of the household on-farm, and the age of the operator. Output per acre in both models is estimated to be negatively related to farm size, the export share of the crop output, distance of the farm from St. George's (the dummy variable), and the education of the operator.

The estimated coefficients for farm size, hired labor expense, export share, hours of the operator on-farm, and residence are significant at a 5 percent level of significance. The independent variables explain about a fourth of the variation in gross output per acre, and a little over a fourth of the variation in net output per acre.

### 8.2.2 Technical efficiency

In the paragraphs above, the review of the survey data and estimation of the two multiple regression models indicated a positive relation between off-farm work of the operator and farming efficiency as measured by the value of output per acre.

In the discussion which follows, an index is developed which measures the technical efficiency with which the entire bundle of farm resources is used. The index of technical efficiency is derived from an estimated frontier production function. The characteristics of the less technically efficient farms can be compared to those of the more technically efficient farms, and the impact of off-farm work on the technical efficiency of farming can be considered.

Variables defining the frontier production function are as follows:

FMVL	The dependent variable is the value at market prices of farm output
SIZE	Acres of land controlled by the household
PDWK	Annual expenses for hired labor on-farm
FERT	Annual expenses for fertilizer
OTYP	Other miscellaneous expenses (seeds, chemicals, feed, etc.)
OPHR	Hours per week of on-farm work by the farm operator
HHWK	Hours per week of on-farm work by the rest of the household

The frontier production function, as outlined in Section 4.2 above, is estimated by solving the following linear programming problem:

Table 8-7  
Factors Affecting Value  
of Gross Output Per Acre

Name of explanatory variable	Estimated regression coefficient	Standard error of estimate	Ratio of coefficient to error
SIZE	-69.4*	19.7	3.52
AGE	-12.7	39.5	0.32
EDUC	3.2	5.5	0.58
PDWK	.44*	.14	3.14
FERT	.29	.20	1.45
HHWK	3.8	3.7	1.02
EXPT	-664.8*	330.5	2.01
OPOF	3.3	4.4	0.75
OPON	11.8*	6.2	1.90
UC	-305.7	246.4	1.24
GR	-721.7*	212.9	3.40

$R^2 = .32$

Table 8-8  
Factors Affecting Value  
of Net Output Per Acre

Name of explanatory variable	Estimated regression coefficient	Standard error of estimate	Ratio of coefficient to error
SIZE	-36.0*	19.1	1.88
AGE	-14.7	38.3	.38
EDUC	4.1	5.3	.77
PDWK	.22*	.13	1.69
FERT	.07	.19	0.37
HHWK	3.2	3.5	.91
EXPT	763.6*	320.5	2.38
OPOF	2.1	4.2	0.50
OPON	11.0*	6.0	1.83
UC	-2/1.3	238.9	1.13
GR	-624.3*	206.4	3.03

$R^2 = .25$

Table 8-9  
Farm, Household, and Income Characteristics  
of Households by Rankings of Technical Efficiency

Household and farm characteristics	More efficient farms	Less efficient farms
<u>Household characteristics 1/</u>		
operator age	53	53
operator education	5.0	4.9
operator labor off-farm	14.6	15.1
household labor on-farm	18.5	13.2
household labor per acre	4.9	4.7
operator labor per acre	6.1	8.3
hired labor per acre	1.4	1.9
total labor per acre	12.4	14.9
<u>Farm characteristics</u>		
farm size	3.8	2.8
fertilizer EC\$/acre	38.9	33.0
labor EC\$/acre	90.1	117.4
other EC\$/acre	89.4	61.6
total EC\$/acre	218.4	212.0

1/ Labor data are expressed in hours per week. Household hours here exclude labor by operator.

Minimize:

$$a_0 + a_1 \overline{SIZE} + a_2 \overline{PDWK} + a_3 \overline{FERT} + a_4 \overline{OTXP} + a_5 \overline{OPHR} + a_6 \overline{HHWK}$$

Subject to:

$$a_0 + a_1 SIZE_1 + a_2 PDWK_1 + a_3 FERT_1 + a_4 OTXP_1 + a_5 OPHR_1 \geq FMVL_1$$

.  
.  
.

$$a_0 + a_1 SIZE_n + a_2 PDWK_n + a_3 FERT_n + a_4 OTXP_n + a_5 OPHR_n + a_6 HHWK_n \geq FMVL_n$$

The linear programming problem is expressed with the mean of the log values (base 10) of the variables in the objective function and the actual log values of the variables for the first through last cases (farm numbers 1 through 157) in the constraint matrix.

The solution to the linear programming problem results in the following coefficients for the frontier production function:

$$.197SIZE + .137PDWK + .074FERT + .067OTXP + .186OPHR + .057HHWK$$

An index of technical efficiency is calculated by dividing the log value of actual output for each farm by the log value of output predicted for the farm by the coefficients of the frontier production function. The most technically efficient farms will have an index of 100; the less technically efficient farms will have an index of less than 100. The calculated index for farms in the sample ranged from 100 to 64. The average calculated index value for the sample was 86.

a) Farm and household characteristics

In Table 8-9 the characteristics of households with an estimated farming efficiency ranking greater than the sample average are compared to characteristics of households with rankings less than the sample averages. About half the households were in each group.

The average age (53 years) and education (5 years) for the two groups are practically the same. Farm operators in both groups work an average of about 15 hours a week off-farm. Average on-farm hours of work by farm operators in the less efficient farms are fewer in total (13 hours compared to 18 hours) but slightly greater on a per acre basis (8 hours compared to 6 hours).

Table 8-10  
 Estimated Factor Elasticities and Ratios of Marginal  
 Value Product to Marginal Cost for More Efficient  
 and Less Efficient Farms<sup>1/</sup>

Name of variable	Factor Elasticities		Value of Marginal Product to marginal factor cost	
	More efficient farms	Less efficient farms	More efficient farms	Less efficient farms
SIZE	.265	.251	0.7	0.3
PDWK	.099	.111	1.5	0.6
FERT	.054	.186	0.8	1.8
OTAP	.078	.007	2.7	0.1
OPFR	.202	.257	0.7	0.3
HEWK	.053	.051	0.2	0.1

<sup>1/</sup>Estimated Cobb Douglas function linear in logs to base 10. Cases limited to households with between 1 and 25 acres of land. More efficient farms (n=77) have an estimated efficiency index value of at least .85. The average efficiency index value for these farms is .92. R squared for more efficient farms regression is .75. Less efficient farms (n=61) have an estimated efficient index value for these farms is .78. R squared for less efficient farms regression is .52. Ratios of marginal product value to marginal costs for the two groups are calculated by multiplying the estimated factor elasticities (regression coefficient) by the ratio of average farm output value to the flow value of factor inputs. Following factor values are inputted: land (\$500 per acre per year) and on-farm labor (\$1.20 per hour).

Average expenses for fertilizer on the less technically efficient farms are about two-thirds the expenses for fertilizer on the more efficient farms. The average farm size of the less efficient farms (2.8 acres) is also less than the average farm size of the more technically efficient farms (3.8 acres). Less technically efficient farms, then, are on the average smaller, use less fertilizer per acre but slightly more labor per acre than more technically efficient farms. Off-farm hours, age, and education are about the same for both groups.

b) Factor elasticities and product to cost ratios

Factor elasticities, which indicate the proportionate response in output to a change in input usage, and ratios of marginal value product to marginal factor cost, which indicate allocative efficiency, can both be derived from estimation of the Cobb Douglas production function.

Cobb Douglas production functions were estimated with input variables as defined above for farms with an efficiency ranking greater than average and for farms with an efficiency ranking lower than average. A Cobb Douglas function in general form is expressed as follows in log linear notation (logs in capital letters):

$$Y_j = a_i X_{ij} + e_j$$

where  $Y_j$  = value of output of farm j  
 $X_{ij}$  = use of factor i by farm j  
 $a_i$  = factor elasticity of factor i  
 $e_j$  = error term

Results of a multiple regression estimation in logs for the two groups of farms are presented in Table 8-40.

The estimated factor elasticities for farm size, hired labor, and household labor on-farm are practically the same for the two groups. The estimated elasticity for fertilizer use is higher for the less efficient farms than for the more efficient farms. The higher elasticity implies a greater return to the less efficient farms than to the more efficient farms from additional inputs of fertilizer. Estimated elasticities for both groups of farms are low, however. A 10 percent increase in use of any of the input variables results in an estimated increase in output of 3 percent or less.

Ratios of marginal product value to marginal factor cost indicate the efficiency with which productive factors are allocated. The average ratio of marginal product value to marginal factor cost is calculated with a Cobb Douglas production function by multiplying the estimated regression coefficient (factor elasticity) by the ratio of average farm output value to the flow value of the factor input:

$$\frac{MRP_{ij}}{MC_{ij}} = \alpha_i \frac{TR_j}{X_{ij}}$$

where  $MRP_{ij}$  = marginal revenue product of factor  $i$  in farm  $j$   
 $MC_{ij}$  = marginal factor cost of factor  $i$  in farm  $j$   
 $\epsilon_i$  = factor elasticity  
 $TR_j$  = total revenue in farm  $j$   
 $X_{ij}$  = cost of factor  $i$  in farm  $j$

The more technically efficient farms (farms with a better than average efficiency ranking) seem also to be more allocatively efficient. The ratios of marginal value product to marginal cost are close to one for farm size, fertilizer use, and on-farm hours of the operator. The more efficient farms seem to underemploy hired labor and miscellaneous inputs, however.

The marginal value product to cost ratios are lower for every factor except fertilizer in the less efficient farms. The high ratio for fertilizer suggests that the use of fertilizer on these farms is too low. The low ratios for the other factors indicate that resources could be profitably re-allocated to other activities. The fact that they are not suggests perhaps the limited alternative earning opportunities available to these households which are farming efficiently.

### c) Income and earnings

Estimated income and earnings characteristics of the households with greater and lesser technical farming efficiency are presented in Table 8-11. Farm operators of both the more efficient and less efficient farms earn on the average a higher wage from work off-farm than from work on-farm. Operators with the less technically efficient farms earn much lower average wages both on-farm and off-farm than do operators with more efficient farms. The on-farm wage of the operators with less technically efficient farms is less than half the on-farm wage of the operators with more efficient farms. The off-farm wage for the operators of less efficient farms is less than a third of the off-farm wage of the operators with more technically efficient farms. The total net income of households with less technically efficient farms is also less than a third of the income of households with more technically efficient farms.

Target households were defined above as households in the sample with per capita incomes of less than EC\$720. Over two-thirds of the target households have an estimated technical farming efficiency lower than the estimated average for the sample.

In Table 8-12, the effects of differences in the components of on-farm and off-farm earnings are considered in examining the differences between the total incomes of target and non-target households. The difference in farm income, reflecting differences in farm size and yield, accounts for most of the difference in income between the target and non-target households. Columns in Table 8-12 under the heading "Compensated net income" show the effect on income of the average target household of substituting the on-farm and off-farm incomes of the non-target households for those of the target households. For example, if the yield alone of the target households

Table 8-11  
 Income and Earnings Characteristics  
 of Households by Estimated Efficiency Rankings

Item	More efficient farms	Less efficient farms
Net farm income/acre (ECS)	1,117	370
Net farm income (ECS)	4,244	1,035
Net household income (ECS)	7,561	2,336
On-farm wage (ECS/hr)	2.36	.93
Off-farm wage (ECS/hr)	3.31	.99
Number of households (#)	17	61
Percent of target households (%)	30.8	69.2

Table 8-12  
 Estimated Income of Target Households  
 With Substituted Yields and Wages of Non-Target Households<sup>1/</sup>

Item	Average, target households	Average, non-target households	Compensated net income		
			total household	per capita	percent increase
<u>Farm income</u> (ECS)	1,178	4,705	5,562	912	173%
yield/acre (ECS)	471	759	2,755	452	35%
farm size (acres)	2.5	6.2	3,777	619	86%
<u>Off-farm income</u> (ECS)	626	3,182	4,591	753	126%
hours/week (hrs)	26	37	2,818	462	39%
wage/hour (ECS)	.46	1.65	3,640	597	79%

<sup>1/</sup>For each item, the averages for target and non-target households are presented. The compensated household income is calculated by substituting, for the first row, the farm income of non-target households for the farm income of target households. For the second row, the yield per acre of non-target households is substituted for the yield per acre of target households to derive compensated household income. Compensated income is calculated similarly for hours and wage differences. Per capita income is calculated by dividing compensated income by 6.1 persons per household. The percent increase calculated by dividing the difference between actual average target household income and calculated compensated income by the actual average target income (\$2,034). Yield and wage are calculated by respectively dividing average net farm income by average farm size and average group off-farm income by average hours per year. Off-farm hours and earnings includes hours and earnings by the operator and the rest of the household.

(ECS471/acre) were increased to that of the non-target households (ECS759/acre), net income of the target households would increase by about a third to \$2,755. Average per capita income (ECS452), however, would still be below the target income level of ECS720.

If farm size alone of the target households was increased to that of the non-target households, total net income of the target households would increase to ECS3,777 and per capita income to ECS619. Finally, if off-farm earnings of the target households were increased to that of the non-target households, total net income of the target households would increase to \$4,591 and per capita income to ECS753.

Table 8-12 shows that differences in farm size, not yield, account for most of the difference in farm income between target and non-target households. Differences in wages, not hours worked, account for most of the differences in off-farm income between target and non-target households.

The data also suggest that the differences in off-farm wages account for more of the differences in income between target and non-target households than the differences in yield. If target households had the same yield per acre as non-target households, income of the target households would increase by a third. If the members of the target households could earn the same wage from off-farm work as members of the non-target households, however, the income of the target household would increase by more than three-quarters.

While these data are merely indicative, they may suggest, one, the important contribution to farm household income of off-farm earnings, and, two, the important potential role of skills training which could perhaps lessen the apparent disparity in wages for off-farm work.

### 8.3 Summary

In this chapter data are presented describing the relationship between off-farm work and farming efficiency.

In the first part of the chapter, the factors affecting yield per acre are considered. Off-farm work is related indirectly to yield per acre through its direct effect on input use. The effect of input use on yield was considered above first, the effect of household work patterns on input use second, and the indirect effect of work patterns on yield third.

As expected, a positive relation between output and levels of use for each of the inputs is indicated. Off-farm work for the sample of households is associated on the average with a somewhat higher input of household labor on-farm per acre and a slightly higher use of hired inputs per acre. Finally, average yield per acre is about 15 percent higher for households where the operator has some off-farm work than for households where the farm operator works only on his own farm.

In the second part of the chapter, the factors affecting the efficiency with which the entire bundle of farm resources is used was considered. An efficiency index is derived by comparing actual output of each of the sample

farms to potential output with the given bundle of resources. Characteristics of households with estimated rankings of technical efficiency above average are then compared to characteristics of households with rankings below average. About half the sample are in each group.

Farm and household characteristics of the groups are compared first. There is little difference in average age, education, or off-farm hours of work between operators of the sample with technically more efficient farms and operators with less efficient farms. The less technically efficient farms have on the average somewhat more total labor per acre (operator, rest of household, and hired labor) than the more technically efficient farms. The less technically efficient farms also on the average use less fertilizer, have smaller farms, but hire slightly more labor per acre than do the more technically efficient farms.

Average factor elasticities and ratios of marginal value product to marginal cost are compared. The factor elasticities and product to cost ratios are derived from Cobb Douglas production functions estimated for the more efficient and less efficient farms. The average estimated factor elasticities of the less technically efficient farms are higher for fertilizer (and lower for operator labor on-farm) than the estimated elasticities of the more technically efficient farms. This means, for example, that an equal increase in fertilizer use by both groups of farmers would result in a greater return for the households currently designated as less technically efficient.

The ratios of marginal value product to marginal factor cost, indicative of allocative efficiency, are lower on the average for the less technically efficient farms for every factor except fertilizer. A ratio of less than 1 indicates that too much of the resource is being used in production: the return for an additional unit of input is not worth the added cost. The generally low ratios for the less technically efficient farms suggest that, except for fertilizer, lower efficiency may reflect an inefficient mix or poor quality of inputs rather than simply a low level of inputs employed.

Finally, the earning and income characteristics of the households with less technically efficient and more technically efficient farms are compared. Both groups of households earn higher wages from off-farm than from work on-farm. Operators of the less technically efficient farms of the sample also earn less, on the average, for on-farm and off-farm work than do operators of the more technically efficient farms.

Over two-thirds of the low income target households operate farms with an estimated technical efficiency ranking lower than average. Farm income on the average accounts for most of the difference between target and non-target households in household income. Farm size, not yield, appears to account for most of the difference in farm income. Differences in off-farm income are almost as important as differences in farm income. Substitution of the average off-farm income of the non-target households for that of the target households doubles the average income of the target households. Differences in the average wage for off-farm work, not the hours of work, account for most of the difference between target and non-target households in the average level of off-farm earnings.

The data show that for the sample, farm income differences between more and less technically efficient farms reflect mostly differences in farm size while differences in off-farm incomes reflect mostly differences in wages. The data may also suggest, one, the limits to reducing rural income differences by programs focusing only on improvements in yields, and, two, the potential importance of basic skills training which may lessen the apparent disparity in wages for off-farm work.

## CHAPTER 9 OFF-FARM WORK AND CREDIT USE

The relationships between work off-farm and credit use are examined in this chapter.

### 9.1 Source and purpose

Supplier credit is the type of credit most often reported by households in the survey. Supplier credit by shopkeepers and the producer associations account for 80 percent of the credit accounts active at the time of the survey. Almost 40 percent of the sample households use credit from shopkeepers, and about 45 percent of the households purchase fertilizer on credit from the producer associations. Shopkeeper credit is mostly in the form of monthly accounts for household goods. The cocoa and banana associations disburse fertilizer on credit with repayment by deductions from crop delivery or semi-annual bonus payments (both the cocoa and nutmeg associations pay producers an "advance" at time of delivery and a "bonus" after the international price for the crop is determined).

Loans from friends, private banks, and the government account for about one-fifth of the credit accounts reported. Over half of the loans (excluding supplier credit in-kind) are from private banks. Loans from the government bank, reported only for farm operating and improvement purposes, accounted for about 20 percent of the loans. The remaining share of loans is provided by friends, neighbors, and other informal loan sources. Loans for farm purposes from all sources (but excluding supplier credit in-kind) were reported by about 10 percent of the sample households.

Table 9-1 shows the average value of credit accounts by the source and purpose of the credit or loan. The average monthly credit account with shopkeepers is about EC\$100. The average annual credit account for fertilizer from the producer associations is about EC\$368 (fertilizer cost: about EC\$25 per 60 pound bag). The annual value of loans from friends and family are typically in the EC\$100 to EC\$200 range. Loans from private banks and from the government range in value from about EC\$600 to EC\$17,000. The average weighted value of farm loans, excluding supplier credit, is about EC\$2,800.

The relative importance of loans and supplier credit for households in the sample is shown in Table 9-2. Credit arrangements with shopkeepers accounted for two-thirds of the total reported credit payments during the twelve-month survey period. Credit payments (loans and supplier credit) for farm purposes accounted for about a third of total reported payments. Credit with the producer associations for fertilizer accounted for almost 60 percent of the value of loans and supplier credit for farm purposes. Loans from private banks and the government each accounted for about 10 percent of the value of loans and supplier credit for farm purposes.

Table 9-1  
Number of Credit Accounts  
by Source and Purpose of Credit or Loan

Purpose of credit or loan	Source of credit or loan					Total accounts
	shopkeeper credit	cooperative credit	loan from friends	loan from bank	loan from government	
land	—	—	1	5	3	9
labor	—	—	1	—	1	2
inputs	—	86	1	4	1	92
non-farm	75	—	6	11	1	93
total	75	86	9	20	6	196

Table 9-2  
Average Value of Credit Accounts  
by Source and Purpose of Credit or Loan<sup>1/</sup>  
(EC\$)

Purpose of credit or loan	Source of credit or loan				
	shopkeeper credit	cooperative credit <sup>3/</sup>	loan from friends	loan from bank	loan from government <sup>2/</sup>
land	—	—	1,500	5,200	4,200
labor	—	—	250	—	1,000
inputs	—	368	100	1,050	1,700
non-farm	100	—	160	5,600	550

<sup>1/</sup>Value of loan currently serviced. Shopkeeper credit is monthly, other accounts are longer term.

<sup>2/</sup>Includes value of land under "Land for the Landless" program.

<sup>3/</sup>Print-out #482 shows associations supplied 86 households and 76 percent of reported fertilizer cost. Annual fertilizer cost (T618) of EC\$266 times .76 equals EC\$202. EC\$202 times sample size 157 equals total association fertilizer credit in kind disbursed of EC\$31,714. Divided by 86 users equals average of EC\$368.

## 9.2 Farm and household characteristics

The characteristics of households with and without loans for farm purposes (excluding supplier credit) are examined in Table 9.3. Farm operators in households with farm loans are on the average younger, have slightly fewer years in school, smaller farms, larger households, and higher farm expenses. The biggest difference between households with and without loans in these characteristics is in the level of farm input expenses. Total average expenses for farm inputs by households with farm loans (EC\$1,455) are over three-quarters higher than farm input expenses for households without farm loans (EC\$814). The data may reflect farm credit use by younger farmers to expand the farming operation and complement the availability of household labor. Credit may facilitate the traditional process in which farm size and yield are improved gradually with savings from work off-farm and inheritance.

Characteristics of households with farm loans from government are compared to characteristics of households with farm loans from private banks and other sources (excluding supplier credit) in Table 9-4. On the average, operators in the sample with loans from government are older, slightly better educated, have larger households, larger farms, and higher farm input expenses than farm operators with farm loans from private banks or other loan sources.

Farm sales and income characteristics of households with and without farm loans are presented in Table 9-5. Households in the sample with farm loans have a higher average household income, a higher value of farm sales, a higher share of income from farm sales, and a high value of farm sales per acre than do households in the sample without farm loans. Of these characteristics, the biggest difference between households with farm loans and households without farm loans is in yield. The value of farm sales per acre of households with farm loans is almost twice the value of farm sales per acre of households without farm loans.

The table also compares farm sales and income characteristics of households with farm loans from government with characteristics of households with farm loans from private banks and other sources (excluding supplier credit). The households with farm loans from government on the average had a higher income, a higher value of farm sales, a higher share of income from farm sales, and higher farm sales per acre than do households with farm loans from other sources.

The number of target and non-target households with and without farm loans is shown in Table 9.6. There is no difference between target and non-target groups in the proportion of households with farm loans. In both groups, only about 10 percent of the households reported a loan to purchase farm inputs, land, or hire labor.

## 9.3 Off-farm work

The number of farm loans reported by farmers with and without off-farm work is shown in Table 9.7. The proportion of farm operators with farm loans

Table 9-3  
Proportion of Credit Payments  
by Source and Purpose of Credit or Loan<sup>1/</sup>  
(percent)

Purpose of loan	Source of credit or loan					Total account
	shopkeeper credit	cooperative credit	loan from friends	loan from bank	loan from government	
land	—	—	0.8	3.8	2.8	7.3
labor	—	—	0.1	—	—	0.1
inputs	—	17.2	0.1	2.3	2.7	22.4
non-farm	62.9	—	0.5	6.6	0.4	70.2
total	62.9	17.2	1.5	12.7	5.9	100.0

<sup>1/</sup>Total credit services calculated as the sum of all payments for credit or loans rep the households during the 12-month survey period. Although average shopkeeper account payments of the average monthly loan explain the large share of this type of credit i credit payments.

Table 9-4  
Characteristics of Households  
With and Without Farm Loans<sup>1/</sup>

Type of household	Number of households	Operator age	Operator education	Household size	Farm size	Farm input expenses		
						fertilizer	labor	total <sup>2/</sup>
Without farm loan	140		5.0	5.1	4.5	255	429	814
With farm loan	17		4.8	5.9	4.2	646	680	1,455
from government	5	53	5.0	7.0	6.1	614	913	1,609
from other	12	47	4.7	5.4	3.4	659	583	1,390
All households	157	53	5.0	5.2	4.5	297	456	883

<sup>1/</sup>Includes loans from friends, commercial bank, and government (including loans for land under "Land for Landless" program) for farm purposes. Excludes supplier credit from shopkeepers and cooperatives.

<sup>2/</sup>Total includes expenses for fertilizer, labor, and other inputs (seed, feed, etc.).

Table 9-5  
Farm Sales and Income Characteristics of Households  
With and Without Farm Loans

Type of household	Number of households	Gross household income (EC\$)	Gross farm sales (EC\$)	Farm sales share (%)	Farm sales per acre <sup>1/</sup> (EC\$)
Without farm loan	140	5,379	2,878	53.5	640
With farm loan	17	8,580	5,165	60.2	1,230
from government	5	11,726	8,067	68.8	1,320
from other	12	7,259	4,114	56.6	1,210
All households	157	5,726	3,103	54.2	690

<sup>1/</sup> Crop sales per acre calculated by dividing average sales by average farm size.

Table 9-6  
Number of Target Households  
With and Without Farm Loans

Type of household	Target households	Non-target households	All households
Without farm loan	62	78	140
With farm loan	8	9	17
from government	2	3	5
from other	6	6	12
All households	70	87	157

Table 9-7  
Number of Farm Loans  
by Full-Time and Part-Time Farmers

Type of farm	Household without farm loans	Households with farm loans			All households
		government loans	other loans	sub total	
Full-time on-farm	61	3	4	7	68
Part-time on-farm	79	2	8	10	89
less than 20 hrs/wk off-farm	33	0	2	2	35
at least 20 hrs/wk off-farm	46	2	6	8	54
All households	140	5	12	17	157

Table 9-8  
Farm Loan Payments by  
Full-Time and Part-Time Farmers<sup>1/</sup>

Type of farm	Value of farm loans (EC\$)			Proportion of loan value (%)		
	government loans	other loans	total	government loans	other loans	total
Full-time on-farm	<u>1,750</u>	<u>3,100</u>	<u>4,850</u>	<u>9.5</u>	<u>16.8</u>	<u>26.3</u>
Part-time on-farm	<u>3,820</u>	<u>9,780</u>	<u>13,600</u>	<u>20.7</u>	<u>53.0</u>	<u>73.7</u>
less than 20 hrs/wk off-farm	—	550	550	—	3.0	3.0
at least 20 hrs/wk off-farm	3,820	9,230	13,050	20.7	50.0	70.7
Total payments	5,570	12,880	18,450	30.2	69.8	100.0

<sup>1/</sup> Loan payments defined as sum of payments for farm loans reported by the 157 sample households during the 12-month survey period.

is the same for both groups. About 10 percent of each group reported a loan for farming purposes. However, more of the farm operators who worked over 20 hours a week off-farm reported farm loans (14 percent) than operators who worked less than 20 hours a week off-farm (6 percent).

Finally, in Table 9.8, the value of farm loan payments by farm operators with and without off-farm jobs, is presented. Almost three-quarters of the total farm loan payments are reported by households where the farm operator works off-farm. Although farmers who do no work off-farm account for almost half of the operators in the sample, loan payments by their households account for only a little more than a quarter of the total reported farm loan payments in the sample.

About 60 percent of the farm operators with off-farm jobs work more than 20 hours a week off-farm. These operators account for over 95 percent of the total value of farm loan payments reported by operators with jobs off-farm. Operators who work only on their own farms account for about a third of the reported farm loan payments to the government bank and less than a quarter of the total payments by the sample on farm loans from private banks and other loan services.

Although the number of households in the sample who used farm credit is very limited, there would appear to be a positive relationship between off-farm work and use of credit for farm purposes. Farmers with off-farm jobs are shown, on the average, to have higher expenses for farm operation and expansion. Higher farm expenses, other things equal, imply more of a need for credit. Also, farmers with jobs off-farm may be more in contact with formal credit sources and, for a variety of reasons, more willing to assume risks associated with credit use. Lenders may also be more willing to make loans to clients with a regular source of non-farm earnings. These several factors on both the demand and supply sides may explain the suggested positive relationship between off-farm work and use of farm credit.

#### 9.4 Summary

In this chapter, the effects of work patterns and other farm and household characteristics on the use of loans and other credit are considered. Credit in kind from suppliers (consumer credit for household goods from shopkeepers and production credit for farm inputs from the producer associations) account for most of the reported credit accounts. Only about one-fifth of the sample reported loans from commercial banks, government banks, friends, or other loan sources. Of the loans reported, excluding supplier credit, about half are from private banks, and a fourth each from the government bank and other sources.

Supplier credit from shopkeepers accounts for about two-thirds of the annual credit payments reported by households in the sample. About one-third of the total annual credit payments reported are for farming purposes and, of this, about 60 percent of the payments is for credit from the producer associations for fertilizer and 40 percent for payment on loans from commercial banks, the government bank, and other lenders.

Farm operators with farm loans (excluding supplier credit) are on average younger, less well educated, and have smaller households and slightly smaller farms than operators without farm loans. Total average farm expenses for households with farm loans were considerably higher than those for households without farm loans. Average yield, farm sales, and incomes were also higher for households with farm loans.

Households with loans from the government bank for farm purposes (the only use of government loans reported by households in the sample) were on the average older, had larger farms, and higher total farm expenses than households with farm loans from commercial banks and other loan sources.

There was no difference between target and non-target households in the proportion of households reporting loans for farm purposes. Also, only about 10 percent of both operators with and without jobs off-farm reported loans for farm purposes. There is, however, a difference in the value of farm loan repayments between operators with off-farm jobs and operators without off-farm jobs. Operators with off-farm work account for only about half the sample of farm operators but for more than three-quarters of the value of total reported loan payments. Also, farm operators who work more than 20 hours a week off-farm account for a greater than proportionate share of reported farm loan payments.

The limited number of households in the sample who used farm credit makes generalization hazardous. The data indicate a positive relationship between off-farm work and use of farm credit. The suggested relationship may reflect a greater demand for credit by off-farm operators to cover higher farming expenses, and a greater willingness by lenders to make loans to farm operators with a regular source of supplemental earnings from off-farm work.

## CHAPTER 10 SUMMARY AND CONCLUSIONS

### 10.1 Summary

#### 10.1.1 Objectives

The objectives of this study of part-time farming in Grenada are (1) to provide data on the level and sources of farm household income, (2) to determine factors affecting the allocation of household labor to farm work and other work, and (3) to consider the relationships among off-farm work, farming efficiency, and credit demand.

#### 10.1.2 The agriculture sector

A review of the agriculture sector in Grenada provides both rationale and context for studying factors affecting farming and non-farm work. Agriculture accounts for about a third of employment and gross domestic product, and about half the country's foreign exchange earnings. Exports in 1978 of nutmeg and mace (US\$5.4 million), cocoa (US\$10.0 million), and bananas (US\$3.9 million) accounted for most of the value of commodity exports. Tourism receipts accounted for the remainder of foreign exchange earnings.

Because of climate, terrain, and traditional patterns of trade, agriculture in Grenada is geared towards the export market. Production for the local market accounts for only a third of the value of sector output.

Expansion of agricultural production for the local market has been constrained by uncertainties regarding land use, marketing services, and availability of credit and extension assistance. These constraints are related to the patterns of off-farm work by small farmers in Grenada.

Work patterns, for example, affect and are affected by land use policies of government. Estate agriculture has declined in Grenada with increasing labor costs and fluctuations in export prices. The previous government acquired about 30 estates with a combined area of 2,000 to 3,000 acres. In some areas, estates were subdivided into small holdings under a "Land for the Landless" program. The holdings were too small to provide for full-time farming and subdivision of the estate removed the principal employer of the area. The present government has decided to continue to farm the estates as large units so that existing infrastructure can be used effectively and existing employment patterns in affected areas not be disrupted.

Marketing services for the three principal export crops are well organized by the producer associations. Marketing of crops for the local market is characterized by frequent shortages and oversupply, poor product quality, inadequate storage, and excessive spoilage. Work patterns and marketing arrangements are related in several ways. Although intensive production of fruits and vegetables for the local market could provide

full-time employment for a small farmer, the inadequate marketing arrangements make such a venture very risky. Due partly to the risk in specialization, the farmer maintains his off-farm job and limits his farm work to crops which require minimal production and marketing attention. Thus, the inadequate marketing arrangements for the local markets, off-farm work patterns, and the importance of the traditional export crops are all related.

Work patterns also affect the effectiveness of credit and extension services. The limited use of loans for farm purposes may reflect the availability of cash for the farm from off-farm jobs as well as the availability of credit in kind from the export associations. The effectiveness of extension services may be limited by inadequate attention to demands of the off-farm job on the time of the operator. Extension demonstrations, for example, might be made more compatible with work patterns of the farm operator if held at the market place or the off-farm job site. The policy implications of interrelationships between work patterns and development services are considered further in the conclusions of the study.

### 10.1.3 Recent research

Factors affecting work patterns are examined in Chapter 3 in a review of recent research on part-time farming in the United States and other countries.

The average share of farm household income from off-farm earnings has increased in the United States from 30 percent in 1950 to 60 percent in 1977. The share of household income is related to farm size: data for the U.S. show generally that the smaller the farm, the higher the share of income from work off-farm. Off-farm jobs in the United States have lessened the disparity in household income between households with small farms and households with large farms as well as between farm households and non-farm households. A study of off-farm work in the United States by Carlin and Larson (1977) concluded that the nonfarm economy did more to improve the economic status of farmers than did changes in the farming sector.

Many of the characteristics of off-farm work by farm households in the United States are noted as well in studies of off-farm work in other countries. Meyer and Larson concluded in a study of part-time farming in Japan and Taiwan that for many households with small farms and limited potential to increase farm productivity and income, off-farm work was the most effective means of increasing household income. Everson and Quizon (1978), in a survey of rural households in the Philippines, considered allocation of household labor to market work (work for sales or wages) and home production work (work related to home consumption). The authors concluded that attention to this full range of activities is needed to consider properly problems of household labor allocation.

Several additional studies of household labor patterns in the Philippines by Hyami and by Smith considered the effect of farm and household characteristics on work on-farm and off-farm. As in the United States, farm size was found to be correlated negatively with work off-farm. In his study of labor patterns in three villages in Northern Nigeria, Norman found that work off-farm paid a lower wage than work on-farm. He concluded that the off-farm work was a secondary activity necessary to supplement the farm incomes of the small farm families in his sample. A study of off-farm employment in Sierra Leone by Byorlee considered the variation in seasonal employment patterns. The studies by Norman and by Byorlee both suggested that farmers adjusted their non-farm labor to the primary labor demands of their farm work.

Several studies of multiple job holding in the Caribbean were reviewed by Zurekas. A survey of sugar workers in Barbados found that 80 percent of the workers there had at least three other earning activities. Another survey showed that about two-thirds of the farmers in Barbados and in St. Lucia reported some off-farm work. A government survey in Antigua showed that only 10 percent of the farmers there worked full-time on their own farms.

Brierly, in his survey of small farmers in Grenada, found that about 40 percent of his sample of farmers with between one and fifteen acres earned at least half their income from non-farm sources. Brierly concluded that the farm was run less efficiently when the operator worked off-farm since his attention was divided between the needs of the farm and the needs of the off-farm employer.

Comitas considered off-farm work in Jamaica in terms of the occupational balance achieved with multiple job holding. Multiple job holding, and the associated social networks, offer "maximum individual and household security with minimum risk in a basically limited environment." Comitas concluded that development programs for small farmers in the Caribbean "aimed at the socio-economic amelioration of such people, but based on uni-occupational models more typical of developed countries, start with limited chances for success."

The recent research reviewed in Chapter 3 and summarized here suggests that, first, off-farm work was generally found to be a substantial source of income for farm households and generally of greater importance for households

with smaller farms. Second, off-farm income was found to contribute to a more equal distribution of income between households with small farms and households with large farms, between farm households and non-farm households, and to even out income for a single household over time. Third, the particular combination of farm work and other work carried out by the household reflects farm earnings, wages and availability of off-farm work, the risks perceived in alternative combinations of farming and other work, and a number of other farm and family characteristics.

#### 10.1.4 Models of labor allocation and technical efficiency

The effect of the variables mentioned above on off-farm work and on farming efficiency are considered in models of labor allocation and technical efficiency presented in Chapter 4. The labor allocation model presented is based on a work-leisure model. The work-leisure model considers the trade-offs between more income from more work and more leisure from less work. The basic labor allocation model simply adds two types of work (on-farm work and off-farm work) to the work-leisure model.

The labor allocation model predicts an increase in off-farm work will result from an increase in the off-farm wage. Although the combined income and substitution effects are not predicted, the displacement effect (the change in off-farm wage relative to on-farm wage) is considered likely to result in an increase in work off-farm with an increase in the wage for work off-farm.

An increase in the on-farm wage, from an increase in farm product prices, for example, is predicted by the model to result in an increase of work on-farm, an increase in leisure time, and a decrease in off-farm work. There is no substitution effect on the margin since the off-farm wage has not changed. There is an income effect and a displacement effect. Both tend to reduce the proportion of time allocated to off-farm work.

The allocation model also would predict a decrease in off-farm work in response to an increase in non-earnings income (remittances, for example). With farming as the primary occupation, the income effect of an increase in non-earnings income results in increased leisure time and a decrease in off-farm work.

Household labor allocation is also affected by a number of other farm and household variables. Farm size is expected to be related to work off the farm since, other things equal, the smaller the farm the more likely the household will need to supplement farm income with off-farm earnings. The availability of household and hired labor on-farm will also affect the off-farm hours of work by the farm operator. On-farm labor by the household and by hired workers substitutes for the on-farm labor of the operator and enables him to work longer hours off-farm.

Age and education also affect the pattern of work on-farm and off-farm. A younger farmer is less likely to have acquired sufficient land to be farming full-time. Younger workers can also expect a greater return from the costs

of job search than can older workers. Also, employers may prefer to hire younger workers. Education, as indicated by years in school, is also expected to be related to work off-farm. "Book learning" may be needed more in off-farm jobs than in farm work. Residence, aside from differences in land quality, affects the returns from farm work and off-farm work through the effect on transport costs to markets and job sites.

In the second part of Chapter 4, the derivation of an index is presented which measures technical efficiency of farming. Allocative efficiency is concerned with equating a single factor's marginal cost and marginal revenue product. Technical efficiency is concerned with achieving the greatest possible output with a given bundle of resources.

The index of technical efficiency is derived from an estimated frontier production function. The frontier production function is an envelope defined by factor-to-product ratios of the most efficient farms. An index of efficiency is calculated as the ratio of actual output of the farm to the output which could be achieved with the most efficient use of the resources. The index is used to rank the technical efficiency of the farms in the sample. Work patterns and other farm and household characteristics are then associated with the calculated efficiency rankings.

#### 10.1.5 Data collection

Data collection procedures for the survey are described in Chapter 5. Data were collected in two survey trips to Grenada. In the first trip, from early January to mid-March 1979, a sample of farm households in three farming communities of Grenada was selected. Production and income data for these households were collected for the previous six-month rainy season from July to December. The second survey trip, from early July to late August 1979, collected similar data for the same households from January to June.

The three areas selected for the survey were in Willis, Upper Capital, and Grand Roy. The sample was selected purposefully (non-randomly) in order to provide sufficient variation for analysis of variables associated with different levels of off-farm work. The intended respondent was a farm operator whose household controlled (owned or rented) at least one acre of land. There were approximately 305 households contacted in the three areas. Half of the households (142) had less than an acre of land and responses from several other households were incomplete. The number of farm households in the full sample totaled 157. The average length of an interview was slightly more than an hour.

#### 10.1.6 Level and source of income

Results of the survey are considered in Chapters 6 through 9. The level and source of income for the sample of farm households are considered in Chapter 6.

Farm households in the sample are defined as target households if the average annual per capita income of the household is less than EC\$720. About 45 percent of the households in the sample are target households.

The average farm size of households in the sample is 4.5 acres. The average farm size of target households (2.5 acres) is less than half that of the non-target households (6.2 acres). The land tenure of the target households is also on an average less secure than that of the non-target households. The farm operators of the target households are on the average slightly younger and less well educated than farm operators of the non-target households.

Cropping patterns for farms of target and non-target households also vary although the average income from sales of banana, cocoa, and nutmeg is important for both groups of households. Over half of the households in the sample sell banana, almost two-thirds sell cocoa, and over three-quarters sell nutmeg. The proportion of target households growing export crops, however, is lower than the proportion of non-target households growing export crops.

Crop sales account for about three-quarters of the average farm output for households in the sample. Home consumption of crops accounts for most of the remaining output value. Livestock output value is less than 5 percent of total farm output value. Home consumption of farm output is a higher share of total output for target households than for non-target households.

The value of output on farms of the target households is less than a fourth of the output on farms of the non-target households. The difference reflects differences in farm size and yield. The average output per acre for target households (EC\$866) is less than two-thirds the value of output per acre for non-target households (EC\$1,484).

Differences in cropping patterns reflect also differences in other farm and household resources. The small average farm size of the target households means that a higher proportion of the holding will be taken by the house lot and subsistence garden. The size and age of the average target household imply greater home consumption and less marketable surplus than for the average non-target household. Also, the less secure land tenure associated with the target households may discourage investments in permanent crops. Investments in such crops which have been made by the younger farmers of the target households are less likely to have fully matured.

The allocation of household labor to work on-farm and off-farm is also different for target and non-target households. Over half the farm operators in the sample worked at least part-time off-farm. Over a third of the operators in the sample worked more than 20 hours a week off-farm. The proportion of operators who worked off-farm was slightly less for target households than for non-target households. Differences are more pronounced when the work of the whole household is considered. The average total hours of work off-farm by all members of the target households is about 40 percent less than that of the non-target households.

Average estimated wages for work on-farm and off-farm are also less for the target households. The differences in wages and in hours of work are, of course, reflected in differences in the level and source of household income. Average household income for the sample is about EC\$5,800. The average net

value of farm output accounts for about half the average household income, and off-farm earnings for about a quarter of the total. The remaining quarter share of average household income is split between off-farm earnings by the rest of the household and non-earnings income (remittances, mostly).

The average income of the target households is less than a fourth of the income of non-target households. Differences in farm income make for most of the difference between target and non-target household income. Differences in off-farm earnings account for about a third of the difference between target and non-target household income. Thus, off-farm work is shown to account for a substantial share of both the average farm household income and the difference in household incomes between target and non-target households.

#### 10.1.7 Factors affecting levels of off-farm work

Farm and household characteristics associated with alternative patterns of work on-farm and off-farm are discussed in Chapter 7. Variables associated with work patterns include income variables (wages from work on-farm and from work off-farm, and non-earnings income) and environmental variables (operator age and education, farm size, and other farm and household characteristics).

The associations between the environmental variables and work patterns are generally as expected. Farm size is negatively associated in the sample with work by the farm operator off-farm. The availability of household and hired labor appear to be positively related to work off-farm by the operator.

Age and education of the operator are also considered. Younger operators, on the average, work longer hours off-farm than older operators. Higher education levels are also associated with longer hours of off-farm work. Proximity to the principal urban market of St. George's is thought to be more of an advantage for commuting to work than for marketing farm products since collecting stations for nutmeg, banana, and cocoa are well distributed throughout the island. The relative advantage of lower cost commuting to work may than explain the higher average hours of work off-farm in the sampling area closest to St. George's.

The relationships between income variables and household work patterns are less apparent than the relationships described above between environmental variables and work patterns. Off-farm work by the operator is found generally to be negatively related in the sample to the estimated on-farm wage although differences are slight and for the higher on-farm wages, off-farm hours increased. Farming for these operators may be the secondary occupation with hours of work on-farm the residual of off-farm work. In cases where farming is the second job, it may be that the few hours of work sets the high estimated wage, rather than the wage setting the hours. High returns per hour may reflect more the returns to land and capital than to the limited labor inputs.

Off-farm work by the farm operator is also negatively related in the sample to the off-farm wage. The relationship may reflect structural

characteristics of the rural labor market in Grenada which were not considered in the sample labor allocation model. Higher wage jobs are frequently less secure than lower wage jobs. Higher paying jobs in construction and building activities are less continuously available than lower paying but more secure jobs in shopkeeping or taxi driving. Finally, no association was shown between the level of non-earnings income and hours of work off-farm.

Results of the regression analysis are generally consistent with results discussed above. Tobit analysis was selected since the normal assumptions of ordinary least squares regression analysis are not valid. Specifically, the dependent variable, off-farm hours of work by the operator, tend to "bunch up" at zero.

The results of the Tobit analysis are as expected for the environmental variables. Off-farm hours of work by the operator are estimated to increase with his education, available hired and household labor on-farm, and proximity to urban employment opportunities. Off-farm hours are estimated to decrease with age of the operator and greater farm size. Results for the income variables are as expected from the initial data analysis. The estimated effects of the income variables on off-farm work seem to reflect more the structural characteristics of the rural labor market in Grenada than the simple analytics of the allocation model.

#### 10.1.8 Off-farm work and farming efficiency

The relationship between off-farm work and farming efficiency is discussed in Chapter 8. In the first part of the chapter, the factors affecting yield per acre are considered. In the second part of the chapter, factors are considered which affect the efficiency with which the entire bundle of farm resources is used.

Work off-farm affects yield efficiency indirectly through its effect on input usage. Off-farm work by the farm operator is generally associated in the sample with higher levels of household labor, and slightly higher levels of purchased inputs, on-farm per acre. Average yield per acre is about 15 percent higher on farms where the operator has some off-farm work than on farms where the operator works only on his own farm.

An efficiency index is derived in the second part of the chapter by comparing actual output of each of the farms to potential output with the given bundle of resources. Characteristics of households with an estimated ranking of technical efficiency above average are then compared to characteristics of households with estimated efficiency rankings below average. About half of the households in the sample are in each group.

Operators of the less technically efficient farms work, on the average, fewer hours on-farm in total, but more hours on-farm per acre, than do operators of the more technically efficient farms. Operators of the less technically efficient farms also, on the average, hire more labor per acre, but use less fertilizer per acre and have smaller farms, than do operators of the more technically efficient farms.

Comparison of factor elasticities and product-to-cost ratios suggest that technical inefficiency may reflect, except for fertilizer, an inefficient mix or poor quality of resources rather than simply a low level of resources employed.

Technical efficiency rankings of the low income target households and the higher income non-target households are also compared in the chapter. Over two-thirds of the target households in the sample operate farms with an estimated technical efficiency ranking of less than the sample average. Farm income accounted for most of the difference in average income between target and non-target households. Farm size, not yield however, accounts for most of the difference in average farm income.

#### 10.1.9 Off-farm work and credit

The effect of off-farm work patterns and other characteristics of the household on credit use are considered in Chapter 9. Consumer credit from shopkeepers and production credit from the export producer associations account for most of the credit reported by households in the sample. About half of the households in the sample reported use of supplier credit from shopkeepers or the producer associations. About one-fifth of the households reported loans (excluding supplier credit) from commercial banks, the government bank (the Grenada Agricultural and Industrial Development Bank) or other loan sources.

Over one-third of the total credit payments reported (including supplier credit) is for agricultural purposes. Slightly less than two-thirds of the total agricultural credit payments reported is supplied by the producer associations (mostly for fertilizer with repayment deducted from crop purchase price) and the balance is supplied by commercial banks, the government bank, and by other lenders.

Only about 10 percent of the households in the sample reported loans from government or commercial banks. Households in the sample with farm loans from the government bank have, on the average, larger farms and higher total farm expenses than households with farm loans from other lenders.

There is no apparent difference between target and non-target households of the sample in the number of households with farm loans. Similarly, only about 10 percent of both part-time and full-time farm operators reported use of farm loans. There is, however, a difference in the average value of loan payments (as opposed to the number of loans reported) between part-time and full-time farm operators. Farm operators with jobs off-farm account for only about half of the farm operators in the sample but for over three-quarters of the total value of farm credit payments. Part-time operators with higher hours of work off-farm also accounted for a greater than proportionate share of farm credit payments.

## 10.2 Conclusions

Implications of the study for rural development policy in Grenada are considered in this section. First, the importance of off-farm work for rural development is indicated. Second, policies which can contribute to increased off-farm work are reviewed. Third, implications of the study for rural development policies of USAID in Grenada are considered.

### 10.2.1 Off-farm work and rural development

Off-farm work accounts for a large share of the income and work time of households in the sample. Also, the smaller the farm, generally the more important is off-farm work to the household. Thus, it should be apparent that farm policies focused on the needs of households with small farms must recognize the importance to these households of their off-farm earning activities.

An increase in off-farm work contributes to rural development. Off-farm earnings provide for a more equitable distribution of income between households with large farms and households with small farms, between farm households and non-farm households, and between stages in the life cycle of a single household.

Off-farm work was not shown to lessen farming efficiency. Average yields on farms in the sample where the operator worked off-farm were higher than those where the operator worked only on his own farm. Operators with jobs seem able to substitute effectively household labor, hired labor, and capital for any reduction in their hours of work on-farm needed to work off-farm.

Where small farm size, risk factors, and marketing constraints strictly limit the potential for increasing farm income, the best prospect for increasing household income may be an increase in off-farm earning opportunities. Off-farm work allows for less stark a range of choices than there would be if farming were the only source of income for rural households with limited resources. The choice for the farmer, for example, is not between continued poverty and migration to urban areas but between alternative combinations of farm work and other work which will allow him to maintain his existing network of economic and social relationships. The choice for the policy maker need not be between continued small farm poverty and radical land redistribution but between policies which can contribute to increased opportunities for non-farm employment and income. The choice in program targeting should not be between small farms and large farms but between alternative programs recognizing the complementarity between the two farming systems as well as between farm and non-farm enterprise.

### 10.2.2 Policies which promote off-farm enterprise

Prospects for developing off-farm enterprise are affected principally by (1) the small scale of the firms offering jobs in rural areas, and (2) the linkages between small rural businesses and farm production and income. Both the scale of the enterprise and the linkages with agriculture production and

incomes affect the effectiveness of credit, extension, and marketing policies of government intended to increase employment opportunities in rural areas.

Credit for most small rural businesses is supplied informally. Funds to purchase inventory for a shop, for example, may normally be borrowed from family and friends, from savings, or from the supplier. Small rural businesses may lack access to formal credit sources because of insufficient collateral and an inadequate credit record. Owners of small businesses may also not be familiar with procedures involved in obtaining credit. The high transactions costs (red tape, frequent visits to the bank, etc.) may also effectively limit the access of small businesses to formal credit sources.

The problems are similar to those which have limited the access of small farmers to formal credit programs. Small farm credit programs have been designed to increase the availability of credit to households with small farms. Special programs are also appropriate to increase the availability of credit to small rural businesses.

Small farm and small business loan programs both have high administrative costs. Much of the same paperwork is needed for a small loan as for a large loan. Thus, the overhead costs per dollar loaned are higher for portfolios of smaller loans. Attempts in loan programs for small farmers or small businesses to determine eligibility based on repayment ability rather than marketable collateral also increases administrative costs.

Since the costs of a small loan program will likely be higher, the loans could perhaps be made more cost effective by extending the range of feasible small loan projects. Perhaps as an alternative to separate credit programs for small business and small farms, a combined credit program for limited resource households could be considered. Such a program would more realistically reflect the linkages at the household level between farm and off-farm income-earning activities. The full productive potential of the household could then be utilized.

Extension services for small farms and small businesses might also be combined effectively. Providing extension assistance programs for small farms or small businesses are also more costly than extension programs for larger enterprises. Contact with smaller enterprises may be more difficult: the small enterprise may be more remote and the social networks of the small operator may not be those of the extension worker. Communication may be difficult. The extension worker may not consider the small businessman or small farmer an important client of his services. Small farmers and small businessmen may also have less room for error, less of an ability to experiment with new techniques, or new ways of doing business. The extra effort and training required of extension works to serve small farmers and small businesses is costly. Again, savings may be possible by extending the range of services offered. Extension workers could be trained as referral agents for both small farmers and small rural businesses. Often the small farmer and the small businessman is the same person. One visit could serve both purposes.

Marketing is another area in which services for farm and non-farm enterprises can be complimentary. Marketing services for small non-farm businesses include assistance in packaging and quality control, collective marketing, export promotion, etc. Improvements in transport facilities reduce the costs of marketing for both farm and non-farm enterprise. Better bus service reduces travel time to markets and to jobs. Better road maintenance lowers travel costs and provides for substantial direct rural employment and earnings.

This complimentary in farm and non-farm services reflects the linkages between agriculture and rural non-farm enterprise at the sectoral level. Backward and forward linkages between farming and rural businesses tie together their prospects for development. Much of rural non-farm employment in Grenada is tied directly to processing, packaging, and marketing of farm products (banana boxing, nutmeg processing, cocoa fermentaries, etc.). Non-farm businesses also supply production inputs and consumer goods to farming households.

The kind of agriculture promoted will, therefore, affect also the kind of non-farm business which will be developed. For example, there is evidence that the income elasticity of demand for goods provided by rural businesses is higher for households with lower incomes. Higher income households have more of a demand for better finished goods not available from small rural businesses. Therefore, agricultural policies which benefit a broad range of producers, and consumers, will have more of an impact on demand for goods provided by rural non-farm businesses than policies which increase production and incomes of a limited number of larger producers. Larger producers are also more likely to utilize imported production technologies with fewer ties to the local economy.

### 10.2.3 USAID assistance

The assistance of USAID in Grenada has focused on increasing the capabilities of regional technical and financial institutions serving the Eastern Caribbean. The principal institutional channel of assistance in the region has been the Caribbean Development Bank (CDB). Fully one-third of all international development assistance to less developed countries of the Eastern Caribbean region is channeled through the CDB. The CDB has had more success in implementing infrastructure projects than credit programs for small farms and businesses. Major infrastructure projects of the CDB in Grenada are for main and rural feeder roads (\$6.7 million) and water systems (\$1.0 million). Major new agricultural and industrial credit programs are for food crop diversification (\$3.1 million), livestock development (\$3.5 million), revitalization of the coconut industry (\$0.9 million) and small farm and industry development (\$1.6 million).

Efforts by USAID to direct more CDB credit to small farmers has required the CDB to expand its role in providing technical assistance in project development and implementation. Additional technical assistance in these and related areas are provided by other regional institutions including the University of the West Indies (UWI), the Caribbean Agricultural Research and

Development Institute (CARDI), and the regional program of the Food and Agriculture Organization (FAO/CARDATS). UWI with USAID funds initiated training courses for agricultural extension staff in the region. CARDI has begun with USAID assistance research in small farm production for local markets. FAO/CARDATS has initiated several pilot projects designed to demonstrate the feasibility of full-time farming on small farms through cropping intensification.

In addition to these multilateral programs, bilateral assistance programs of the British Development Division (BDD) and the Canadian International Development Agency (CIDA) have focused respectively on banana and cocoa development projects. Cuba and Venezuela are providing funds for construction of a new airport near St. George's. The bilateral role of the United States is limited to several small scale education and health projects.

Considerably more bilateral and multilateral assistance could be usefully directed towards the development of rural nonfarm enterprise in Grenada. Sufficient assistance is available through the CDB for infrastructure projects. The major export crops are self-sufficient (nutmeg) or are already receiving external assistance (banana, cocoa). Small farm assistance programs of USAID and other agencies abound. In contrast, only limited technical and financial assistance from the CDB and the OAS has been provided for formulating policy and preparing projects directed towards development of non-farm rural enterprise.

Assistance could be provided in evaluation of combined credit delivery systems for limited resource households, expansion of extension services to include small rural businesses, and improvements in rural roads and bus services which would facilitate marketing for both farm and non-farm enterprise. USAID would have a particular advantage in providing such assistance because of its currently expanded role in promoting small farm development in the region.

Throughout this final section concerned with the policy implications of the study, an attempt has been made to emphasize the linkage and complementarity between farming and nonfarm rural enterprise. Formulation of effective rural development policy for the region must match with a combination of services the real combination of farm and nonfarm productive activities undertaken by rural households.

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Appendix 1  
Persons Contacted in Grenada

Ministry of Agriculture

Bunny Fletcher	Permanent Secretary
Dennis Noel	Chief Technical Officer, Extension
Arthur Branch	Senior Agricultural Officer, Extension
Patrick Redhead	Senior Executive Officer
Lesley Sayers	Agriculture Assistant, Statistics
Egbert Barrett	Agriculture Assistant, Statistics

Ministry of Planning

Gloria Payne	Permanent Secretary
Mike Gerome	Assistant Secretary
Neville Nedd	Agriculture Planning Officer

Ministry of Finance

David Fletcher	Senior Economist
John Francis	Statistical Officer

Ministry of Health

Martin Abraham	Senior Public Health Officer
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Organization of American States

Russell Irvine	Acting Director
Daniel Barrima	Economic Planning
Jack Young	Agricultural Planning
Anthony Rock	Statistical Planning

## COUNTRY DATA - GRENADA

AREA  
34- km<sup>2</sup>

## POPULATION

106,406 (mid-1978)  
Rate of Growth: 1.0 (from 1970 to 1978)

## DENSITY

306 per km<sup>2</sup>  
.. per km<sup>2</sup> of arable land

## POPULATION CHARACTERISTICS - 1977

Crude Birth Rate (per 1,000) 25.1  
Crude Death Rate (per 1,000) 7.3  
Infant Mortality (per 1,000 live births) 16.7

## HEALTH - 1977

Population per physician (1975) 4,686  
Population per hospital bed 149

## ACCESS TO PIPED WATER - 1977

% of population - urban) 38  
- rural)

## DISTRIBUTION OF LAND OWNERSHIP - 1971

% owned by top 10% of owners 46.4  
% owned by smallest 10% of owners 1.0

## ACCESS TO ELECTRICITY - 1977

% of population - urban) 73  
- rural)

## EDUCATION - 1977

Adult literacy rate % 85%  
Primary school enrollment % 90%

## NUTRITION - 1975

Calorie intake as % of requirements 88  
Per capita protein intakeGNP PER CAPITA in 1978<sup>a/</sup> US \$544

## GROSS NATIONAL PRODUCT IN 1978

## ANNUAL RATE OF GROWTH (% constant prices)

	US \$ Mil.	%
GNP at Market Prices	61.3	100.0
Gross Domestic Investment	6.2	10.0
Gross National Saving	0.9	1.5
Current Account Balance	-5.3	8.6
Exports of Goods, NPS	34.4	56.1
Imports of Goods, NPS	-43.6	71.1

1975-78

6.6

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3.8

..

## OUTPUT, LABOR FORCE AND PRODUCTIVITY in 1978

	Value Added - 1978		1977 Labor Force b/		1977 V.A./Worker	
	US \$ Mil.	%	Mil.	%	US \$	%
	Agriculture	15.0	29.9	11.0	31.2	1,236.4
Industry	2.6	5.2	2.1	6.0	1,476.2	126
Services	32.5	64.9	22.1	62.8	1,104.1	94
Unallocated						
Total/Average	50.2	100.0	35.2	100.0	1,167.6	100

## GOVERNMENT FINANCE

Central Government  
(EC\$ mln) % of GDP  
1978 1978

Current Receipts	44.8	26.8
Current Expenditure	53.1	31.8
Current Surplus	-8.3	5.0
Capital Expenditures	3.9	2.3
External Assistance (net)	5.8	3.5

a/ The Per Capita GNP estimate is at 1977 market prices, calculated by the same conversion technique as the 1979 World Atlas. All other conversions to dollars in this table are at the average exchange rate prevailing during the period covered.

b/ Total labor force; unemployed are allocated to sector of their normal occupation.

.. not available

COUNTRY DATA - GRENADA

MONEY, CREDIT and PRICES

	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
	(ECS million outstanding end period)			
Money and Quasi Money	57.8	66.5	72.4	84.9
Bank Credit to Public Sector	15.9	17.4	17.4	22.8
Bank Credit to Private Sector	44.0	41.3	50.8	60.0
Money and Quasi Money as % of GDP	60.1	57.3	53.9	50.9
Annual percentage changes in:				
Bank Credit to Public Sector	..	9.4	-	31.0
Bank Credit to Private Sector	..	-6.5	23.0	18.1

BALANCE OF PAYMENTS

	<u>1976</u>	<u>1977</u>	<u>1978</u>
	(Millions US \$)		
Exports of Goods, NFS	21.3	28.2	34.4
Imports of Goods, NFS	-25.3	-34.4	-43.6
Resource Gap (deficit = -)	-4.0	-6.1	-9.2
Interest Payments (net)	-0.2	0.5	-0.5
Other Factor Payments (net)	-	-	-
Net Transfers	2.4	5.6	4.4
Balance on Current Account	-1.8	-	-3.5
Net MLT Borrowing	2.0	1.5	1.0
Disbursements	1.9	1.7	1.7
Amortization	-0.9	-0.2	-0.7
Capital Grants	2.0	0.6	0.6
Other Capital (net)	-0.6	-1.8	4.4
Other Items n.e.c.	-	-	-
Increase in Reserves	0.4	-0.3	0.3

RATE OF EXCHANGE (Since May 1976)

US\$1.00 = ECS2.70  
ECS1.00 = US\$0.37

MERCHANDISE EXPORTS (Average 1975-79)

	<u>US \$ MLn</u>	<u>%</u>
Bananas	3.3	20.2
Cocoa	5.4	33.1
Mace	1.4	8.6
Nutmeg	4.8	29.5
All other commodities	1.4	8.6
Total	16.3	100.0

EXTERNAL DEBT, DECEMBER 31, 1978

	<u>US \$ MLn</u>
Public Debt, incl. guaranteed	7.3
Non-Guaranteed Private Debt	..
Total outstanding & Disbursed	..
<u>DEBT SERVICE RATIO for 1978 a/</u>	<u>..</u>
Public Debt, incl. guaranteed	2.9
Non-Guaranteed Private Debt	..
Total outstanding & Disbursed	..

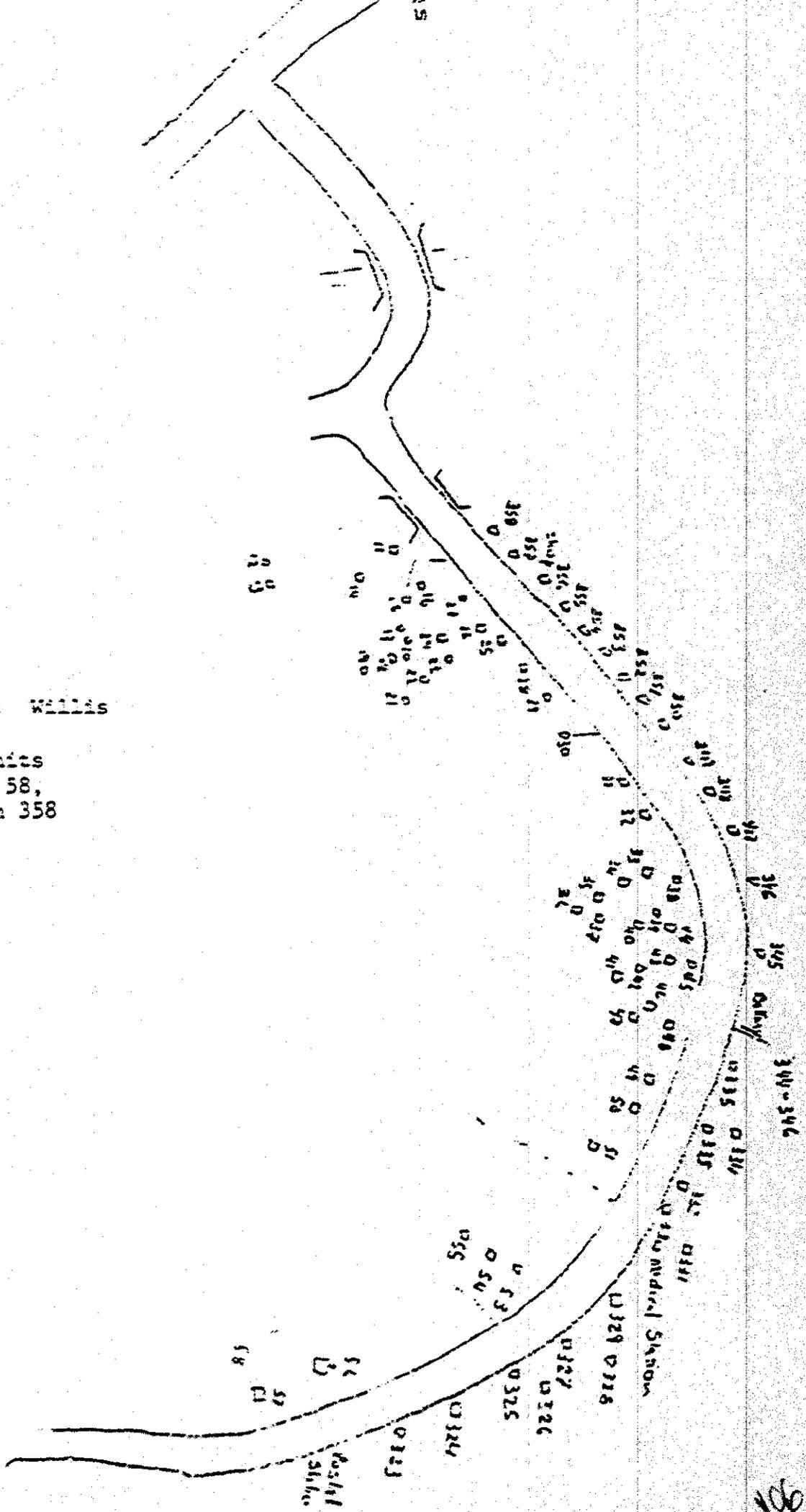
a/ Ratio of Debt Service to Exports of Goods and Non Factor Services.

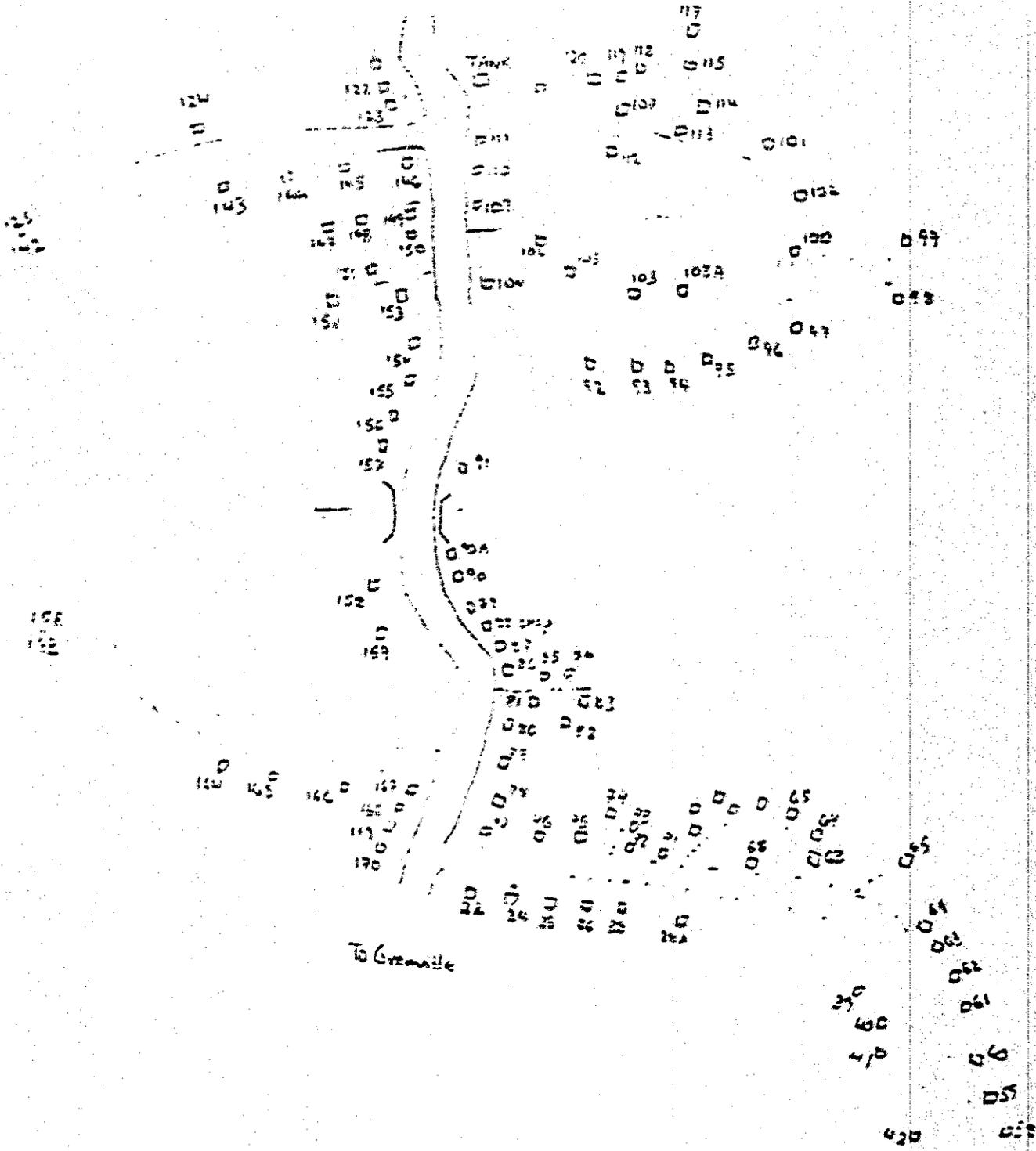
.. not available  
.. not applicable

Source: World Bank. Economic Memorandum on Grenada. Report 2949-GRD.  
(May 12, 1980).

Sketch map: Willis

dwelling units  
11 through 58,  
323 through 358

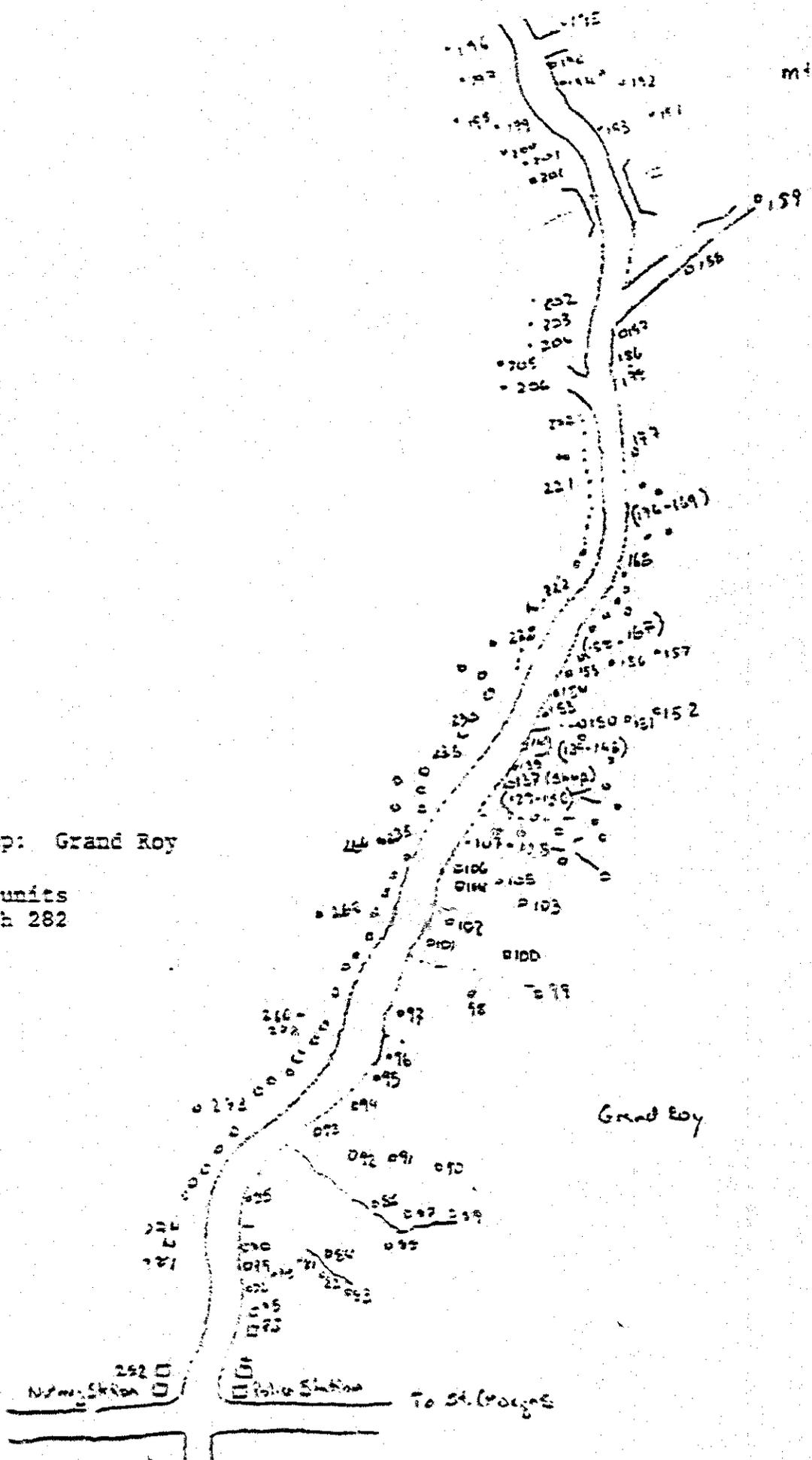




Sketch map: Upper Capital

dwelling units  
32 through 170

mt. Placid



Grand Roy

New Station 252  
To St. Moyses

## Appendix 1

## Crop Codes and Estimated Prices

Crop code	Crop name	Unit price	Unit of measure	Condition of measure
1	Nutmeg	.84	lb.	green
2	Mace	1.61	lb.	dry
3	Cocoa	.69	lb.	wet
4	Coconut	.25	lb.	water
5	Banana	3.25	bunch	-
6	Breadfruit	.20	fruit	-
7	Mango	.20	fruit	-
8	Lime	.20	fruit	-
9	(see notes)	.90	fruit	-
10	Cassava	.20	lb.	unground
11	Dasheen	.50	lb.	-
12	Yams	.50	lb.	-
14	Corn	.32	lb.	fresh on cob
15	Okra	.60	lb.	-
16	Pigeon peas	1.25	lb.	green, shelled
17	Tomatoes	1.85	lb.	-
51	Tannia	.55	lb.	-
52	Cabbage	2.10	lb.	-
53	Sweet potato	.55	lb.	-
54	Cane	.02	lb.	-
55	Grapefruit	.25	fruit	-
56	Orange	.20	fruit	-
57	Ginger	1.00	lb.	-
58	Plantain	.50	lb.	-
59	Carrot	1.40	lb.	-
60	Cinnamon	6.00	lb.	-
61	Guava	.40	lb.	-
62	Bluggoes	.15	lb.	-
63	Sorrel	1.00	lb.	-
64	Beet	1.80	lb.	-
65	Avocado	.30	number	-
66	Cashew	.05	number	-
67	Mandarine	.10	number	-
68	Ugly fruit	.25	lb.	-
69	Lettuce	1.75	lb.	-
70	Christophine	1.14	lb.	-

Crop code	Crop name	Unit price	Unit of Measure	Condition of measure
71	Golden apple	.05	number	-
72	String beans	1.30	lb.	-
73	Sapodilla	.20	number	-
74	Sweet pepper	1.20	lb.	-
75	Chive, thyme	2.80	lb.	-
76	Coffee	.80	lb.	-
77	Sour sop	1.60	lb.	-
78	Eddoes	.50	lb.	-
80	Cucumbers	.45	lb.	-
81	Cloves	6.50	lb.	-
82	Pumpkin	.90	lb.	-
83	Celery	.29	lb.	-

Notes:

Prices for export crops reported by commodity associations. Includes expected bonus where applicable. Domestic food crop prices computed from weekly lists of prices in St. Georges market estimated by the Ministry of Agriculture. Following notes refer to crop codes.

- 1 Nutmeg prices include amount paid on delivery to collecting stations (.40) plus amount expected as bonus. Bonus estimated on bonus to delivery ratio paid in June 1978.
- 2 Mace price includes first (1.09) and bonus (.52) payments. Average grade.
- 3 Cocoa price includes first (.47) and bonus (.41) payments. Advance paid July-September was .42; october to December, .50. Estimate two thirds of six month delivery in October-December. Wet to dry, divide by 2.5.
- 5 Banana price .14 per pound, assume 30 pounds per bunch.
- 9 Orange for household 3/1/217. Number harvested divided by 10, price multiplied by 10.
- 10 Cassava converted to flour yields 16 percent, flour sells at 1.30 per pound.
- 54 Price \$40 per ton.
- 55 1 fruit = 1 lb.
- 56 1 fruit = 1/3 lb.
- 65 1 fruit = 2/3 lb.
- 66 1 fruit = 1/15 lb.
- 67 1 fruit = 1/4 lb.
- 68 1 fruit = 1/2 lb.
- 71 1 fruit = 1/2 lb.
- 73 1 fruit = 1/2 lb.

## Summary Data Tabulations

These summary tables are presented in six sections: (1) Land size, tenure and use, (2) family size, dependency index, operator age, and education, (3) value of crop production and sales, (4) farm input expenses and efficiency, (5) household hours of work, and (6) source and level of household income. Results shown in the text tables have been slightly revised in several cases from the preliminary results shown in these summary tables.

Each section presents on separate tables data by credit characteristics, household characteristics, measures of input efficiency, occupation characteristics, and farm characteristics. Credit from producer associations is not included in data on credit characteristics. Input efficiency ratios refer to ratios of input cost to output value. Occupation characteristics include definition of operator types by hours of work on-farm and off-farm per week. Types are defined as follows:

Operator type	Hours of work per week on-farm	Hours of work per week off-farm
double job	more than 15	more than 15
mostly off-farm	less than 15	more than 15
mostly on-farm	more than 15	less than 15
under-employed	less than 15	less than 15

Land Size, Tenure, and Use by  
Credit Characteristics

Credit characteristics	Number of farms	Acres owned	Acres rented in	Acres rented out	Other acres	Total acres	Acres in crops	Acres idle
Source of loan								
friends, neighbors	10	2.1	.7	--	.2	3.0	2.6	.3
shopkeeper	76	2.0	.8	--	.2	3.0	2.4	.4
commercial bank	18	4.6	.9	--	.9	6.5	4.8	1.4
government bank	5	2.3	3.8	--	--	6.1	5.2	.8
Purpose of loan								
purchase of land	9	1.8	1.2	--	.1	3.2	2.9	.2
labor hire	2	2.4	9.8	--	.5	12.6	11.2	1.0
other farm inputs	6	2.2	.7	--	.4	2.9	2.5	.2
non-farm inputs	87	2.6	.8	--	--	3.7	2.8	.7
Monthly payments								
none	63	4.5	1.0	.2	.6	5.9	3.8	1.8
1 to 99	66	2.2	.9	--	.3	3.2	2.6	.5
100 to 299	20	1.7	.5	--	.1	2.3	1.9	.2
300 and over	8	7.3	.3	--	1.9	9.6	6.4	2.9
All households	157	3.3	.9	.1	.5	4.5	3.1	1.1

Table 1.1

Land Size, Tenure, and Use by Household Characteristics

Household characteristics	Number of farms	Acres owned	Acres rented in	Acres rented out	Other acres	Total acres	Acres in crops	Acres idle
Age of operator								
less than 30	12	2.8	.2	-	-	3.1	1.6	1.3
30 to 60	94	3.0	1.0	-	.4	4.4	3.3	.8
more than 30	51	4.1	.7	.2	.6	5.1	3.2	1.5
Family size								
less than 4	51	4.8	.7	-	.4	6.0	4.1	1.5
4 to 8	73	3.0	.9	.1	.5	4.1	2.7	1.2
more than 8	33	1.7	.9	-	.5	3.2	2.6	.3
Area								
Willis	34	1.9	.4	-	.2	2.4	2.0	.3
Upper Capital	48	3.0	.4	.2	.3	3.5	2.7	.7
Grand Roy	75	4.2	1.3	-	.7	6.1	4.0	1.7
All households	157	3.3	.9	.1	.5	4.5	3.1	1.1

Table 1.2

Land Size, Tenure, and Use by  
Measures of Input Efficiency

Measures of efficiency	Number of farms	Acres owned	Acres rented in	Acres rented out	Other acres	Total acres	Acres in crops	Acres idle
Input ratio								
.0 to .24	130	3.3	.8	-	.5	4.6	3.2	1.0
.25 to .49	17	4.6	1.1	.5	.1	5.3	3.2	1.8
.50 to .74	5	.9	.5	-	.1	1.5	1.4	-
.75 to 1.0	5	1.0	1.0	-	.1	2.9	1.9	.9
Labor ratio								
.0 to .24	130	2.7	.9	-	.4	3.9	2.9	.7
.25 to .49	21	7.8	.5	.5	.9	8.7	4.9	3.5
.50 to .74	5	1.2	1.7	-	.8	3.7	3.0	.6
.75 to 1.0	1	.1	.5	-	.5	1.1	1.0	-
All households	157	3.3	.9	.1	.5	4.5	3.1	1.1

Table 1.3

Land Size, Tenure, and Use by  
Occupation Characteristics

Occupation characteristics	Number of farms	Acres owned	Acres rented in	Acres rented out	Other acres	Total acres	Acres in crops	Acres idle
Operator work								
double job	31	1.5	.8	-	.3	2.7	2.1	.4
mostly off-farm	21	4.0	.3	.6	.1	4.7	2.8	1.6
mostly on-farm	83	3.7	.2	-	.6	5.5	3.8	1.2
under-employed	22	3.0	-	-	.5	3.5	2.4	1.0
Rest of household, on-farm								
less than 9 hrs/wk	77	3.1	.6	-	.7	4.4	2.8	1.3
10 to 49 hrs/wk	65	3.0	.8	-	.3	4.3	3.1	.7
50 to 99 hrs/wk	14	5.4	2.2	.6	.1	7.1	5.1	1.9
more than 100 hrs/wk	1	6.6	.5	-	-	7.0	6.3	.5
Rest of household, off-farm								
less than 9 hrs/wk	99	3.9	1.0	.1	.3	5.1	3.5	1.3
10 to 49 hrs/wk	44	2.2	.4	.1	.5	3.1	2.5	.3
50 to 99 hrs/wk	9	1.0	.4	-	-	1.8	1.7	.2
more than 100 hrs/wk	5	4.8	2.9	.2	3.0	10.6	4.6	5.4
All households	157	3.3	.9	.1	.5	4.5	3.1	1.1

Table 1.4

Land Size, Tenure, and Use by  
Farm Characteristics

Farm characteristics	Number of farms	Acres owned	Acres rented in	Acres rented out	Other acres	Total acres	Acres in crops	Acres idle
<b>Farm size</b>								
1 to 1.9	54	1.0	.3	-	.1	1.3	1.1	.2
2 to 4.9	74	2.2	.5	-	.3	3.0	2.3	.4
5 to 24.9	25	4.9	3.2	-	.6	8.6	6.3	1.8
25 and over	4	45.0		2.0	7.5	50.5	27.1	21.7
<b>Export share</b>								
.00 to .33	43	1.7	1.1	-	.2	2.9	2.3	.5
.34 to .66	63	2.1	.9	-	.2	3.1	2.4	.4
.67 to 1.	51	6.2	.6	.2	1.0	7.6	4.8	2.4
<b>Input expense</b>								
0 to 99	34	1.8	.4	.1	.1	2.2	1.4	.6
100 to 199	25	2.0	.5	-	.3	2.8	1.5	.9
200 to 499	49	2.3	.9	.1	.6	3.7	2.6	.9
500 and over	48	6.1	1.3	.2	.7	7.9	5.7	1.7
<b>Hired labor</b>								
less than 99	68	1.7	.5	-	.2	2.4	1.7	.5
100 to 199	22	2.1	.4	-	.1	2.5	1.8	.5
200 to 499	31	2.4	.4	-	.9	3.6	2.2	1.2
500 and over	36	7.9	2.1	.3	.9	10.6	7.5	2.5
<b>All households</b>	<b>157</b>	<b>3.3</b>	<b>.9</b>	<b>.1</b>	<b>.5</b>	<b>4.5</b>	<b>3.1</b>	<b>1.1</b>

Table 1.5

Family Size, Dependency Index, and Operator Age and Education by  
Credit Characteristics

Credit characteristics	Number of farms	Average age of operator	Average education of operator	Average size of household	Average dependency index
Source of loans					
friends, neighbors	10	56	4.9	4.8	.35
shopkeeper	76	51	4.9	5.8	.41
commercial bank	18	48	5.7	5.5	.42
government bank	5	59	4.8	6.0	.50
Purpose of loans					
land purchase	9	51	4.2	6.6	.47
labor hire	2	54	5.5	7.5	.25
other inputs	6	49	5.3	4.8	.51
non-farm inputs	87	52	5.0	5.5	.39
Monthly payments					
none	63	55	4.9	4.6	.34
1 to 99	66	52	4.6	5.1	.41
100 to 299	20	50	5.6	7.0	.38
300 and over	8	49	6.9	5.5	.38
All households	157	53	5.0	5.2	.37

Table 2.1

Family Size, Dependency Index, and Operator Age and Education by  
Household Characteristics

Household characteristics	Number of farms	Average age of operator	Average education of operator	Average size of household	Average dependency index
Age of operator					
less than 30	12	25	6.9	4.1	.28
30 to 60	94	48	4.9	5.7	.33
more than 30	51	69	4.7	6.4	.60
Family size					
less than 4	51	54	5.4	2.2	.29
4 to 8	73	56	4.8	5.2	.38
more than 8	33	50	4.7	9.6	.51
Area					
Willis	34	52	4.9	6.6	.66
Upper Capital	48	55	4.7	5.5	.36
Grand Roy	75	52	5.2	4.3	.37
All households	157	53	5.0	5.2	.37

Table 2.2

Family Size, Dependency Index, and Operator Age and Education by  
Measures of Input Efficiency

Measures of Efficiency	Number of farms	Average age of operator	Average education of operator	Average size of household	Average dependency index
Input ratio	130	54	4.9	5.1	.37
.0 to .24					.40
.25 to .49	17	66	5.3	5.2	.58
.50 to .74	5	53	3.2	6.6	.33
.75 to 1.0	5	51	5.8	4.8	
Labor ratio	130	52	6.9	5.3	.35
.0 to .24					.50
.25 to .49	21	60	5.6	4.1	.65
.50 to .74	5	63	6.8	5.2	-
.75 to 1.0	1	60	7.0	1.0	
All households	157	53	5.0	5.2	.37

Table 2.3

Family Size, Dependency Index, and Operator Age and Education by  
Occupation Characteristics

Occupation characteristics	Number of farms	Average age of operator	Average education of operator	Average size of household	Average dependency index
Operator work	1				
Double job	31	47	4.9	6.0	.45
Mostly off-farm	21	48	5.7	4.7	.30
Mostly on-farm	82	54	4.8	5.0	.34
under-employed	22	63	4.8	4.8	.49
Rest of household, on-farm					
less than 9 hrs/wk	77	53	5.2	4.3	.39
10 to 49 hrs/wk	65	53	4.8	5.6	.36
50 to 99 hrs/wk	14	53	4.4	7.6	.34
more than 100 hrs/wk	1	55	2.0	10.0	.50
Rest of household, off-farm					
less than 9 hrs/wk	99	54	5.2	4.5	.39
10 to 49 hrs/wk	44	52	4.6	5.8	.36
50 to 99 hrs/wk	9	49	4.6	7.3	.28
more than 100 hrs/wk	5	57	4.2	9.0	.37
All households	157	53	5.0	5.2	.37

Table 2.4

Family Size, Dependency Index, and Operator Age and Education by  
Farm Characteristics

Farm characteristics	Number of farms	Average age of operator	Average education of operator	Average size of household	Average dependency index
<b>Farm size</b>					
1 to 1.9	54	52	4.7	5.4	.41
2 to 4.9	74	51	5.0	5.1	.37
5 to 24.9	25	50	4.8	4.9	.35
25 and over	4	60	7.5	3.5	.06
<b>Export share</b>					
.00 to .33	43	47	5.1	5.7	.36
.34 to .66	63	52	5.0	5.2	.36
.67 to 1.	51	58	4.8	4.6	.41
<b>Input expense</b>					
0 to 99	34	53	5.3	4.7	.42
100 to 199	25	54	4.6	5.0	.45
200 to 499	49	51	4.9	5.1	.36
500 and over	48	53	4.9	5.7	.33
<b>Labor expense</b>					
0 to 99	68	51	4.8	5.4	.37
100 to 199	22	51	5.0	4.9	.33
200 to 499	31	53	4.7	5.1	.46
500 and over	36	58	5.4	4.8	.36
<b>All households</b>	<b>157</b>	<b>53</b>	<b>5.0</b>	<b>5.2</b>	<b>.37</b>

Value of Crop Production and Sales by  
Credit Characteristics

Credit characteristics	Number of farms	Nutmeg and mace	Cocoa	Banana	Other	Total crop sales	Total crop value
Source of loan							
Friends, neighbors	10	773	231	548	982	2535	3606
shopkeeper	76	1011	324	430	788	2552	3507
commercial bank	18	1713	368	388	1088	3557	4636
government bank	5	1896	889	638	4850	8073	10039
Purpose of loan							
purchase of land	9	1747	345	588	1009	3689	5011
labor hire	2	3782	1449	285	13704	19220	24097
farm inputs	6	518	319	1913	836	2686	3702
non-farm inputs	87	1103	341	406	783	2631	3573
Monthly payments							
none	63	1528	800	392	924	3645	4519
1 to 99	66	847	258	365	722	2193	3087
100 to 299	20	1018	443	694	870	3026	4124
300 and over	8	2999	609	553	812	4972	5864
All households	157	1252	517	427	826	3023	3935

Table 3.1

Value of Crop Production and Sales by  
Household Characteristics

Household characteristics	Number of Farms	Nutmeg and mace	Cocoa	Banana	Other	Total crop sales	Total crop value
Age of operator							
less than 30	12	394	126	69	489	1078	1730
30 to 60	94	1140	603	556	1065	3363	4381
more than 30	51	1660	451	275	468	2854	3633
Family size							
less than 4	51	1676	924	349	763	3711	4535
4 to 8	73	967	357	374	808	2507	3395
more than 8	33	1227	243	666	966	3102	4203
Area							
Willis	34	328	199	348	1523	2400	3677
Upper Capital	48	1516	403	987	107	3013	3665
Grand Roy	75	1502	736	105	971	3312	4225
<b>All households</b>	<b>157</b>	<b>1252</b>	<b>517</b>	<b>627</b>	<b>826</b>	<b>3023</b>	<b>3935</b>

Table 3.2

Value of Crop Production and Sales by  
Measures of Input Efficiency

Measures of input efficiency	Number of farms	Nutmeg and mace	Cocoa	Banana	Other	Total crop sales	Total crop value
Input ratio							
.0 to .24	130	1348	261	440	941	3321	4315
.25 to .49	17	1132	69	439	305	2130	2711
.50 to .74	5	227	114	281	249	826	1305
.75 to 1.0	5	188	0	0	196	498	834
Labor ratio							
.0 to .24	130	1219	532	437	959	3147	4132
.25 to .49	21	1661	552	405	202	2819	3344
.50 to .74	5	648	78	354	186	1265	2087
.75 to 1.0	1	0	0	0	67	67	67
All households	157	1252	517	427	826	3023	3935

Table 3.3

Value of Crop Production and Sales by  
Occupation Characteristics

Occupation characteristics	Number of farms	Nutmeg and mace	Cocoa	Banana	Other	Total crop sales	Total crop value
Operator work							
double job	31	569	257	349	1039	2213	3263
mostly off-farm	21	1095	322	281	495	2193	2954
mostly on-farm	83	1597	723	499	983	3802	4767
under-employed	22	1060	295	409	255	2018	2759
Rest of household, on-farm							
less than 9 hrs/wk	77	1085	315	321	542	2262	3011
10 to 49 hrs/wk	65	1243	717	434	757	3151	4067
50 to 99 hrs/wk	14	2013	615	626	2777	6030	7716
100 hrs/wk and over	1	4083	1715	5395	13	11206	13623
Rest of household, off-farm							
less than 9 hrs/wk	99	1432	637	354	868	3291	4145
10 to 49 hrs/wk	44	1057	240	590	714	2601	3629
50 to 99 hrs/wk	9	641	336	344	1013	2335	3364
more than 100 hrs/wk	5	501	908	608	666	2683	3493
All households	157	1252	517	427	826	3023	3935

Table 3.4

Value of Crop Production and Sales by  
Farm Characteristics

Farm characteristics	Number of farms	Number of nutmeg and mace	Cocoa	Banana	Other	Total crop sales	Total crop value
Farm size							
1 to 1.9	54	398	112	359	426	1295	1977
2 to 4.9	74	787	315	443	868	2414	3315
5 to 24.9	25	2984	817	552	1608	5961	7341
25 and over	4	10553	7830	290	581	19253	20556
Input expense							
0 to 99	34	367	102	38	217	725	1423
100 to 199	25	319	205	186	618	1329	1986
200 to 499	49	802	275	417	938	2433	3369
500 and over	48	2785	1223	849	1246	6103	7277
Labor expense							
0 to 99	68	566	171	352	358	1448	2125
100 to 199	22	538	262	225	389	1393	2186
200 to 499	31	645	258	438	1280	2622	3655
500 and over	36	3506	1562	683	1590	7340	8666
All households	157	1252	517	627	826	3023	3935

Table 3.5

Farm Input Expenses and Efficiency by  
Credit Characteristics

Credit characteristics	Number of farms	Input expenses (K\$)		Output per unit of input (EC\$)		Gross per acre	net per acre
		labor dollars per acre	fertilizer dollars per acre	labor dollar	fertilizer dollar		
Source of loans							
Friends, neighbors	10	73	78	22	20	1171	989
shopkeeper	76	103	115	14	19	1438	1164
commercial bank	18	152	136	9	60	1475	1127
government bank	5	142	125	68	15	1355	1064
Purpose of loans							
land purchase	9	241	137	12	98	1973	1547
labor hire	2	229	84	10	30	2311	1963
other inputs	6	65	232	58	15	1623	1290
non-farm inputs	87	101	110	15	19	1368	1100
Monthly payments							
none	63	76	78	15	24	946	752
1 to 99	66	86	95	16	31	1186	972
100 to 299	20	188	164	9	14	1997	1581
300 and over	8	104	103	7	24	1490	1082
All households	157	96	97	15	26	1208	967

Table 4.1

Farm Input Expenses and Efficiency by Household Characteristics

Household characteristics	Number of farms	Input expenses (EC\$)		Output per unit of input (EC\$)			Gross per acre	net per acre
		Labor dollars per acre	fertilizer dollars per acre	Labor dollar	fertilizer dollar	total dollar		
Age of operator								
less than 30	12	26	39	13	42	35	590	670
30 to 60	94	112	114	11	26	12	1385	1103
more than 60	51	84	79	21	22	11	1028	833
Family size								
less than 4	51	95	66	16	30	18	1065	903
4 to 8	73	92	123	16	26	7	1147	875
more than 8	33	106	87	8	20	22	1564	1060
Area								
Willis	34	113	96	17	48	10	1893	1598
Upper Capital	48	99	158	19	13	6	1319	1004
Grand Roy	75	86	59	11	25	20	826	657
All households	157	96	97	15	26	14	1208	967

Table 4.2

Farm Input Expenses and Efficiency by  
Occupation Characteristics

Occupation characteristics	Number of farms	Input expenses (EC\$)		Output per unit of input (EC\$)		gross per acre	net per acre
		Labor dollars per acre	fertilizer dollars per acre	Labor dollar	fertilizer dollar		
Operator work							
double job	31	119	112	12	19	1509	1212
mostly off-farm	21	105	94	12	18	900	687
mostly on-farm	83	84	86	18	32	1199	994
under-employed	22	90	117	11	24	911	730
Rest of household, on-farm							
less than 10 hrs/wk	77	81	82	13	33	1019	822
10 to 49 hrs/wk	65	104	1052	18	19	1271	1022
50 to 99 hrs/wk	14	141	136	10	20	1899	1463
over 100 hrs/wk	1	110	240	18	8	1972	1612
Rest of household, off-farm							
less than 10 hrs/wk	99	94	90	16	22	1101	867
10 to 49 hrs/wk	44	108	116	11	38	1353	1094
50 to 99 hrs/wk	9	77	103	21	18	1877	1628
over 100 hrs/wk	5	59	54	3	10	843	633
All households	157	96	97	15	26	1208	967

Table 4.4

Farm Input Expenses and Efficiency by  
Farm Characteristics

Farm characteristics	Number of farms	Input expenses (EC\$)		Output per unit of input (EC\$)		gross per acre	net per acre
		Labor dollars per acre	Fertilizer dollars per acre	Labor dollar	Fertilizer dollar		
Farm size							
1 to 1.9	54	96	135	12	29	1692	1198
2 to 4.9	74	97	86	18	26	1187	956
5 to 24.9	25	94	58	11	22	797	622
25 and over	4	89	25	4	36	339	218
Export share							
.00 to .33	43	110	95	18	40	1779	1518
.34 to .66	63	72	99	15	23	1076	856
.67 to 1.00	51	114	97	10	19	890	660
Input expense I/							
0 to 99	34	37	27	16	36	791	720
100 to 199	25	47	61	22	47	987	868
200 to 499	49	120	103	15	17	1323	1052
500 and over	48	140	161	10	17	1508	1108
Hired labor expense							
0 to 99	69	6	88	20	24	1022	886
100 to 199	22	78	100	15	13	953	732
200 to 499	31	172	126	12	66	1748	1371
500 and over	35	217	88	7	20	1258	917
All households	157	96	97	15	26	14	1208

Table 4.5

I/ Includes labor fertilizer and other expenses but excludes land.

Household Hours of Work per Week by  
Credit Characteristics

Credit characteristics	Number of farms	Operator		Rest of household		Total household	
		on-farm	off-farm	on-farm	off-farm	on-farm	off-farm
Source of loans							
friends, neighbors	10	22	17	23	8	65	25
shopkeeper	76	24	17	20	20	66	37
commercial bank	18	25	26	19	16	66	39
government bank	5	19	16	36	0	53	16
Purpose of loans							
land purchase	9	29	18	38	18	67	36
labor hire	2	19	26	86	7	103	31
other inputs	6	29	17	12	9	61	26
non-farm inputs	87	23	17	19	18	62	35
Monthly payments							
none	63	23	11	17	17	60	28
1 to 99	66	25	12	16	16	39	28
100 to 299	20	20	26	30	28	50	52
300 and over	8	25	37	29	12	56	69
All households	157	24	15	39	17	60	31

Table 5.1

Household Hours of Work per Week by  
Household Characteristics

Household characteristics	Number of farms		Operator		Rest of household		Total household	
	of farms	total	on-farm	off-farm	on-farm	off-farm	on-farm	total
Age of operator								
less than 30	12	37	18	6	16	22	25	34
30 to 60	94	65	18	22	20	63	49	38
more than 60	51	28	8	12	14	26	32	22
Family size								
less than 4	51	33	10	9	9	18	32	18
4 to 8	73	60	16	17	17	36	41	33
more than 8	33	42	18	35	32	67	59	51
Area								
Willis	36	49	26	28	27	55	53	51
Upper Capital	68	37	13	20	14	35	44	27
Grand Roy	75	36	11	12	15	28	35	26
All households	157	39	15	18	17	35	60	31
								71

Table 5.2

Household Hours of Work per Week by  
Measures of Input Efficiency

Measures of input efficiency	Number of farms	Operator		Rest of household		Total household				
		on- farm	off- farm	on- farm	off- farm	on- farm	off- farm	total		
Input ratio										
.0 to .24	130	25	14	39	17	19	36	42	33	75
.25 to .49	17	21	21	42	23	9	32	44	30	74
.50 to .74	5	20	10	30	39	23	62	59	33	92
.75 to 1.0	5	18	24	42	19	2	21	37	25	62
Labor ratio										
.0 to .24	130	25	14	39	18	19	37	43	34	77
.25 to .49	21	18	17	35	13	9	22	31	26	57
.50 to .74	5	23	24	48	41	15	55	64	39	103
.75 to 1.0	1	2	28	30	0	0	0	2	28	30
All households	157	24	15	39	18	17	35	40	31	71

Table 5.3





Reference Week Hours by  
Occupation Characteristics

Occupation characteristics	Number of farms	Wet season		Dry season		Total
		on-farm	off-farm	On-farm	Off-farm	
Operator work						
double job	31	31	36	20	33	53
mostly off-farm	21	10	46	15	50	65
mostly on-farm	83	29	9	28	7	35
under-employed	22	15	3	23	5	28
Rest of household, on-farm						
less than 9 hrs/wk	77	22	17	24	14	38
10 to 49 hrs/wk	65	25	21	21	23	44
50 to 99 hrs/wk	14	27	20	28	14	62
over 100 hrs/wk	1	48	10	30	15	65
Rest of household, off-farm						
less than 9 hrs/wk	99	21	18	24	16	60
10 to 49 hrs/wk	64	28	18	22	23	45
50 to 99 hrs/wk	9	30	27	24	18	62
over 100 hrs/wk	5	16	30	30	11	41
All households	157	24	18	23	18	61

Table 6.1

Reference Week Hours by  
Farm Characteristics

Farm	Number of farms	Wet season		Dry season		Total
		on-farm	off-farm	On-farm	Off-farm	
Farm size						
1 to 1.9	54	22	20	20	19	39
2 to 4.9	74	25	19	24	20	44
5 to 24.9	25	24	10	28	12	40
25 and over	4	17	20	31	6	37
Export share						
.00 to .33	43	28	18	27	17	44
.34 to .66	63	24	21	20	20	40
.67 to 1.	51	20	13	23	16	39
Input expense						
0 to 99	34	24	15	19	13	32
100 to 199	25	23	8	20	8	28
200 to 499	49	23	22	25	25	50
500 and over	48	26	22	28	20	48
Labor expense						
0 to 99	68	25	15	23	22	45
100 to 199	22	21	24	20	24	44
200 to 499	31	21	22	25	32	57
500 and over	36	26	18	27	18	45
All households	157	24	18	23	18	41

Table 6.2

Source and Level of Household Income by  
Credit Characteristics

Credit characteristics	Number of farms	Source of household income			Total household income
		off-farm work of operator	off-farm work of rest of household	non-earnings income	
Source of loans					
friends, neighbors	10	1389	559	658	2614
shopkeeper	76	1621	633	580	2627
commercial bank	18	2161	584	986	3624
government bank	5	2405		602	8079
purpose of loans					
land purchase	9	2015	529	26	3738
labor hire	2	1428	476	1363	19235
other inputs	6	2405	803	900	2706
non-farm inputs	87	1632	609	675	2710
Monthly payments					
none	63	912	627	648	3729
1 to 99	66	899	564	682	2277
100 to 299	20	3327	891	270	3062
300 and over	8	3929	271	1268	5054
All households	157	1368	616	646	3101

Table 7.1

Source and Level of Household Income by  
Household Characteristics

Household characteristics	Number of farms	Source of household income			Total household income
		off-farm work of operator	off-farm work of rest of household	non-earnings income	
Age of operator					
less than 30	12	614	253	726	1163
30 to 60	94	1771	714	397	3435
more than 60	51	802	522	1085	2942
Family size					
less than 4	51	1424	263	914	3825
4 to 8	73	1216	603	586	2574
more than 8	33	1619	1190	365	3148
Area					
Willis	34	2435	777	603	2464
Upper Capital	48	1463	683	466	3050
Grand Roy	75	824	500	780	3423
All households	157	1368	616	646	3101

Table 7.2

Source and Level of Household Income by  
Measures of Input Efficiency

Measures of efficiency	Number of farms	Source of household income			Total household income
		off-farm work of operator	off-farm work of rest of household	non-earnings income farm sales	
Input ratio					
.0 to .24	130	1364	664	3393	6040
.25 to .49	17	1106	282	2228	4561
.50 to .74	5	3384	762	981	5487
.75 to 1.0	5	338	378	601	1760
Labor ratio					
.0 to .24	130	1250	675	3219	5771
.25 to .49	21	1751	95	2918	5621
.50 to .74	5	3099	1406	1342	6135
.75 to 1.0	1			367	367
All households	157	1368	616	3101	5726

Table 7.3

Source and Level of Household Income by  
Occupation Characteristics

Occupation characteristics	Number of farms	Source of household income			Total household income
		off-farm work of operator	off-farm work of rest of household	non-earnings income	
Operator work					
double job	31	2495	543	397	5713
mostly off-farm	21	3631	734	685	7123
mostly on-farm	83	667	547	689	5773
under-employed	22	265	869	985	4210
Rest of household, on-farm					
less than 9 hrs/wk	77	1035	359	847	4592
10 to 49 hrs/wk	65	1260	738	493	5693
50 to 99 hrs/wk	14	3529	1244	295	11173
more than 100 hrs/wk	1	3772	3772	-	18861
Rest of household, off-farm					
less than 9 hrs/wk	99	1471	85	758	5681
10 to 49 hrs/wk	44	1180	1197	368	5404
50 to 99 hrs/wk	9	1569	1549	718	6237
more than 100 hrs/wk	5	626	4350	735	8516
All households	157	1368	616	646	5726

Table 7.4

Source and Level of Household Income by  
Farm Characteristics

Farm characteristics	Number of farms	Source of household income			Total household income
		off-farm work of operator	off-farm work of rest of household	non-earnings income	
Farm size					
1 to 1.9	54	1017	449	593	3401
2 to 4.9	74	1359	673	571	5080
5 to 24.9	25	1590	834	1018	9565
25 and over	4	4905	469	411	25176
Export share					
.00 to .33	43	1470	778	610	6138
.34 to .66	63	1357	651	428	4576
.67 to 1.	51	1297	438	945	6798
Input expense					
0 to 99	34	337	394	501	2029
100 to 199	25	233	202	433	2228
200 to 499	49	1886	677	571	5619
500 and over	48	2189	908	913	10229
Labor expense					
0 to 99	68	619	545	344	3015
100 to 199	22	825	672	249	3219
200 to 499	31	1914	633	1122	6353
500 and over	36	2644	702	1049	11837
All households	157	1368	616	646	5726

Control Number: ( 1 ) \_\_\_\_\_

Interviewer's Number: ( 2 ) \_\_\_\_\_

Interviewer's Name: \_\_\_\_\_

First Respondent: \_\_\_\_\_

Second Respondent: \_\_\_\_\_

RECORD OF PERSONAL VISITS

<u>DATE</u>	<u>TIME STARTED</u>	<u>TIME FINISHED</u>	<u>TOTAL MINUTES</u>
1. _____	<input type="checkbox"/> am <input type="checkbox"/> pm	<input type="checkbox"/> am <input type="checkbox"/> pm	( 3 ) _____
2. _____	<input type="checkbox"/> am <input type="checkbox"/> pm	<input type="checkbox"/> am <input type="checkbox"/> pm	
3. _____	<input type="checkbox"/> am <input type="checkbox"/> pm	<input type="checkbox"/> am <input type="checkbox"/> pm	
4. _____	<input type="checkbox"/> am <input type="checkbox"/> pm	<input type="checkbox"/> am <input type="checkbox"/> pm	

If the unit is a non-interview, mark which reason:

- ( 4 ) 1.  Unit occupied but no one can be found at home.
2.  Unit occupied but household members are temporarily absent.
3.  Unit occupied but household members refused to be interviewed.
4.  Unit occupied but did not interview for some other reason. Specify:  
\_\_\_\_\_
5.  The unit is vacant (no one lives here).
6.  The unit is used for something other than a dwelling. Specify use:  
\_\_\_\_\_
7.  Unit is condemned, demolished, moved, not found, etc. Specify:  
\_\_\_\_\_

OFFICE USE ONLY: ( 5 )  
( 6 )  
( 7 )

SECTION 1: FAMILY AND FARM CHARACTERISTICS

1. About six months ago an interviewer asked you a number of questions about your household and your farm.

Has there been any change since then in the number of persons in the household?

( 8) 1  No -- if no, skip to question 2

2  Yes -- if yes, list persons, their age, sex, standard in school, type of job, and if the change is an addition or deletion

(name)	(age)	(sex)	(school)	(work)	(add or delete)
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

2. Has there been any change since January in the amount of land you manage for someone else or share with another household?

( 9) 1  No -- if no, skip to question 3

2  Yes -- if yes, ask: How much land do you presently share with another household?

\_\_\_\_\_ acres

Altogether, how much land is managed for someone else by this household?

\_\_\_\_\_ acres

3. Has the amount of land controlled by this household alone changed since January?

( 10) 1  No -- if no, skip to question 4

2  Yes -- if yes, ask: At present, how much land is owned by members of this household?

\_\_\_\_\_ acres

How much is rented?

\_\_\_\_\_ acres

Do you control any other land which you have not mentioned yet? How much?

\_\_\_\_\_ acres

This means that the total land controlled by this household is \_\_\_\_\_ acres. Is that correct?

4. Has the amount of land which you use for crops, grazing, or for a housepot changed since January?

( 11) 1  No -- if no, skip to the next section

2  Yes -- if yes, ask: At present, how much land do you have in crops?

\_\_\_\_\_ acres

How much do you use for grazing?

\_\_\_\_\_ acres

How much do you use for your housepot?

\_\_\_\_\_ acres

How much is idle?

\_\_\_\_\_ acres

(Note total acreage in question 3 and question 4 must be the same.)

\_\_\_\_\_ total acres

OFFICE USE ONLY: ( 12)

( 13)

( 14)

( 15)

( 16)

SECTION II: LIVESTOCK AND CROPS

INTERVIEWER: READ: In this section I am interested in the crops, livestock, and poultry raised by anyone in your household during the six months from January through June.

CATTLE

1. a. Did anyone in your household keep any cows or cattle in the six months from January through June?
  - ( 17) 1  No -- if no, skip to question 3
  - 2  Yes -- if yes, continue
- b. How many cows or cattle did your household have at the end of June?
  - ( 18) \_\_\_\_\_ number of cattle
- c. How many cows or cattle did you sell from January through June? (Pause.) How much in total did you get for them?
  - ( 19) \_\_\_\_\_ number of cattle sold
  - ( 20) \_\_\_\_\_ dollars
- d. How many cows or cattle did you buy? (Pause.) How much in total did you pay for them?
  - ( 21) \_\_\_\_\_ number of cattle bought
  - ( 22) \_\_\_\_\_ dollars
- e. How many cows or cattle were killed for eating in your home?
  - ( 23) \_\_\_\_\_ number of cattle killed
2. a. Did you milk any cows since January?
  - ( 24) 1  No -- if no, skip to question 3
  - 2  Yes -- if yes, continue
- b. How many weeks did you milk from January through June?
  - ( 25) \_\_\_\_\_ number of weeks
- c. How many bottles (26 oz.) of milk did you sell per week? (Pause.) How much per bottle did you get for the milk sold?
  - ( 26) \_\_\_\_\_ bottles sold per week
  - ( 27) \_\_\_\_\_ price per bottle
- d. How many bottles of milk from your own cows did you use in the home each week?
  - ( 28) \_\_\_\_\_ number of bottles

SHEEP, GOATS

3. a. Did your household keep any sheep or goats in the six months from January through June?
  - ( 29) 1  No -- if no, skip to question 4
  - 2  Yes -- if yes, continue
- b. How many goats and sheep of all ages did you have at the end of June?
  - ( 30) \_\_\_\_\_ number of animals
- c. How many did you sell from January through June? (Pause.) How much in total did you get for them?
  - ( 31) \_\_\_\_\_ number of animals sold
  - ( 32) \_\_\_\_\_ dollars
- d. How many did you buy? (Pause.) How much did you pay for them?
  - ( 33) \_\_\_\_\_ number of animals bought
  - ( 34) \_\_\_\_\_ dollars
- e. How many of your own sheep and goats were killed for eating in the home?
  - ( 35) \_\_\_\_\_ number of animals killed

Pigs

2. a. Did your household keep any pigs in the six months from January through June?  
( 37) 1  No -- if no, skip to question 5  
2  Yes -- if yes, continue
- b. How many pigs of all ages did you have at the end of June?  
( 38) \_\_\_\_\_ number of pigs
- c. How many pigs did you sell from January through June? (Pause.) How much in total did you get for the pigs you sold?  
( 39) \_\_\_\_\_ number of pigs sold  
( 39) \_\_\_\_\_ dollars
- d. How many pigs did you buy? (Pause.) How much did you pay for them?  
( 40) \_\_\_\_\_ number of pigs bought  
( 41) \_\_\_\_\_ dollars
- e. How many of your own pigs did you kill for eating at home?  
( 42) \_\_\_\_\_ number of pigs

FOWLS, CHICKENS, BROILERS

3. a. Did anyone in your household keep any fowls, chickens, or broilers in the six months from January through June?  
( 43) 1  No -- if no, skip to question 6  
2  Yes -- if yes, continue
- b. How many birds in all did you have at the end of June?  
( 44) \_\_\_\_\_ number of birds
- c. How many birds did you sell from January through June? (Pause.) How much in total did you get for the birds you sold?  
( 45) \_\_\_\_\_ number of birds sold  
( 46) \_\_\_\_\_ dollars
- d. How many birds did you buy? (Pause.) How much in total did you pay for the birds you bought?  
( 47) \_\_\_\_\_ number of birds bought  
( 48) \_\_\_\_\_ dollars
- e. How many birds did you kill for eating by your household?  
( 49) \_\_\_\_\_ number of birds killed
- f. Did you collect any eggs from your own flock?  
( 50) 1  No -- if no, skip to question 6  
2  Yes -- if yes, continue
- g. About how many eggs from your flock do you sell each week? (Pause.) How much do you get for the eggs you sell?  
( 51) \_\_\_\_\_ number of eggs per week  
( 52) \_\_\_\_\_ price per egg
- h. About how many eggs from your flock do you use in the home each week?  
( 53) \_\_\_\_\_ number of eggs

OTHER LIVESTOCK

6. a. Did your household keep any rabbits, donkeys, or any other animals on the farm in the six months from January through June?
- ( 54) 1  No -- if no, skip to question 7  
 2  Yes -- if yes, continue
- b. How many of each type did you have on your farm at the end of June?
- ( 55) \_\_\_\_\_ number of donkeys  
 ( 56) \_\_\_\_\_ number of rabbits  
 ( 57) \_\_\_\_\_ number of other animals -- Specify animal: \_\_\_\_\_
- c. How many of each type did you sell from January through June? (Pause.) How much in total did you pay for the animals you sold?
- ( 58) \_\_\_\_\_ number of donkeys                      ( 59) \_\_\_\_\_ dollars  
 ( 60) \_\_\_\_\_ number of rabbits                      ( 61) \_\_\_\_\_ dollars  
 ( 62) \_\_\_\_\_ number of other animals              ( 63) \_\_\_\_\_ dollars
- d. How many of each type did you buy? (Pause.) How much in total did you pay for the animals you bought?
- ( 64) \_\_\_\_\_ number of donkeys                      ( 65) \_\_\_\_\_ dollars  
 ( 66) \_\_\_\_\_ number of rabbits                      ( 67) \_\_\_\_\_ dollars  
 ( 68) \_\_\_\_\_ number of other animals              ( 69) \_\_\_\_\_ dollars
- e. How many of these animals were killed for eating in the home?
- ( 70) \_\_\_\_\_ number of rabbits  
 ( 71) \_\_\_\_\_ number of other animals

CROPS

7. Now I would like to ask you about the crops grown on land controlled directly by your household. I am interested here only in the six months from January 1 through June 30 of this year.

(INTERVIEWER: Read list of crops given in first column of following pages and check all crops grown on holdings of household members. Once all crops are listed, ask for details of production and distribution as indicated.)

OFFICE USE ONLY: ( 72)  
( 73)  
( 74)  
( 75)  
( 76)

<p>a. Did you or any other member of this household harvest any of the following crops during the six months from January 1 through June 30 of this year?</p> <p>(1) Tobacco <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>(2) Rice <input type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>b. How much (name crop) was harvested during January through June?</p> <p>(77) _____ pounds green nutmeg</p> <p>(78) _____ pounds dry maca</p> <p>(79) _____ pounds wet cocoa</p>	<p>c. How much of this amount was sold?</p> <p>(80) _____ cents per pound green</p> <p>(81) _____ cents per pound dry</p> <p>(82) _____ cents per pound wet</p>	<p>How much of this amount was sold?</p> <p>(83) _____ pounds green nutmeg</p> <p>(84) _____ NONE -- GO TO 8.</p> <p>(85) _____ pounds dry maca</p> <p>(86) _____ NONE -- GO TO 8.</p> <p>(87) _____ pounds wet cocoa</p> <p>(88) _____ NONE -- GO TO 8.</p>
<p>(3) Coconut <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>(4) Coconut <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>(5) Bananas <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>(6) Breadfruit <input type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>(90) _____ pounds wet cocoa</p> <p>(91) _____ NONE -- GO TO 8.</p> <p>(92) _____ nuts</p> <p>(93) _____ NONE -- GO TO 8.</p> <p>(94) _____ bunches</p> <p>(95) _____ number</p>	<p>(96) _____ cents per pound wet</p> <p>(97) _____ cents per nut</p> <p>(98) _____ cents per bunch</p> <p>(99) _____ cents per basket</p>	<p>(99) _____ pounds wet cocoa</p> <p>(100) _____ nuts</p> <p>(101) _____ bunches</p> <p>(102) _____ NONE -- GO TO 8.</p> <p>(103) _____ number</p>
<p>(104) _____ (105) _____ (106) _____ (107) _____</p> <p>(108) _____ (109) _____ (110) _____ (111) _____</p> <p>(112) _____ (113) _____ (114) _____ (115) _____</p>		<p>(116) _____ (117) _____ (118) _____ (119) _____</p> <p>(120) _____ (121) _____ (122) _____ (123) _____</p> <p>(124) _____ (125) _____ (126) _____ (127) _____</p>	

<p>a. Did you or any other member of this household harvest any of the following crops during the six months from January 1 through June 30 of this year?</p> <p>(7) Mango <input type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>b. How much of same crop was harvested during January through June?</p> <p>(115) number _____</p> <p><input type="checkbox"/> NONE -- Go to c.</p>	<p>c. How much did you receive for crop? (Specify for what you sold; received on price for what)</p> <p>(116) net total _____</p> <p>(117) cents per pound _____</p>	<p>d. How much was used as feed for this livestock?</p> <p>(118) number _____</p>	<p>e. How much was used for other purposes? (Specify purpose)</p> <p>(119) number _____</p>
<p>(8) I. no <input type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>(120) number _____</p>	<p>(122) net total _____</p> <p>(123) cents per line _____</p>	<p>(130) number _____</p> <p>(131) number _____</p>	<p>(132) number _____</p> <p>(133) pounds _____</p>
<p>(9) Other tree crops (Specify which tree crops included)</p> <p>(112) _____</p> <p>(119) _____</p>	<p>(127) number _____</p> <p>(136) number _____</p> <p><input type="checkbox"/> NONE -- Go to e.</p>	<p>(128) net total _____</p> <p>(129) cents per fruit _____</p> <p>(130) cents per fruit _____</p> <p>(131) cents per fruit _____</p> <p>(132) net total _____</p> <p>(133) cents per pound _____</p>	<p>(140) number _____</p> <p>(141) pounds _____</p> <p><input type="checkbox"/> NONE -- Go to e.</p>	<p>(142) net total _____</p> <p>(143) cents per pound _____</p> <p>(144) pounds _____</p>
<p>(10) Cassava <input type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>(147) pounds _____</p> <p><input type="checkbox"/> NONE -- Go to e.</p>	<p>(148) net total _____</p> <p>(149) cents per pound _____</p>	<p>(150) pounds _____</p>	<p>(151) pounds _____</p>
<p>(11) Cashew <input type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>(152) pounds _____</p> <p><input type="checkbox"/> NONE -- Go to e.</p>	<p>(154) net total _____</p> <p>(155) cents per pound _____</p>	<p>(156) pounds _____</p>	<p>(157) pounds _____</p>
<p>(12) Vans <input type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>(153) pounds _____</p> <p><input type="checkbox"/> NONE -- Go to e.</p>	<p>(154) net total _____</p> <p>(155) cents per pound _____</p>	<p>(156) pounds _____</p>	<p>(157) pounds _____</p>

a. Did you or any other member of this household harvest any of the following crops during the six months from January 1 through June 30 of this year?	b. How much (name crop) was harvested during June?	c. How much of this amount was sold?	d. How much did you receive for (specify crop) (received for sale you sold; (received for price per unit.)	e. How much was the total for this household?	f. How much was used for other purposes (specify purpose.)
(11) Other ground provisions (specify which crops included)	(163) pounds (171) pounds	(159) pounds (166) pounds (171) pounds <input type="checkbox"/> NONE -- GO TO e.	(160) cents per pound (167) cents per pound (174) cents per pound	(162) pounds (169) pounds (176) pounds	(163) pounds (170) pounds (177) pounds
(12) Corn <input type="checkbox"/> YES <input type="checkbox"/> NO	(172) pounds	(179) pounds <input type="checkbox"/> NONE -- GO TO e.	(181) cents per pound	(182) pounds	(183) pounds
(13) Okra <input type="checkbox"/> YES <input type="checkbox"/> NO	(184) pounds	(185) pounds <input type="checkbox"/> NONE -- GO TO e.	(187) cents per pound	(188) pounds	(189) pounds
(17) Tomatoes <input type="checkbox"/> YES <input type="checkbox"/> NO	(190) pounds	(191) pounds <input type="checkbox"/> NONE -- GO TO e.	(192) cents per pound	(194) pounds	(195) pounds
(18) Other vegetables and greens (specify which crops included)	(196) pounds (201) pounds	(197) pounds (204) pounds	(199) cents per pound (206) cents per pound	(200) pounds (207) pounds	(201) pounds (208) pounds

(202)	(209)	(212)	(216)	(219)	(221)	(222)
(210)	(217)	(213)	(214)	(215)	(218)	(220)

SECTION 3: OPERATING EXPENSES

1. Did anyone other than members of your household work on your farm for pay from January through June?

- (224) 1  No -- if no, skip to question 5  
 2  Yes -- if yes, continue

2. How many persons?

(225) \_\_\_\_\_ persons

3. How many days of work in total were paid for from January through June?

(226) \_\_\_\_\_ days of work paid for

4. What was the total amount paid for hired labor during the six-month period? (Pause.) Were meals provided?

(227) \_\_\_\_\_ total payment

(228) 1  meals not provided

2  meals provided

5. Did anyone other than members of your household work on your farm under some other arrangement?

(229) 1  No -- if no, skip to question 6

2  Yes -- if yes, explain

6. a. Please tell me about how much you spent for the following items which you used during the six months from January through June.

(230) \$ \_\_\_\_\_ .00 Seeds and planting materials

(231) \$ \_\_\_\_\_ .00 Fertilizer and lime from banana board (note bags used)

(232) \$ \_\_\_\_\_ .00 Fertilizer and lime from cocoa board (note bags used)

(233) \$ \_\_\_\_\_ .00 Fertilizer and lime from other sources (note bags used)

(234) \$ \_\_\_\_\_ .00 Chemicals for crops

(235) \$ \_\_\_\_\_ .00 Livestock feeds, medicine

(236) \$ \_\_\_\_\_ .00 Transport of crops, animals

(237) \$ \_\_\_\_\_ .00 Other expenses

CHECK ITEM A: Add entries above: (238) \$ \_\_\_\_\_ .00

b. This means that your total expenses for farm materials and transportation during the six months were about \$ \_\_\_\_\_ .00. Is that correct?

1  No -- if no, review and resolve

2  Yes -- if yes, continue

OFFICE USE ONLY: (239)  
 (240)  
 (241)  
 (242)  
 (243)

7. a. During the last 12 months, did you owe money for any reason to friends, a shopkeeper, a bank or to anyone else?

- 1  No -- if no, skip to question 8  
 2  Yes -- if yes, continue

b. Who loaned you the money or goods?  
 (Indicate choice by number.)

- 1 -- friends or family  
 2 -- shopkeeper  
 3 -- commercial bank  
 4 -- government bank

c. For what purpose did you use the loan?  
 (Indicate choice by number.)

- 1 -- buy land  
 2 -- hire labor  
 3 -- buy farm inputs  
 4 -- non-farm items

d. How much of the loan did you receive before the last 12 months? (dollars)

e. How much of the loan did you receive during the last 12 months? (dollars)

f. How much of the loan did you repay during the last 12 months? (dollars)

g. How much of the loan do you still owe today? (dollars)

h. How many weeks did you have to repay the loan? (weeks)

i. How many weeks did the lender need to consider and approve the loan? (weeks)

j. When did you receive the initial loan? (month, year)

k. What interest or charges did you have to pay for the loan? (percent or dollars)

FIRST LOAN (245)	SECOND LOAN (246)	THIRD LOAN (267)
_____	_____	_____
(246)	(257)	(268)
_____	_____	_____
(247)	(258)	(269)
\$ _____ .00	\$ _____ .00	\$ _____ .00
(248)	(259)	(270)
\$ _____ .00	\$ _____ .00	\$ _____ .00
(249)	(260)	(271)
\$ _____ .00	\$ _____ .00	\$ _____ .00
(250)	(261)	(272)
\$ _____ .00	\$ _____ .00	\$ _____ .00
(251)	(262)	(273)
_____ weeks	_____ weeks	_____ weeks
(252)	(263)	(274)
_____ weeks	_____ weeks	_____ weeks
(253)	(264)	(275)
_____/_____ mo. year	_____/_____ mo. year	_____/_____ mo. year
(254)	(265)	(276)
_____ % or	_____ % or	_____ % or
(255)	(266)	(277)
\$ _____ .00	\$ _____ .00	\$ _____ .00

8. a. Have you ever applied for a loan and been refused?

(278) 1  No — if no, skip to question 9

2  Yes — if yes, continue

b. When did you apply for the loan? (year)

c. Who turned you down? (Indicate choice by number.)

- 1 — friends or family
- 2 — shopkeeper
- 3 — commercial bank
- 4 — government bank

d. What were you going to do with the loan? (Indicate choice by number.)

- 1 — buy land
- 2 — hire labor
- 3 — buy farm inputs
- 4 — non-farm items

e. How many weeks did it take for your loan to be considered or rejected? (weeks)

MOST RECENT APPLICATION (279)	SECOND APPLICATION (283)	THIRD APPLICATION (287)
19 _____	19 _____	19 _____
(280)	(284)	(288)
_____	_____	_____
(291)	(285)	(289)
_____	_____	_____
(292)	(286)	(290)
_____ weeks	_____ weeks	_____ weeks

4. a. Are you interested at the present time in a loan for any purpose from friends or family, a shopkeeper, a bank, or anyone else?

(291) 1  No -- if no, ask: Why are you not interested in a loan? (Then go to Section 4.)

- (291) 1  interest rate too high
- 2  too much delay in getting loan
- 3  no need for loan
- 4  expected ineligibility

2  Yes -- if yes, continue

b. Who would you ask for money? (Indicate choice by number.)

- 1 -- friends or family
- 2 -- shopkeeper
- 3 -- commercial bank
- 4 -- government bank

c. For what purpose would you ask for money? (Indicate choice by number.)

- 1 -- buy land
- 2 -- hire labor
- 3 -- buy farm inputs
- 4 -- non-farm items

d. How much money would you ask for? (dollars)

e. How many weeks would you need to repay the money? (weeks)

f. What interest rate would you expect to pay for the loan? (percent)

g. How many weeks do you think would be needed to consider your request? (weeks)

FIRST LOAN (293)	SECOND LOAN (299)	THIRD LOAN (305)
_____	_____	_____
(294)	(300)	(306)
_____	_____	_____
(295)	(301)	(307)
\$ _____ .00	\$ _____ .00	\$ _____ .00
(296)	(302)	(308)
_____ weeks	_____ weeks	_____ weeks
(297)	(303)	(309)
<input type="checkbox"/> Don't know _____ %	<input type="checkbox"/> Don't know _____ %	<input type="checkbox"/> Don't know _____ %
(298)	(304)	(310)
_____ weeks	_____ weeks	_____ weeks

OFFICE USE ONLY: (311)  
(312)  
(313)  
(314)  
(315)

1. What are the rainy season months in this area? (Check all that apply.)

- (316) 01  January  
 (317) 02  February  
 (318) 03  March  
 (319) 04  April  
 (320) 05  May  
 (321) 06  June  
 (322) 07  July  
 (323) 08  August  
 (324) 09  September  
 (325) 10  October  
 (326) 11  November  
 (327) 12  December

2. In the last 12 months, did (you/the farm operator) do any farm work on your farm?

- (328) 1  No -- if no, explain reason and skip to question 10  
 2  Yes -- if yes, continue

3. In the last 12 months, did (you/the farm operator) generally do more farm work on your farm during the rainy season or during the rest of the year?

- (329) 1  Rainy season  
 2  Rest of year  
 3  About the same

4. Did (you/the farm operator) do any farm work on your farm last week?

- (330) 1  No -- if no, ask: What was the most recent week in which (you/the farm operator) did farm work on this farm?  
 \_\_\_\_\_  
 2  Yes -- if yes, continue

5. Monday through Friday, about how many hours did (you/the farm operator) do farm work on your farm last week (or the specified week)?

(331) \_\_\_\_\_ hours per week (excluding Saturday and Sunday)

6. Saturday and Sunday, about how many hours did (you/the farm operator) do farm work on your farm last week (or the specified week)?

(332) \_\_\_\_\_ hours per weekend (Saturday and Sunday)

CHECK ITEM A: Add entry in question 5 and question 6: (333) \_\_\_\_\_ sum of question 5 and question 6

7. This means that (you/the farm operator) did about \_\_\_\_\_ hours a week of farm work on your farm last week (or the specified week). Is that correct?

- 1  No -- if no, review and resolve  
 2  Yes -- if yes, continue

9. Compared to last week, how many hours a week did (you, the farm operator) do farm work on your farm during \_\_\_\_\_? (Enter response in each space of hours per week column.)

		HOURS PER WEEK		WEEKS PER MONTH
January	(334)	_____	(346)	_____
February	(335)	_____	(347)	_____
March	(336)	_____	(348)	_____
April	(337)	_____	(349)	_____
May	(338)	_____	(350)	_____
June	(339)	_____	(351)	_____
July	(340)	_____	(352)	_____
August	(341)	_____	(353)	_____
September	(342)	_____	(354)	_____
October	(343)	_____	(355)	_____
November	(344)	_____	(356)	_____
December	(345)	_____	(357)	_____

9. Did (you/the farm operator) do farm work on your farm every week during the last 12 months?

- (358) 1  No -- if no, ask: How many weeks each month did (you/the farm operator) do farm work on your farm? (Enter response in weeks per month column.)
- 2  Yes -- if yes, enter "4" in each space of weeks per month column

10. a. In the last 12 months did (you/the farm operator) do any work other than farm work on your own farm?

- (359) 1  No -- if no, skip to question 17
- 2  Yes -- if yes, continue

b. What did you do?

	FIRST JOB (360) mark only one	SECOND JOB (364) mark only one	THIRD JOB (368) mark only one
1	<input type="checkbox"/> other farm	1 <input type="checkbox"/> other farm	1 <input type="checkbox"/> other farm
2	<input type="checkbox"/> fishing	2 <input type="checkbox"/> fishing	2 <input type="checkbox"/> fishing
3	<input type="checkbox"/> handicraft	3 <input type="checkbox"/> handicraft	3 <input type="checkbox"/> handicraft
4	<input type="checkbox"/> processing, boxing	4 <input type="checkbox"/> processing, boxing	4 <input type="checkbox"/> processing, boxing
5	<input type="checkbox"/> construction	5 <input type="checkbox"/> construction	5 <input type="checkbox"/> construction
6	<input type="checkbox"/> store, shop	6 <input type="checkbox"/> store, shop	6 <input type="checkbox"/> store, shop
7	<input type="checkbox"/> taxi	7 <input type="checkbox"/> taxi	7 <input type="checkbox"/> taxi
8	<input type="checkbox"/> other business	8 <input type="checkbox"/> other business	8 <input type="checkbox"/> other business
9	<input type="checkbox"/> government	9 <input type="checkbox"/> government	9 <input type="checkbox"/> government
c. Did you do this work for someone else or were you self-employed?	(361)	(365)	(369)
1	<input type="checkbox"/> someone else (work for wages)	1 <input type="checkbox"/> someone else (work for wages)	1 <input type="checkbox"/> someone else (work for wages)
2	<input type="checkbox"/> self-employed (own business)	2 <input type="checkbox"/> self-employed (own business)	2 <input type="checkbox"/> self-employed (own business)
d. How many other people did you work with? (If he works alone, enter 0.)	(362)	(366)	(370)
	_____ number of other people	_____ number of other people	_____ number of other people
e. How far from your home is the place where you did this work?	(363)	(367)	(371)
	_____ miles	_____ miles	_____ miles

11. Did (you/the farm operator) do any of this work last week?  
 (372) 1  No -- if no, ask: What was the most recent week in which (you/the farm operator) did any work other than farm work on this farm?  
 2  Yes -- if yes, continue

12. Monday through Friday, about how many hours did (you/the farm operator) do this work last week (or the specified week)?  
 (373) \_\_\_\_\_ hours per week (excluding Saturday and Sunday)

13. Saturday and Sunday, about how many hours did (you/the farm operator) do this work last week (or the specified week)?  
 (374) \_\_\_\_\_ hours per weekend (Saturday and Sunday)

CHECK ITEM 3: Add entry in questions 13 and 14: (375) \_\_\_\_\_ sum of entries in questions 13 and 14

14. This means that (you/the farm operator) did about \_\_\_\_\_ hours a week of work other than your own farm work last week (or the specified week). Is that correct?

1  No -- if no, review and resolve

2  Yes -- if yes, continue

15. Compared to last week, how many hours a week did (you/the farm operator) do any of this other work during \_\_\_\_\_? (Enter response in each space of hours per week column.)

		HOURS PER WEEK		WEEKS PER MONTH
January	(376)	_____	(388)	_____
February	(377)	_____	(389)	_____
March	(378)	_____	(390)	_____
April	(379)	_____	(391)	_____
May	(380)	_____	(392)	_____
June	(381)	_____	(393)	_____
July	(382)	_____	(394)	_____
August	(383)	_____	(395)	_____
September	(384)	_____	(396)	_____
October	(385)	_____	(397)	_____
November	(386)	_____	(398)	_____
December	(387)	_____	(399)	_____

16. Did (you/the farm operator) do this other work every week during the last 12 months?

(400) 1  No -- if no, ask: How many weeks each month did (you/the farm operator) do this other work? (Enter response in weeks per month column.)

2  Yes -- if yes, enter "4" in each space of weeks per month column

17. Do you think farm work on this farm (pause) or other work (pause) would offer you the best possibility for increasing your household income?

(401) 1  Farm work on this farm

2  Other work

18. Do you think good jobs are obtained chiefly on the basis of ability (pause) or on the basis of luck?

(402) 1  Mostly ability

2  Mostly luck

19. Do you think farm work on this farm (pause) or other work would give your household more security for the future?

(403) 1  Farm work

2  Other work

20. Do you think farmers who are successful get ahead mostly because of their luck (pause) or mostly because of their ability?

(404) 1  Mostly luck

2  Mostly ability

---

OFFICE USE ONLY: (405)  
(406)  
(407)  
(408)  
(409)

- 11. a. What are the names of any other members of your household who helped with the farm work or did any other work? (List names.)
- b. Generally, in an average week during the last 12 months, about how many hours a week did \_\_\_\_\_ do farm work on this farm? (Enter hours per week.)
- c. Did \_\_\_\_\_ do this work every week? (Enter weeks per year.)
- d. How many hours a week did \_\_\_\_\_ do work other than farm work on your farm? (Enter hours per week.)
- e. Did \_\_\_\_\_ do this work every week? (Enter weeks per year.)

	<u>HOUSEHOLD MEMBER</u>	<u>OWN-FARM WORK HOURS</u>	<u>WEEKS PER YEAR</u>	<u>OTHER WORK HOURS</u>	<u>WEEKS PER YEAR</u>
1.	_____	(410) _____	(416) _____	(422) _____	(428) _____ (434)
2.	_____	(411) _____	(417) _____	(423) _____	(429) _____ (435)
3.	_____	(412) _____	(418) _____	(424) _____	(430) _____ (436)
4.	_____	(413) _____	(419) _____	(425) _____	(431) _____ (437)
5.	_____	(414) _____	(420) _____	(426) _____	(432) _____ (438)
6.	_____	(415) _____	(421) _____	(427) _____	(433) _____ (439)

---

OFFICE USE ONLY: (440)  
 (441)  
 (442)  
 (443)  
 (444)

In these final questions, I am interested in the relative importance of farm work and other work for your household.

Suppose that this whole line (show line) represents the total income of your household during the last 12 months:

- a. About how much of the line would show the income from (your/the farm operator's) work other than farm work on this farm?
- b. About how much of the line would show the income of other household members from work other than farm work on this farm?
- c. About how much of this line would show the income from family or friends living abroad, pensions, or insurance?
- d. About how much of the line would show the income from sales of agricultural goods produced on this farm?

INTERVIEWER: Be sure and label shares with appropriate letters, and check to assure yourself that income is completely accounted for. After completing graph, enter indicated shares as percent of total in the following spaces. Check to see that percent entries sum to 100.

- (445) a. \_\_\_\_\_ % operator off-farm  
 (446) b. \_\_\_\_\_ % other off-farm  
 (447) c. \_\_\_\_\_ % remittances, pensions  
 (448) d. \_\_\_\_\_ % farm sales  
 100 = TOTAL

2. Finally, during the last 12 months, what was the total monthly income from all these sources (dollars)?

(449) \$ \_\_\_\_\_ .00 per month

INTERVIEWER: Check questionnaire for any missing information. Thank respondent for interview. Complete your editing of the questionnaire immediately following the interview.

OFFICE USE ONLY: (450)  
 (451)  
 (452)  
 (453)  
 (454)  
 (455)  
 (456)  
 (457)

GRENADA RURAL FARM HOUSEHOLD SURVEY

INTERVIEWER MANUAL

- Chapter 1 Introduction and Purposes
- Chapter 2 Duties and Performance of Interviewers
- Chapter 3 Interviewing Techniques
- 7 Chapter 4 Definitions and the Questionnaire in Detail

== 111 ==

CHAPTER 1  
INTRODUCTION AND PURPOSES

What is the survey to accomplish?

The Grenada Farm Household Survey consists of interviews conducted with farm households in selected areas of Grenada. The primary purpose of the survey is to study farm practices and labor use of households in small farming areas characterized by alternative types of off-farm employment opportunities. This information will be used to determine the needs of such farm households and to review the effectiveness of current efforts to assist them.

Who is included in this survey?

This survey covers farm households in several selected areas of Grenada. In order to be included in this survey, a household must have one or more members who is a farm operator, that is, who is in charge of agricultural production. The members of a household in charge of agricultural production must be responsible for between one and twenty five acres of land. One purpose of Sections 1 and 2 of the Questionnaire is to determine just which households in a given village contain such eligible operators and therefore should be included in the survey. All households to be contacted in the selected areas will thus be asked to complete Sections 1 and 2 of the questionnaire. Only farming households will be asked to complete the remaining sections of the questionnaire.

The definitions of farm household, farm operator and other terms are presented in greater detail in Chapter 4.

What kind of information is to be collected?

The questionnaire for the survey includes questions on the following topics:

- \* characteristics of the household members
- \* farm type, size, tenure, and land use
- \* production and distribution of crops
- \* cost of operating the farm
- \* data on livestock production and care
- \* information on household labor use
- \* farm practice and technology

\* use of credit

\* attitudes of the respondent toward farming

Each of these types of questions contributes to the basic purposes of the survey.

The farm household is, of course, our most important concern and resource in agriculture. This is why we ask about characteristics of the head of the household and of household members.

The land is the second basic resource. Questions about the extent of land farmed and the purposes for which this land is used help us understand this resource base for agriculture. Related information covers tenure and land conditions.

Production of crops and livestock is the purpose of agricultural activity and demonstrates the effectiveness of the farming effort. Therefore, these questions are quite detailed.

The costs of production are needed to determine net farm income actually enjoyed by farmers. This information also indicates the efficiency of our agricultural production.

Questions about agricultural services and credit provide information on programs serving farmers.

Questions about off-farm work and household income from other sources will help give a better picture of the total livelihood of farm households and the importance of farming for their overall income and for their use of labor.

Finally, questions about the attitude of farmers indicate what changes in farming we may be likely to see in the future.

The questionnaire is discussed on a question-by-question basis in Chapter 4.

## DUTIES AND PERFORMANCE OF INTERVIEWERS

Your  
performance

You, the enumerator are the most important person in the whole survey. The whole success or failure in attaining the objectives depends entirely on your performance in the field. As such, it is extremely important that you pay careful attention and fully understand your duties in preparation for the survey and in the field.

The list of  
basic duties

Your basic tasks are as follows:

- \* Attend the training course promptly and regularly
- \* Study this manual carefully and remember the main points which are explained here. Become fully familiar with the questionnaire.
- \* Contact the households you are assigned to interview
- \* Find the appropriate person for the interview
- \* Complete the interview as instructed
- \* Review each completed questionnaire for accuracy
- \* Submit completed questionnaires to your supervisor as promptly as possible
- \* Keep all information received confidential

Some of these duties are discussed in greater detail below.

Contact the  
assigned  
household

Your supervisor will assign you and other interviewers to conduct interviews in a given village. Once you have completed work in one village, you will be assigned to another and so on until the survey is completed. In each village to which you are assigned, you will be given a map of the area. All dwelling units within the map should be visited. To assist you some of the units have been identified on the map. However, you should continue to look for and ask about other units within the boundaries outlined on your map. All units within this boundary must be visited.

Find the  
right person  
for the  
interview

The first questions of the questionnaire help you to determine if this is an eligible farm household and if so how to find the person in charge of the agricultural production. This will usually be the head of the household. If this person is not available at the moment, but can be reached somewhere else in the area, either try to find him (or her) or make an appointment for a time when he (she) is expected to be available. Also make an appointment for another time if the person is away at the moment but will return within the time in which you will be interviewing in the village. If this person in charge is absolutely unavailable, try to find someone else in the household who can answer questions about the agricultural production, as indicated in the questionnaire. If no such person is available, contact your supervisor. (Continue your work with another assigned household if your supervisor is not immediately available.) Also, if no one is home after repeated visits and neighbors do not know how a member of the household can be reached, contact your supervisor as well.

IN SUMMARY, IT IS ESSENTIAL TO MAKE CERTAIN YOU HAVE THE RIGHT HOUSEHOLD AND AN ELIGIBLE PERSON TO BE INTERVIEWED BEFORE YOU CONDUCT THE INTERVIEW AND COMPLETE THE QUESTIONNAIRE.

Complete  
the interview

This is your most important activity. Complete the interviews assigned to you as promptly and accurately as you can, using the techniques in which you have been instructed. These interviewing techniques are reviewed in Chapter 3.

Review each  
completed  
questionnaire

This is a task which is sometimes neglected, but it is very important. It is quite proper at the end of the interview to thank the respondent and ask him whether you can sit for a few more minutes and review the questionnaire to make sure you have everything right. Questions which can help you check the completeness and accuracy of your filled-in questionnaire are included in Chapter 4. If you find incomplete answers or mistakes, check with the person you interviewed to get it right.

This review should be done for each completed questionnaire before you hand it in to your supervisor.

Submit  
completed  
questionnaire  
to your  
supervisor

Submit each completed questionnaire to your supervisor daily, soon after you have checked it. After he has reviewed it, he may ask you to return to the respondent and complete or double check certain questions.

Keeping  
appointments

Schedule all your appointments wisely and make every effort to be prompt. A courteous and professional manner will make it easier to get the cooperation of the respondent.

Keep all  
information  
confidential

All information obtained by you through contact with the farmer IS and MUST under all circumstances BE KEPT CONFIDENTIAL. You must at no time divulge any information whatsoever to any person who is not connected with the survey or even to any member of your family. The information you obtain from one farmer or household MUST NOT be disclosed to any relative, friend or neighbor of that farmer. Strict measures will be taken against anyone who does not adhere to this principle. Even permission will have to be sought from your supervisor before disclosing any information to others engaged in the survey.

## INTERVIEWING TECHNIQUES

Initial  
Contact

Two stages in typical introductory situations may be defined. The first one occurs at the door when contact is made with the people living in the household; the second stage occurs inside the house when the interviewer is able to talk more easily. The reaction of the person who answers the door is likely to be a mixture of curiosity and formal courtesy.

The doorway is not a very convenient place to carry on a conversation and the doorstep introduction should be just long enough to get the interviewer inside the house. Once inside he will be in a better position to obtain the person's cooperation. It is easier for the respondent to say "No thank you" at the door than it is in the living room.

At the doorstep, desired course of action should be taken, rather than asking permission for the interviewer. For instance, instead of asking "May I come in?" - to which a respondent could easily reply "No." - the interviewer should say "I would like to come in and talk with you about this".

Avoid questions such as "Are you busy now?" or "Could I take this interview now?" or "Should I come back?" Questions which permit undesired responses can lead or even push a respondent into refusing to be interviewed.

The interviewer should assume the respondent is not busy and approach the meeting as though the interview were going to take place right then - at the time of contact. Of course, if the respondent really is unavailable for an interview, by all means arrangements have to be made for a more convenient time.

Securing  
the  
Interview

The most successful interviewer is one who is able to size up the situation quickly on the basis of what little information is available and to act accordingly. The person who answers the door may not be the person you must interview. A cooperative relationship with whom ever answers the door should be established so that the interviewer will be able to obtain the information needed to find the appropriate respondent for that household.

The interviewer should remember not to be too specific about the interview in introducing himself and the survey to the respondent. It is important to avoid introducing a bias into the interview which might predispose the respondent to answer in a particular way. Briefly give

the introductory statement in the questionnaire in your own words.

In most homes, the interviewer will be welcome because he represents a change in the day's routine. Most people enjoy being interviewed and many people develop interest and insight into matters which they have not thought about before or not thought about in the same way.

Respondents have various kinds of concerns and questions, and the interviewer must be prepared to give correct and courteous answers, phrased so that they seem to be a natural part of an introductory conversation. Here are some questions respondents are likely to ask, along with some suggested answers.

Q. "How did you happen to pick me? Who gave you our name?"

A. "You see, in trying to find out about farming in this country, we cannot talk with everyone, but we try to talk to people in different areas. We start by selecting communities from all over the country, and then we visit a number of households. Depending on the number of households, in some areas we visit all the households; in others we select only a portion of the households.

Q. "What's this all about anyway?"

A. "We'll be talking about several things related to this household and your crops and livestock." (If there is serious hostility or reluctance to be interviewed, offer to have your supervisor call to explain the importance of cooperation by selected respondents).

Q. "What good will this do?"

A. This is difficult to answer. While a survey adds to our knowledge about problems and concerns in agriculture in the region and this country this particular study will probably have little or no direct effect on individual respondents.

It may help if you explain, "Informed decisions are better than guesses, and decision-makers need the kind of information which can be obtained only by talking to people and finding out how they feel in order to formulate intelligent policies."

Your own state of mind is often reflected in the respondent's reaction to the request for an interview. In your approach is uncertain or uneasy, if you cannot answer the questions the respondent asks and seem vague about the work and its purposes, this feeling will be communicated to the respondent and he will react accordingly. If you have a pleasant positive and well informed approach, this again will be reflected in the respondent's attitude.

#### Using the Questionnaire

The goal of the interviewer is to collect accurate information by using the survey questionnaire in accordance with sound interviewing practices.

Responses are strongly influenced by the way in which a question is worded. Obviously, if a question is worded differently for different respondents, it will not produce information which can be added up. Question order must also be the same from interview to interview because changes in sequence affect respondents' answers. It is only when each interviewer uses the questionnaire in the same fashion as all other interviewers that we can hope to collect information that is uniformly accurate.

#### Asking the Questions

You should avoid creating the impression that the interview is a quiz or cross-examination; be careful that nothing in your words or manner implies criticism, surprise, approval or disapproval either of the questions you ask or of the respondent's answers.

If you have a normal tone of voice, an attentive way of listening, and a non-judgemental manner, you will maintain and increase the respondent interest. Know the questions so well that you can read each one smoothly and move on to the next without any hesitancy. Study the questionnaire carefully and practice reading the questions aloud.

- Ask the questions exactly as they are worded in the Questionnaire.

- Read each question very slowly.

- Ask the questions in the order in which they are presented in the questionnaire. The question sequence is designed to create a sense of continuity and to ensure that early questions will not have a harmful effect on the respondent's answers to later questions. Furthermore, question order needs to be standardized from respondent to respondent if the interviews are to be comparable.

- Ask every question specified in the questionnaire. From time to time, when the interviewer needs to ask a series of apparently similar questions the respondent may ask "Just put me down as 'yes' to all of them." In these cases you may wonder whether you should skip the questions which are apparently answered. You should not. It is your responsibility to make certain, wherever possible, that the respondent is fully exposed to each question specified in the questionnaire.

- Repeat questions which are misunderstood or misinterpreted.

- Keep track of changes you make in the questionnaire. Any changes - even inadvertant ones that you make in the wording, phrasing or order of questions in the interview should be noted in the questionnaire. This is necessary because supervisors and coders must know what was asked in order to decide whether these altered questions can be used and how they should be coded.

- Gathering personal data. Questions about earnings which some respondents might find somewhat sensitive are at the end of the questionnaire. If you are matter-of-fact in your approach you probably will not encounter any problems.

Probing and  
other  
Interviewing  
Techniques

One of the most challenging and important aspects of the interviewer's work is getting the respondent to answer the question which was asked. If your respondent gives you an incomplete or irrelevant answer, or if he misunderstands the question, or if you do not understand his answer, or if he loses track of the question and gets off on another topic, it is your responsibility to get him back on the track through careful, neutral techniques.

The quality of the interview depends a great deal on the interviewer's ability to probe and use these techniques successfully.

Probing has two (2) major functions:

- It motivates the respondent to communicate more fully so that he enlarges on, clarifies or explains the reason behind what he has said.

- It helps the respondent focus on the specific content of the interview so that irrelevant and unnecessary information can be avoided.

Some respondents have difficulty putting their thoughts into words; others may give unclear or incomplete answers; still others may be reluctant to reveal their attitudes because they feel that they are socially unacceptable. The interviewer must deal with such factors and use procedures which encourage and clarify responses.

## Kinds of Probes

Repeat the Question. When the respondent does not seem to understand the question, when he misinterprets it, when he seems unable to make up his mind, or when he strays from the subject, the most useful technique is to repeat the question just as it is written in the questionnaire.

An Expectant Pause. The simplest way to convey to a respondent that you know he has begun to answer the question, but that you feel he has more to say, is to be silent. The pause - often accompanied by an expectant look or a nod of the head - gives the respondent time to gather his thoughts.

- Repeating the respondent reply. Simply repeating what the respondent has said as soon as he has stopped talking is often an excellent probe.

Neutral Questions or Comments. Neutral questions or comments are frequently used to obtain clearer and fuller responses. The following are examples of the most commonly used probes.

- Repeat question.
- Anything else?
- Any other reason?
- How do you mean?
- Any other?
- Could you tell me more about your thinking on that?
- Would you tell me what you think?
- What do you mean?
- Why do you feel that way?
- Which would be closer to the way you feel?
- Anything else?

These probes indicate that the interviewer is interested and they make a direct request for more information.

- Asking for further clarification In probing, it will sometimes be useful to appear slightly puzzled by the respondent's answer and intimate with your probe that

it might be you who failed to understand. For example, "I'm not quite sure I know what you mean by that - could you tell me a little more?" This technique can arouse the respondent's desire to cooperate with someone who he thinks is trying to do a good job. It should not be overplayed, however, or the respondent will get the feeling that you do not know when a question is properly answered.

Occasionally, a respondent will give a "I don't know" answer. This can mean any number of things. For instance

- \* The respondent does not understand the question and answer "don't know" to avoid saying he does not understand

- \* The respondent is thinking the question over and says "don't know" to fill the silence and to give himself time to think

- \* The respondent may be trying to evade the issue, or he may feel that the question is too personal and does not want to hurt the interviewer's feelings by saying so in a direct manner

- \* The respondent really may not know, or may not have an opinion or attitude on the subject or the requested parts on hand

If the respondent actually does not have the information which you request, this in itself is significant survey data. It is the interviewer's responsibility to be sure that this is in fact the case, and not mistake "I have no opinion on that" for "Wait a minute, I'm thinking". A repetition of the question, an expectant pause, a reassuring remark or a neutral probe will all encourage the respondent to reply.

#### A RECORDING AND EDITING OF THE INTERVIEW

A good written interview should record not only what the respondent said, but also the way in which he said it. Even though you may do a good job of asking the questions and probing in order to meet the study objectives, the information you gather will be lost if you cannot convey it to the coders in a full and unbiased form. Each interviewer must use the format given in the questionnaire in transcribing the interview while it is being conducted and in editing each interview after it has been completed. Use the space marked for "Interviewer Notes" to record any question, comments, or other information which explains an answer on that page.

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Mechanics  
of Recording

- Use a pencil to record (#2 black lead)
- Writing must be legible
- Use parentheses to indicate the interviewer's words or observations
- Do not put anything the respondent says in parentheses
- Cross reference relevant material in the interview
- Account for each question in the questionnaire

Summary tips  
on Editing

When you edit, it has to be remembered that someone who was not present when you took the interview will be examining it. Even if you have asked a question, probed, and obtained a full answer, the entire response can be lost if the coder cannot understand what you wrote. The best time to edit an interview is right after you take it, when the entire situation is still clear.

Sometimes it is not possible to edit immediately but try not to let more than a day elapse between the interview and the editing. Be sure that

- \* all entries are legible
- \* all unclear responses are clarified by notes

## SECTION 1. THE RESPONDENT AND THE HOUSEHOLD

Q 1a). This question is a filter, that is, a question intended to determine whether the interviewer should ask the questions following or skip to another specified place in the questionnaire. For example, in this case, if none of the land run by household members is used for farm work or gardening, there is no need for the interviewer to ask who in the household is in charge of the farm operation.

Q 1b). This question is intended to learn the name of the household member responsible for the day-to-day decisions on the growing of crops and the raising of livestock (the farm operator). His full name is to be recorded.

Q 1c). If the farm operator is available, you continue the interview with him from Question 2. If the farm operator is not available, ask where he may be found. If he is nearby, try to find him.

Q 1d). If the farm operator can not be found, then find out the full name of another knowledgeable household member familiar with the day-to-day farming operation. This person must be a household member, knowledgeable about all farming operations, and capable and mature enough to answer the questions responsibly.

Q 1e). If this person is available, continue interview with him from Question 2. If another person familiar with the farming operation is not available, ask when the farm operator or another eligible substitute will be available. If the time given is within the period in which you will be in the area, make an appointment to return to the household at the time the respondent will be available. Use a visiting card to note the time convenient for the respondent when you will return to the household.

Q 2 The first name of each of the household members is to be recorded. For deciding if a person is to be considered a member of the household in complex cases, the instructions and definitions contained above in this manual are to be followed. In normal conditions the explanations given along with the question on the questionnaire are sufficient. If you are not sure whether a person should be considered a member of the household as defined in this manual, include the person and explain fully the situation in the Interviewer Notes. For example:

No. 7, Angela, daughter of household head, goes to school in St. Georges and lives with an uncle there during the week. She comes home every weekend for Friday and Saturday nights and stays at home during holidays.

Names: Do not worry or ask about correct spelling.

Q 3 Age: The survey is most concerned to know who is age 14 or over, and who is age 30 and over, and who is age 65 and over. So do not worry if the respondent is not sure about the exact age of a young child or a very old person in the family. For children under one year of age, the age should be recorded as 1 year.

Q 4 Sex. Straight forward.

Q 5 Education. Straight forward.

Q 6 Occupation. Ask respondent to define for himself his and his other household member's major occupation. He may define the principal occupation for himself and other household members in terms of the work which offers the most security, or work offering best wage, or the work in which he spends the most time. We want the respondent to define for himself and other household members, for whatever reason, which activity is considered the major occupation. Be sure to enter job code and description as instructed in the questionnaire.

Q 7 This is a filter. In case of discrepancy with listed household members, review and correct.

Q 8 This is another filter. Again, in case of discrepancy, probe and resolve.

CHECK ITEM. If answer to 1a) is "no", check again to make sure that no land controlled (owned, rented or freehold) by the household is used for farming or gardening. If in fact no land is used for farming or gardening, the interview is to be terminated at this point.

REMEMBER - CHECK ITEMS ARE QUESTIONS FOR YOU, THE INTERVIEWER. DO NOT READ THEM TO THE RESPONDENT.

SECTION 2. FARM TYPE, TENURE, SIZE AND LAND USE

Q 1 This is a filter. It is intended to make clear that all holdings of all the household members, including possibly land which is currently unused, be included in answering the following questions.

Q 2a) This is a filter. We are interested in the time and resource use of self-run farming operations of between 1 and 25 acres. If the holding run by members of the household are not completely self run, the following questions will determine tenure arrangements in more detail

Q 2b) This is an additional filter check question to make sure that no land managed for others is included in land run by the household.

Q 2c) Straight forward

Q 2d) Straight forward

CHECK ITEM: It is important that the respondent realizes that all of the rest of the questionnaire is concerned only with the self-run farm operation of the household. None of the following questions refer to any land managed for others or run in partnership. (We do, of course, include land run by the household with the help of hired labor).

Q 3 If some of the land operated by the household is self-run and other land is not self-run, it must be made clear we are asking all of the following questions in reference only to self-run land. This may include land which is currently unused. Farm work by the household in land which is not completely self-operated will be dealt with only in the labor of household members other than farm work on this, the self-run, household farm. Questions on crops, crop costs, etc. will refer only to the self-run holdings. Ownership of land does not require title. Land held by transport means land held in the capacity of a full owner, or free hold permanent right to own, sell, lease, and to rent to others, without limitation.

Q 4 The renter has limited rights for use of land for a stipulated period in accordance with the terms of the lease. Rights of ownership do not belong to the leasee.

Q 5 Land rented from others under arrangements different from question 4 (rental with payment in cash or crop shares) is to be reported here. This includes land of another owner occupied for free with or without owner's permission. Specify in Interviewer Notes.

Q 6 Land owned by the household but run by another household with or without permission should be included here whether or not a rent payment is received.

Q 7 Number of acres rented out referred to in Question 6.

CHECK ITEM \_\_\_\_\_

and Q 8 \_\_\_\_\_ Follow directions in the questionnaire. If the respondent does not think the total is correct, ask him what his acreage should be. You may have one of the following problems to check out:

1. The addition and subtraction of CHECK ITEM \_\_\_\_\_ may be wrong: go over your calculation again.
2. The respondent may be including land you subtracted because it is rented out to others.
3. The respondent may not have included the area covered by his houses, pens or yards.

If any adjustment was made, indicate this in the blank space on the right side of question 8. The final figure will determine whether the household has the required farm area to be included in the sample.

CHECK ITEM \_\_\_\_\_ This is a filter item. Answer yourself, do NOI read to the respondent.

Q 9 Rental payments paid out. For land rented or leased an amount for land rent or lease fee has to be paid. This is usually a cash payment; however, sometimes the charges are met by payment in kind (i.e. a portion of the crop) for which the respondent's estimate of the market value of the crop (how much money he could have gotten if he had sold the same produce at regular market prices) should be entered.

CHECK ITEM \_\_\_\_\_ This is a filter item. Answer yourself, do NOI read to the respondent.

Q 10 Rental payments received. Same instructions as for Question 9.

Q 11 Include all area run by this household alone cultivated in crops. Be sure to include the kitchen garden.

Q 12 Land fallow between crops should not be included here.

Q 13 This is the land on which the house and other buildings stand, including the year (excluding gardens).

Q 14 This should be the area which for one reason or another was not utilized for crops, grazing or buildings. Do not treat this as a residual or balancing figure; allow the respondent to answer the question.

CHECK ITEM \_\_\_\_\_ All checks are important, but this one is especially so. If this sum of acres does not agree with Question 8, then begin the search for error by checking your addition for Questions 11, 12, 13 and 14. Then review with the respondent the replies for 11, 12,

13 and 14 since total acreage run by this household alone in Question 8 has already been confirmed.

Q 15 Refers to fragmentation of holdings operated only by members of the household. Land in one contiguous area with separations only by roads or trenches should be treated as one block. If the separations are made by wide rivers or gorges or another operator's land, the areas should be considered as separate blocks. The intention is to ascertain in how many completely different blocks of land, no matter where in Grenada, the farm operations of the household are conducted.

CHECK ITEM  Filter item; self-explanatory.

Q 16 The land reported for grazing only in Question 12 may not be suitable for growing crops for a variety of reasons. The question of under-utilized land is a bit sensitive. You should find out the reasons in a skillful manner to avoid non-cooperation of the respondent.

Allow the respondent to provide you with his reasons, and tick the precoded responses. Of course, the precodes do not have to match exactly the words used by the farmer. If you are not sure how to record an answer, place it in "other" and note the farmer's exact wording in the note space. If the respondent has given no answer (or only one answer), probe by saying "any (other) reasons?" Be sure to mark all reasons that apply.

CHECK ITEM  Filter item; self-explanatory.

Q 17 Refers to unused lands; same instructions as for Q 16.

Q 18 Steepness is a proxy here for land quality; we are interested in the farmer's perceptions of the quality of all the land his household runs, including unused land.

### SECTION 3. CROP PRODUCTION AND DISTRIBUTION

Q 1 The question is intended to obtain information on volume, value and distribution of crop production on holdings run only by members of the household. (i.e. not from land managed or shared with another household). Follow the instructions in the questionnaire, checking first the separate crops harvested from July 1st through December 31 last year. Then proceed across columns for each crop harvested during the period.

Column a. The list of crops includes the principal crops of interest. Other crops should be aggregated where possible. For example, if the farmer harvested lemons and oranges the two fruits should be listed under "other tree crops" with production volume, value of sales, etc. added together for the two fruits. Remember to write the names of the crops included in these aggregate categories (other tree crops, other ground provisions, other vegetables and greens, other crops).

Column b. This column is meant to record for each of the crops harvested during the six month period the volume harvested. There are two important issues here.

First, if volume cannot be estimated by respondent in terms of suggested measure, note production measure given and estimated conversion. "Number" (of yams, cassava, etc.) is perhaps the best substitute measure.

Second, where appropriate, the measured condition of the harvested crop must be specified. The preference is to use for the harvest the same unit of measure and crop condition used in the sale of the crop by the household. If cocoa is sold wet, or unfermented, then the harvested volume should also be reported as pounds of wet cocoa, not pounds of pods or pounds of cocoa in some other condition. If corn is sold dried and off the cob, then the unit and condition of measure for corn harvested should also be pounds dry and off the cob. Specify exactly any deviations from these instructions that you must make.

Column c. As indicated above, the unit of measure and the condition of crops (green or dried, etc.) must be the same for both columns b and c.

Column d. As an alternative to reporting the total value of sales for a particular crop, the respondent can report the price in cents per unit if and only if the number of units and condition of units is the same as reported in column c. A price per pound of dried cocoa can obviously not be multiplied by the pounds of wet cocoa to derive value of cocoa sales; both pounds sold and price per pound must refer to the same thing.

If the full payment for a crop harvested and sold during the period was not received by the end of the period, enter the payment expected for

the amount sold. If payment was received in part prior to the harvest, this partial payment should be included. If some of the crop harvested during the period was sold, or is expected to be sold, outside of this period, note the value or expected value of sales.

In summary, we want the value, or expected value, of sales of crops harvested during the period no matter when payment was actually received. Record in interviewer notes any cases in which full payment not received for crops harvested during the period.

Column e. Note the volume of the crop used as food for the household in same unit and condition of measure as listed in columns b, c, and f.

Column f. Again, the same unit and condition of measure is used in the other columns is to be used here. The uses of the crop for storage, processing for home use, processing for sale, other on-farm uses, and any other uses should be clearly specified. You should review here to assure yourself that the sum of reported volumes in columns f, e, and c equals the reported volume of the crop harvested in column b.

#### SECTION 4. OPERATING EXPENSES

Q 1 This is a filter question referring to hired labor. Note that hired labor refers to any labor other than household members for which payment in cash or kind is extended for labor services.

Q 2 Straight forward, simply how many different workers were hired during the period.

Q 3 Days of work can be calculated by multiplying for each worker his number of work days and summing the results.

Q 4 Self-explanatory. Payment for labor used during the six month period, no matter when actual payment made.

Q 5 The costs of farming must be deducted from value of sales to derive net income from farming. The period of reference, as above, is the six months from July through December.

Ask the cost of items used during the six month period no matter when the expenditure was made. If the farmer bought 10 pounds of fertilizer in January and used only 5 pounds in the period from July through December, only the cost of these 5 pounds of fertilizer is to be reported. Make sure that all costs of farming on land operated only by any members of the household are reported (i.e. not costs of operating land managed or shared with another household).

You must use probing techniques effectively in this section. Ask for the respondent's best estimate of these costs. Often, the information will be given by unit of purchase and you will have to calculate the total cost of the material used during the six months. Explain clearly the procedure you used in deriving total cost.

Any expenses on these accounts for domestic consumption is to be kept outside the scope of farm operating expenses. For example, do not include such expenses as house repairs and house-use electricity. However, electricity for raising chickens or running farm equipment should be included.

Write any farm expenses not on the list in the space provided at the bottom of the page. Costs should not include imputed costs of travel of household members in buying materials, only actual cash costs.

## SECTION 5. LIVESTOCK

This section is composed of the following subsections:

1. Cattle
2. Milk production
3. Sheeps and goats
4. Pigs
5. Fowls, chickens, broilers
6. Egg production
7. Other livestock

Each subsection begins with a filter question designed so that if the household has no livestock, the section can be completed quickly.

Q 1a) Filter. Term "cattle" includes cows, oxen, calves, and heifers.

1b) to 1a) Straight forward.

2a) Filter

2b) to 2f) Straight forward

3a) Filter

3b) to 3g) Straight forward

4a) Filter

4b) to 4f) Straight forward

Q 5a) Filter

Q 5a) to 5c) Straight forward

Q 6a) Filter

Q 6b) to 6d) Straight forward

Q 7a) Filter

Q 7b) to 7e) These questions can be repeated for each remaining type of livestock raised on the farm.

## SECTION 6. HOUSEHOLD LABOR ALLOCATION

All sections of the questionnaire are important. This section is especially important for the analysis of household labor use.

There are ten questions in the section. The first two questions refer to activities of the farm operator on the household farm in his months during the six month period of most and least farm work. The third question asks the farm operator to indicate in the length of lines the amount of farm work done in remaining months of the period.

The next three questions develop the same sort of information for work activities of the farm operator for his work other than farm work on household holdings (handicrafts, off-farm jobs, fishing, etc.)

Questions 7 and 8 refer to the farm work of all other household members while questions 9 and 10 refer to the work other than farm work of the rest of the household members.

### REMEMBER TO USE INTERVIEWER NOTES!

Considerable effort will be required by the respondent to recall the activities of the farm operator and activities of the household over the last several months. Do not rush responses. For this section you will need considerable skill in probing sensitively and effectively.

Q 1a) In this first question, the month of most farm work of the operator on his household farm during the six month period may not be immediately clear if there were several peak months or if work in all the months was about the same. Nevertheless, ask the respondent to try and choose the one peak month of own farm work of the farm operator, even if the difference with other months is slight. Note particular situation and any problems in Interviewer Notes.

Q 1b) Ask question, writing in the space provided the reported month of peak farm work of operator as you do so. You should first simply enter in the appropriate categories all of the activities of the farm operator mentioned by the respondent. (In your questions, use "you" if your respondent is the farm operator; "the farm operator" if your respondent is another household member. Probe once, "anything else?", then probe for (additional) activities in each of the pre-listed categories.

The categories are defined in the definitions section of this manual. For example, let us assume the operator is the respondent and he has indicated September as his peak month. If he has mentioned no activities under CROP CULTIVATION, you should probe: "Did you do any crop cultivation during September?" If the farm operator now recalls weeding the garden in September, record the activity and probe: "You

mentioned weeding the garden. Did you do any other crop cultivation during September?" If he can not recall any additional crop cultivation activities, go to next category.

If you have already recorded picking cocoa under the next category of HARVESTING, probe: "You mentioned picking cocoa; did you do any other harvesting during September?: Record additional activities mentioned, and go on to next category.

In summary, the idea is for you to list all farm activities carried out by the operator in his peak month of farm work on farm holdings of the household. In probing, if activities in the category have already been recorded include in your probe the phrases "you mentioned \_\_\_\_\_ (activity)," and "other \_\_\_\_\_ (category)". If activities have not yet been recorded for the category, do not include these phrases in your probe. USE YOUR INTERVIEWER NOTES!

Q 1c) The idea here is to work across the columns. For each activity you have recorded, ask and record the number of days in the peak month the operator did any work in the mentioned activity.

Q 1d) Then, for the same activity, ask the number of hours a day generally the farmer worked in the particular activity during the days he did the activity.

Q 1e) Then, for the same activity, calculate the number of hours per month spent in the activity.

Repeat Questions 1c) through 1e) for each of the activities you have recorded.

Q 1f) After the hours per month in each of the recorded activities has been calculated, add up the column entries and record result.

Q 1g) Divide result of Q 1f) by 4.3 and record result.

Q 1h) Ask the respondent to estimate the number of hours a week generally the operator spends in farm work on his own farm. If his estimate differs with the calculated response of 1a) by more than 5 hours, resolve the problem.

Q 2a) As in the previous question, the respondent may be unsure which month to name as the slack month for own farm work of the farm operator during the period. If no farm work was done by the operator for one or more months, explain in notes and skip to question 3.

Q 2b) As above, the idea is to list first activities mentioned by respondent, then probe for additional activities. Write in month of least own-farm work before you begin.

Q 2c) Here, as in Question 1, the idea is to work across the columns for each of the activities.

Q 2d) Straight forward.

Q 2e) Straight forward.

Q 2f) As in question 1, sum hours per month and record result.

Q 2g) Divide result of Q 2f) by 4.3 and record result.

Q 2h) Resolve if the difference between estimates by respondent and the calculated estimate is more than 5 hours.

Q 3 You must draw in the lines for hours per week in peak month and slack month before you read the statements to the respondent.

If the farm operator did farm work in the slack month, read statements A, B and D.

If the farm operator did no farm work in the slack month, read statements A, C and D.

If additional instructions are necessary read E.

This will be an unusual method of inquiry for the respondent. It is important that you explain the instructions slowly and carefully.

Ask the respondent to show you about how long or how high to draw the lines representing own-farm work of the farm operator in remaining months of the period, do not have him draw the lines himself.

After you have drawn a line for one of the remaining months, probe to see if the respondent has properly understood the intent of the question. For example, again assuming the respondent is the farm operator, if the line for August is shown to be only slightly shorter than the line drawn for the peak month of September and much longer than the line for the slack month of December, probe "then in August you did farm work on this farm slightly less than in September but much more than in December?" Probe after each line is drawn until you're sure respondent understands and is responding appropriately.

After the lines for all the months of the period have been drawn, ask what accounted for apparent patterns in the farm operator's work: "Why were August and September such busy months?" "Why was December so slow?" Then write the responses very briefly above the lines. This will help explain patterns of labor use and make sure the respondent understands the exercise.

USE YOUR INTERVIEWER NOTES!

Q 4a) Question 4, 5 and 6 are similar to questions 1, 2 and 3

but refer to work of the farm operator other than farm work on the household farm holdings.

We want to be sure in considering the other work of the farm operator, the respondent recalls all of the income earning activities of the operator other than farm work on holdings of the household. Note that income can be in cash or kind. Income in kind would include reciprocal labor time earned from helping out on a neighbor's farm or the fish caught for home consumption. We are interested here in a very wide range of work activities. Collection of vegetables from neighbors for sale in a central market would be included; driving a taxi if only for a few days should be included. Home industry (handicrafts) is included. The idea is to make sure the respondent understands we are interested in much more than simply the earnings work of the farm operator in the traditional factory or government job. Every day house chores or house repairs, however, should not be included here.

In question 4a) we hope to remind the respondent of the wide range of work activities other than own-farm work in which we are interested. Follow the instructions provided in the questionnaire, and probe as effectively as possible to assure the cooperation and appropriate responses of the respondent. If the farm operator did no work other than own-farm work during the period, skip to question 7.

#### USE INTERVIEWER NOTES!

Q 4b) After reviewing if the farm operator was busiest fishing in July, and was busiest driving taxi in December, but of the two months was busier in work other than own-farm work in December, then December is his peak month for work other than own-farm work. We want the month in which with all his other earning-work activities of the operator taken together he was the busiest (excluding his own farm work).

Again, selecting a single month may not be easy for the respondent if there was little difference in the time the farm operator spent in work other than own-farm work from month to month. Nevertheless, ask the respondent to try and select one month during the period in which the farm operator spent the most time in work other than farm work or the household holdings. Note any problems you encounter.

Q 4c) The procedure here is similar to question 1b) and 2b) explained above. Four categories of work are included and are defined in the definitions section of this manual. Ask the question (4c) at the top of the column while you fill in the peak month indicated by the respondent in the space provided. Then record in proper categories the responses of the respondent. Probe once, "Anything else?"; then probe as indicated in the questionnaire for (additional) activities in each of the pre-listed categories.

Q 4d) As in question 1c) and 2c) the idea is to work across columns for each of the activities you've listed. First ask the number of days in which the farm operator did any of the mentioned work.

Q 4e) Then, for the same activity, ask the number of hours a day generally the farm operator worked in the activities during the days he did the activity.

Q 4f) Then, for the same activity, calculate the number of hours per month spent in the activity.

Repeat questions 4d) through 4f) for each of the activities you have recorded.

Q 4g) After the hours per month in each of the recorded activities has been calculated, add up the column entries and record result.

Q 4h) Divide result of Question 4g) by 4.3 and record.

Q 4i) Ask the respondent to estimate the number of hours a week generally the farm operator spends in work other than farm work on his own farm. If his estimate differs with the calculated response of 4h) by more than 5 hours, resolve the problem.

USE INTERVIEWER NOTES!

Q 5a) The operator may be unsure which month to name as slack month for his work other than own-farm work. If no work was done for one or more months, explain on notes and skip to question 6.

Q 5b) As in Question 4c), the idea is to list first activities mentioned by the respondent, then probe for any additional activities of the farm operator he may be able to recall. Remember to write in the space provided the month of least work other than own-farm work during the period before you begin to list activities.

Q 5c) Again, the idea is to work across columns.

Q 5d) Straight forward.

Q 5e) Straight forward.

Q 5f) Sum calculated hours per month and record result.

Q 5g) Divide result of Q 5f) by 4.3 and record result.

Q 5h) Resolve if the difference between estimate by operator and the calculated estimate is more than 5 hours.

AGAIN, USE INTERVIEWER NOTES!

Q 6. As instructed in question 3 above, you must draw in the lines for hours per week in peak month and slack month before you read the statements to the respondent.

If the farm operator did no work other than own-farm work in the slack month, read statements A, B and D.

If the farm operator did no farm work in the slack month, read statements A, C, and D.

If additional instructions are necessary, read E.

As indicated in question 3, this will be an unusual method of inquiry for the respondent. Again, it is important that you explain slowly and clearly what it is you want the respondent to do.

Also, as before, effective probing is essential to be certain the respondent understands the intent of these questions. Probe in a manner similar to that used in the own-farm work section.

For example, if the respondent shows the line next to the peak month line to be only slightly higher than the slack month line, check to see if the respondent intended to indicate that the time the farm operator spent in earnings work other than own-farm work in the particular month was less than the peak month and only slightly more than the slack month.

Again, as in Question 3, after the lines for all the months of the period have been drawn, ask what accounted for apparent patterns in the non own-farm work of the operator: "Why was only \_\_\_\_\_ a busy month?" "Why were \_\_\_\_\_ and \_\_\_\_\_ slow months?" Then write the responses very briefly above the lines. This will help explain patterns of labor use and make sure the respondent understands the exercise.

Q 7 This question is a filter, referring to own-farm work during the six month period of other members of the household. If response is "no", skip to question 9. If "yes", list names of household members doing any own-farm work during the period in the first column of space provided in Question 8.

Q 8 It will not be easy for the respondent to estimate for the six months the approximate number of hours a week each member of the household (other than the farm operator) generally spent in farm work on holdings run by the household. Ask for best estimate. Include gardening time. If a person only worked a few days or weeks on the farm, write this in space provided. Note problems you may have with response to this question.

Q 9 This question is a filter, referring to work other than own-farm work of other members of the household during the six month period. If response is "no", skip to Section 7 of the questionnaire. If "yes", list names of household members (other than operator) doing any work even for a few days, other than own-farm work during the period in the first column of space provided in question 10.

Q 10 Again, it will not be easy for the respondent to estimate for the six months the approximate number of hours a week each member of the household (other than the farm operator) generally spent in work other than own-farm work. Ask for best estimate. If the person only worked a few days or weeks, enter this information in space provided. Again, note problems you may have with response to this question.

USE INTERVIEWER NOTES!

SECTION 7. FARM PRACTICE AND TECHNOLOGY

Q 1a) Mark response in pre-coded items as applicable. Describe any other farm tools or aids mentioned by respondent.

Q 1b) As above, mark responses as applicable. Ask respondent to describe briefly his other work tools and aids, and record this information in space provided.

CHECK ITEM \_\_\_\_ If tools or aids are not listed in both 1a) and 1b) there is no need to ask 1c).

Q 2 Straight forward

Q 3 Straight forward. Read question and list of organizations.

Q 4 Straight forward. Read question and list information sources.

Q 5 Straight forward.

Q 6 Straight forward. Read Question and list of possible reasons for respondent to change practices.

SECTION 8 CREDIT

Q 1 Mark response in pre-coded items as applicable. Try to avoid "don't know" responses, have respondent choose the most likely alternative. Do not read pre-coded items to respondent.

Q 2 Mark responses as applicable. Do not read pre-coded items to respondent.

Q 3 By purchasing on credit, we mean purchases of fertilizer or other inputs are paid later in deductions from payment of the association for the crop delivered by the farmer.

Q 4 Read question and record response as applicable. Do not read pre-coded items to respondent.

Q 5a) Self explanatory

A 5b) Space is provided to collect information separately for each type of loan. If more space is needed, use extra sheet.

Source of credit includes GAICD or commercial bank (you do not need to name which commercial bank). Purpose of loan should be noted briefly. Again, use extra sheet if more space is needed. Record the interest rate, amount applied for and received, and the amount repaid at present. Indicate reason if no money received of loan applied for.

Q 6 Read question and record response as applicable. Do not read pre-coded items to respondent.

Q 7a) We are trying to learn here of any informal or non-institutional sources of credit available to small farmers. We would include here credit from landlords, merchants, village money lenders and other non-institutional, but commercial, sources.

Q 7b) This is of course a very sensitive area. Effective probes will be necessary here to obtain the needed information. It should be made clear to the respondent that we are not interested in the names of creditors or exact amounts of loans but only in the types of informal loans available. Terms of the loan should be explained as the farmer understands them -- not converted, for example, to cash value in interest.

SECTION 9 ATTITUDES, REMITTANCES

Q 1 The respondent may be unsure how to answer this type of question on his attitude and opinions. Ask him, if necessary in probing, which response of the two is closer to his view.

Q 2 Again, if probing is necessary, repeat the two possible responses and ask which is closer to the respondent's view.

Q 3 to 7 Same instructions as question 2.

Q 8 Ask question and record response in pre-coded items. Probe "any others". Note any responses for which pre-coded items do not apply.

Q 9 Do not expand upon the wording of the question, simply ask if probing is necessary which of the responses the respondent would agree with most.

Q 10 Same instructions as question 9.

Q 11 We are interested here in the total income of all members of the household from own-farm work, other work, and any other sources of income. Of this total, what is the share provided from the sale of crops and livestock produced on the farmland run by the household? If any work other than farm work on this farm was reported for any of the household members then the proportion of household income from farm sales must of course be less than 100 percent. This is a very important question. It is a sensitive question for the respondent. Use interview notes to explain response of respondent and any problems you may encounter.

Q 21a) This filter question on remittances from abroad is also a sensitive question. Note in your interviewer notes any reluctance you may encounter to respond to this question.

Q 12b) Household income refers again to the total combined income of all household members from all sources.

Q 13a) Again, note any reluctance or problems you encounter in response to this question.

Q 13b) Straight forward.

CHECK ITEM A Household income has three possible sources: own-farm work, other work, and non-earnings income. These three components together (questions 11, 12, and 13) must equal the total combined household income (excluding the value of on-farm consumption of farm products.)

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