

**DOMESTIC-FOOD PRODUCTION AND
SMALL FARMING IN JAMAICA**

By

BALFOUR A.B. SPENCE

**A Thesis
Submitted to the Faculty of Graduate Studies
in Partial Fulfillment of the Requirements
for the Degree of**

DOCTOR OF PHILOSOPHY

**Department of Geography
University of Manitoba
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ABSTRACT

This thesis attempts to rationalize the plethora of factors which impact on small farming and by extension, domestic-food security in Jamaica and the wider Caribbean. In this regard, the intention is to provide a planning platform on which initiatives for the sustainable development of small farming and improvements in food security can be formulated. The contextual foundation for the research lies in the recognition by the CARICOM directorate of the need for a regional approach to the solution of problems relating to food security in the Caribbean, and which culminated in the ratification of a Regional Food Plan by CARICOM Heads of Government in 1975.

A questionnaire survey of 263 small farmers in Jamaica generated data on the nature of small farming and its influence on and implications for domestic-food security. Analysis of these data revealed that small farmers, although acknowledged as the pillars of domestic-food production, consistently devote a larger proportion of their meagre agricultural resources to export than domestic uses. This pattern of resource use is influenced by the evolution of small farmers along an age-defined continuum which dictates their progression towards export production options. Classification of small farming into five distinct categories indicates the need for agricultural development planners to tailor their strategies on this basis instead of treating small farming as a homogeneous entity.

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CHAPTER 1

RESEARCH PROBLEM: CARIBBEAN FOOD SITUATION

Introduction

By examining the nature and structure of small farming on the Caribbean island of Jamaica (Figure 1.1), this study attempts to rationalize and thereby improve comprehension of the plethora factors which impact on domestic-food supply. Since Jamaica, along with the other member states of the regional integration movement - the Caribbean Community and Common Market (CARICOM) - have recognized the need for a regional approach in addressing problems of food supply, the conceptual framework for this study lies in the Caribbean's general food situation.

The region referred to as the Caribbean has never been clearly delimited. Geographically, the Caribbean is considered the gamut of territories and states whose shorelines border on the Caribbean Sea (Robinson 1965:1). However, the socio-economic and socio-cultural diversity within this region makes any detailed analyses based on this broad regional unit non-functional. Regional researchers have often found it necessary to subdivide this broad regional unit into sub-regions in order to derive functional units for research (Chernick 1978; Dale 1977:1; Graham and Edwards 1984; Axiline 1979, 1980; Palmer 1984:1). For the purposes of this dissertation, the term Caribbean refers to the member territories of the regional integration movement, the Caribbean Community and

Common Market (CARICOM), that is, the countries indicated in Table 1.1 and whose locations are shown in Figure 1.1. These countries are the former colonies of the British West Indies, and today comprise the Commonwealth Caribbean. Commonality in historical development has resulted in cultural and economic similarities among them and in this regard they are considered as a comprehensive unit for study. Although the study was completed in 1995, the baseline research was undertaken in 1987. This does not affect the relevance of the information because from all indications the patterns which prevail during the period covered by the data were in vogue in 1995. However, where necessary more up-to-date data are incorporated into the discussions.

Caribbean Socio-Economic Characteristics

Caribbean economies are essentially rural, generally characterized by high population densities, rapidly growing populations and low per capita GNP. In

TABLE 1.1
CARIBBEAN: BASIC DEMOGRAPHIC AND ECONOMIC INDICATORS - 1988

Country	Total Population Million	Pop. Density (sq. km.)	Pop. Growth % per year	Per Capita GNP US\$
Antigua	0.10	193	1.0	2380
Barbados	0.30	591	0.8	5140
Belize	0.20	9	3.0	1170
Dominica	0.10	135	1.6	1210
Grenada	0.30	309	1.9	1240
Guyana	0.80	4	2.0	500
Jamaica	2.50	212	1.7	880
St. Kitts	0.04	227	1.4	1700
St. Lucia	0.10	331	2.2	1320
St. Vincent	0.10	309	2.0	960
Trinidad	1.30	251	2.2	5120
CARICOM	5.84	234	1.8	1965

Source: Compiled from the Economist August 1988.5; World Population Data Sheet 1988.

FIGURE 1.1
CARIBBEAN: LOCATION OF CARICOM COUNTRIES



Source: Natinal Atlas of Jamaica, 1971

other words, the region is economically poor.

With the exception of the larger mainland territories of Belize and Guyana, national population densities are extremely high. As population density relates to food supply in the region, it has been argued by scholars, such as Sen (1981:433) and Lappé (1977:4), that the occurrence of Third World food crisis in the midst of abundance is evidence that contemporary food shortages cannot be explained by population pressure alone. While this might be the case, it is also true that a region's ability to produce food is finite while its ability to produce people is not. The Caribbean is scarce in agrophysical resources. Regionally, crop and pasture land per person amount to a mere 0.6 hectare, and

Ha/Person	<u>Ha/Economically Active Population in Agriculture</u>				
	<1.0	1.0-2.0	2.0-3.0	3.0-5.0	>5.0
>0.5					Guyana
0.3-0.5			Belize		
0.2-0.3		Dominica			St. Kitts/ Nevis
0.1-0.2	Jamaica	St. Lucia St. Vincent		Barbados	
<0-0.1	Grenada		Antigua	Trinidad	

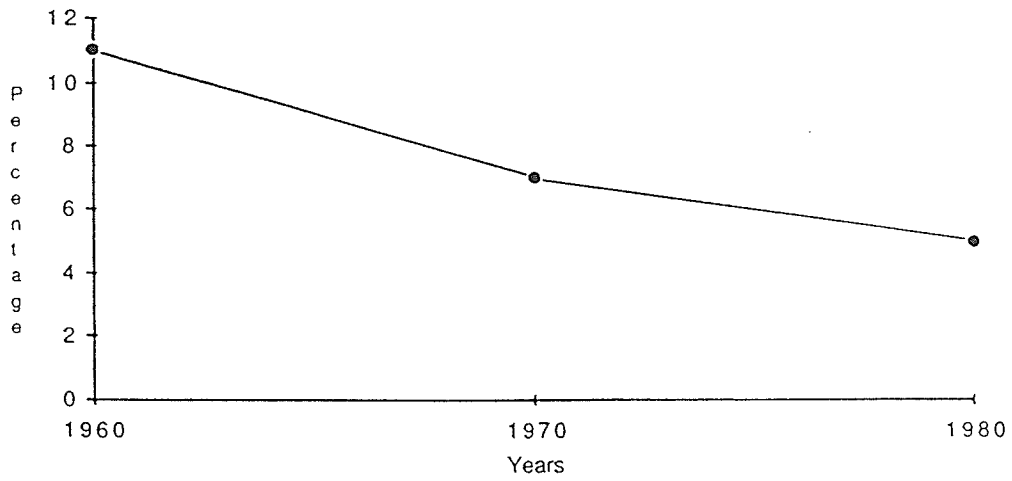
Source: Extracted from FAO 1988.

about two hectares per economically active person in agriculture (FAO 1988, Potentials for Agriculture and Rural Development in Latin America and the Caribbean, Annex IV; Natural Resources and the Environment: 28). Intra-

regionally, there are extreme deviations from these average values (Table 1.2). The scarcity of cropland is most extreme in Grenada, where the availability of cropland per person and economically active person in agriculture is less than 0.1 hectare and 1.0 hectare, respectively. On the other hand, Belize and Guyana have comparatively low cropland densities.

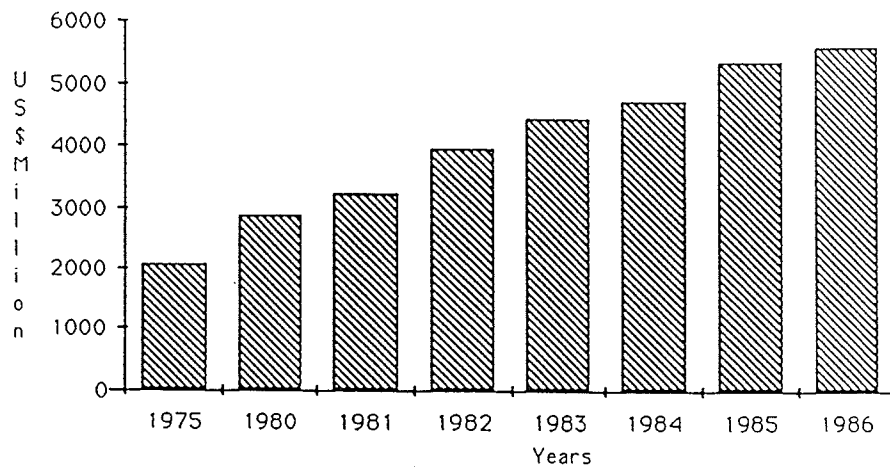
The essentially rural nature of Caribbean economies is reflected in the large proportion (32 percent) of the economically active population accounted for by the agricultural sector (FAO 1988: Potential for Agriculture and Rural Development: Main Report:2). Despite this high proportion of regional employment accounted for by agriculture, the sector's relative contribution to GDP has steadily declined over the past three decades so that in 1980, its contribution to the region's GDP was less than half its 1960 value (Figure 1.2). The declining contribution of agriculture to regional income along with slow or negligible growth in other sectors have resulted in increased dependence on external borrowing (Figure 1.3). A result of this rise in the region's indebtedness has been a corresponding increase in the proportion of regional income allocated to debt servicing (Figure 1.4). While this rise in income devoted to debt servicing has been neither as constant nor as dramatic as its growth in indebtedness, export earnings allocated to debt servicing was nevertheless 8.0 percent points higher in 1986 than in 1975. Extreme deviations from these

FIGURE 1.2
CARIBBEAN: CONTRIBUTION OF AGRICULTURE TO GDP



Source: FAO 1988 Annex 1.

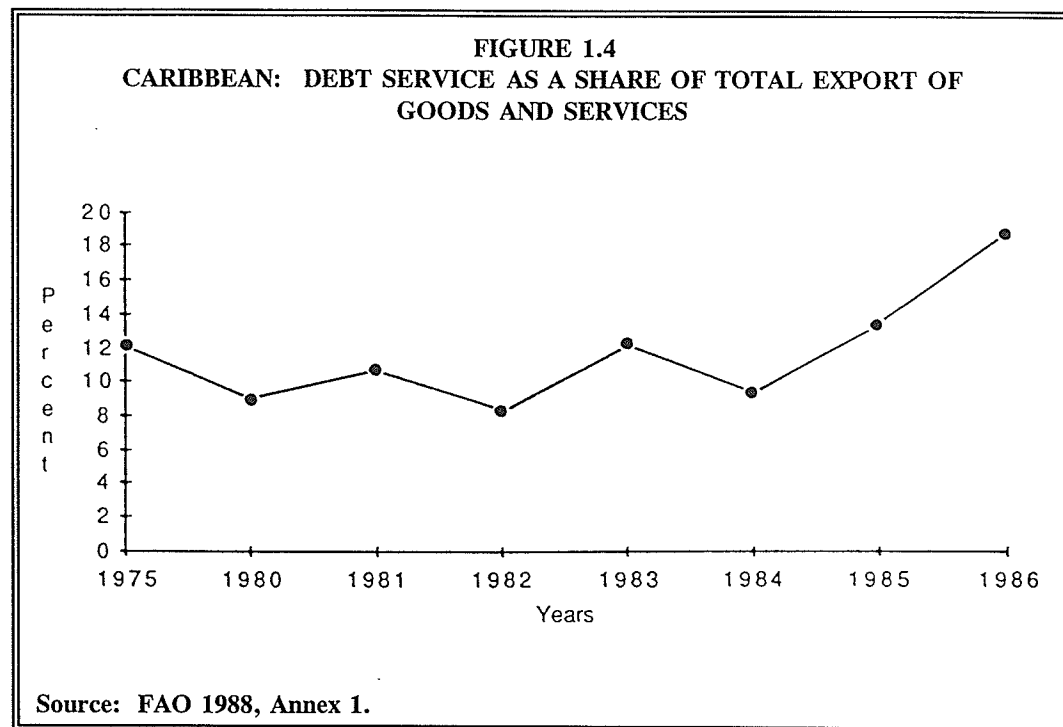
FIGURE 1.3
CARIBBEAN: EXTERNAL DEBT, 1975-1986



Source: FAO 1988 Annex 1.

average values occur. Jamaica, for example, allocated 32.7 percent of its export earnings to debt-servicing in 1986 (FAO 1988: Annex 1:145).

There is general consensus that the economic crisis which faced the Caribbean in the 1980s and was expected to carry through into the 1990s, is rooted in the foreign-debt situation (FAO 1988: Potentials for agricultural and Rural Development in Latin America and the Caribbean; Main Report:13). The burden of debt servicing has been further aggravated by a sharp decline in net financial flows (loans and net private investments) from external sources to the region. Countries which have been unable to meet their debt-servicing commitments are



often denied access to further loans and investments. This, along with bilateral debt rescheduling arrangements undertaken between individual countries and their foreign benefactors, partly explains the fluctuation in debt servicing evident in Figure 1.4. For example, Jamaica which recorded a 20 percent increase in

foreign debt between 1985 and 1986, had over US\$125 million rescheduled through the Paris Club (Planning Institute of Jamaica: Economic and Social Survey of Jamaica 1986:13).

With this brief background on the social and economic features of the Caribbean, the region's food situation which provides the contextual framework for this thesis can now be addressed. The ensuing discussions therefore focus on trends in food production, food import, agriculture balance of trade and land distribution and use.

Food Production

Generating data on Caribbean food production is an elusive task, primarily because agricultural production statistics do not exist in the CARICOM database, while major international statistical sources, such as the FAO and United States Department of Agriculture (USDA), have traditionally omitted the smaller Caribbean islands in their analyses, focusing instead on larger ones and the mainland territories of the region. However, food and agriculture-related studies undertaken in the region have invariably indicated a declining trend in both total and per capita food production (Brierley 1988:64; Chernick 1978:78; FAO 1988:52; Hills and Iton 1983:25).

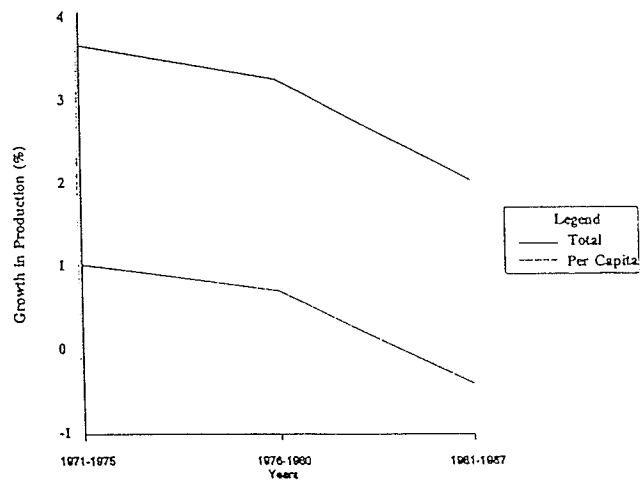
Figure 1.5 shows the growth rates of volume of total and per capita food

production in the Caribbean. Between 1971 and 1987 the growth rate of total food production in the region declined by 47.0 percent while per capita rates declined by about 140 percent over the same period. The slightly reduced gap between these growth rates reflects a slight reduction in the region's rate of population growth between 1971 and 1987. Indeed, the rate of natural increase declined by approximately 0.2 percent between 1975 and 1988. Paradoxically, reduction in food production coincides with improved nutritional levels indicated by daily calorie supply (Figure 1.6), reflecting the region's increased dependence on imported food to fulfill domestic demands.

Food Import

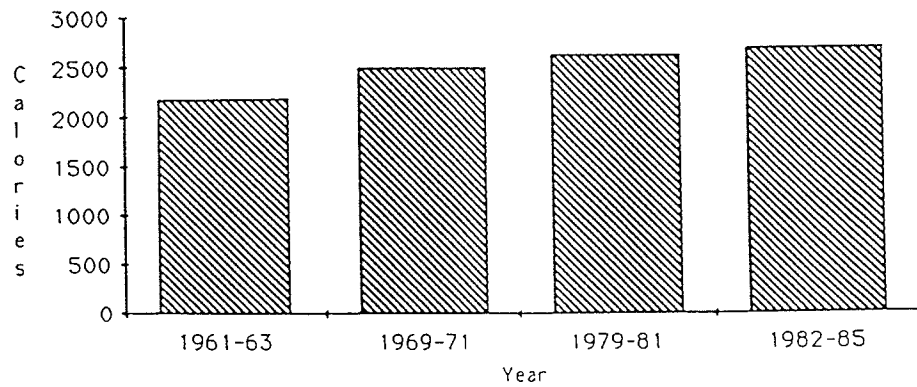
Figure 1.7 shows the index of food import volume for selected commodities between 1977 and 1986. With the exception of beverages, the general trend in the import of food commodities has been upwards. The downward trend in beverage imports is related to increased regional production and is inversely related to the trend in sugar import. The relationship between the import trends of these two items is based on the fact that sugar imports to the Caribbean were comprised mainly of refined sugar, because except for a single refinery at Caroni in Trinidad, sugar refineries are largely non-existent in the region. Refined sugar is the main sweetener used in beverages, and therefore as regional production of beverages increases so does the demand for refined sugar.

FIGURE 1.5
CARIBBEAN: GROWTH RATES OF TOTAL AND PER CAPITA VOLUME OF
FOOD PRODUCTION, 1971-1987



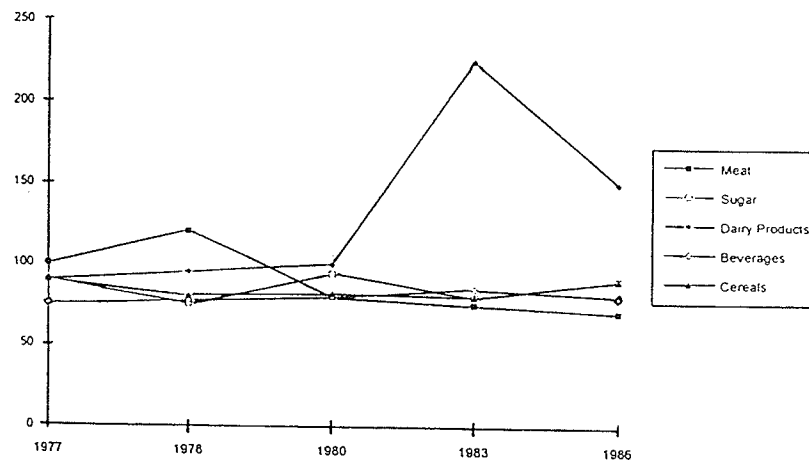
Source: FAO 1988 Annex IV

FIGURE 1.6
CARIBBEAN: DAILY CALORIC SUPPLY



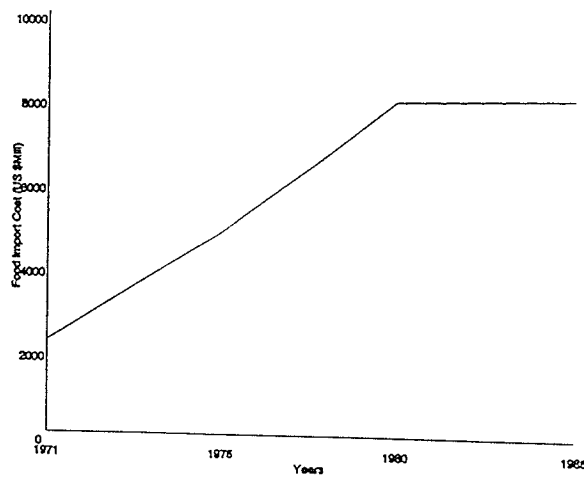
Source: FAO 1988 Annex IV

FIGURE 1.7
CARIBBEAN: INDEX OF FOOD IMPORT FOR SELECTED COMMODITIES



Source: Compiled from FAO 1988, Main Report

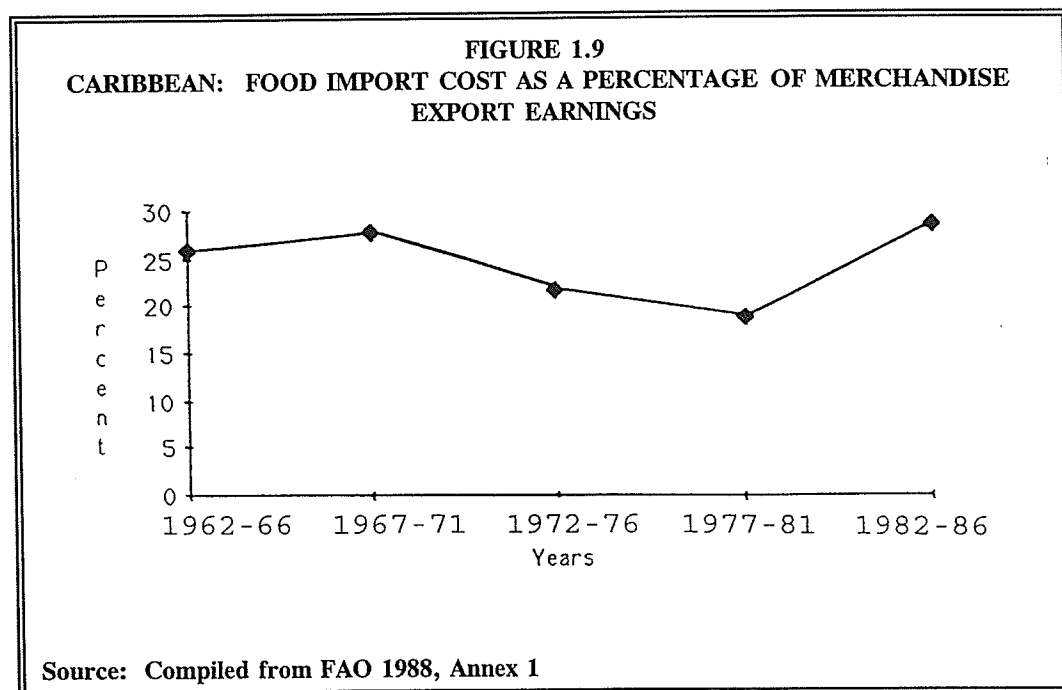
FIGURE 1.8
CARIBBEAN: FOOD IMPORT BILL



Source: Compiled from FAO 1988, Main Report

Increased dependency on imported food has led to an ever-escalating food-import bill (Figure 1.8), which nearly quadrupled in the fifteen years between 1971 and 1985. Regional economic decline and an economic crisis situation since 1980, have resulted in the expenditure of an increasingly larger portion of regional merchandise export earning on imported food (Figure 1.9), (FAO 1988, Potentials for Agricultural and Rural Development in Latin America and the Caribbean: Main Report: 14).

The decline in the proportion of regional incomes spent on food imports through the 1970s coincides with the period of global oil crisis of 1973, when rapid increases in oil prices among OPEC countries resulted in a steep rise in the pro-

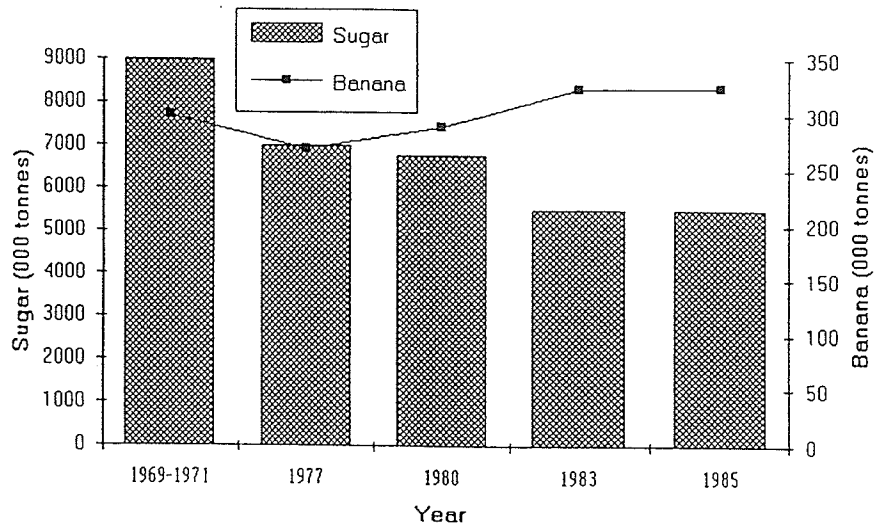


portion of Caribbean incomes spent on fuel, thereby reducing the significance of the food-import bill.

Agricultural Balance of Trade

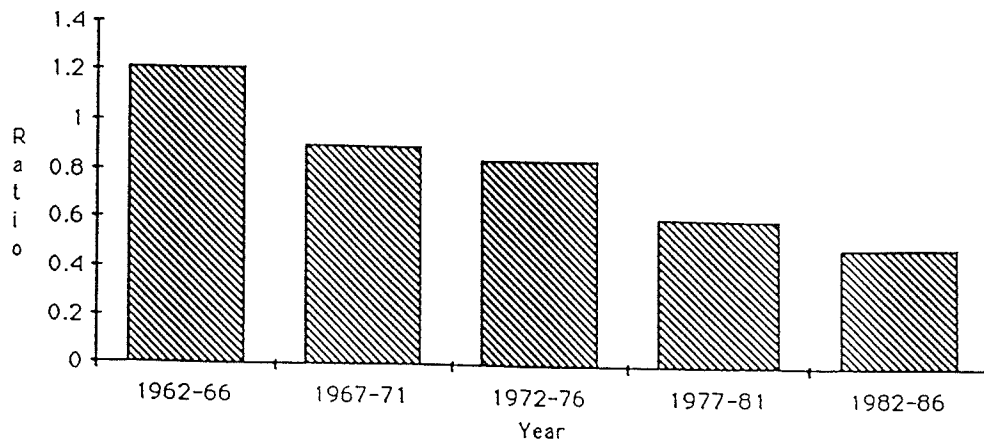
Although supporting empirical evidence has been mixed since the 1980s, it is commonly claimed that agricultural exports from developing countries tend to increase simultaneously with reductions in domestic-food production. This trend has fostered the conclusion that domestic-food production has been sacrificed in favour of export-crop production (Lappé et al. 1979:23). However, this observation does not hold true for the Caribbean because FAO statistical sources indicate that between 1969 and 1985, production of the region's primary agricultural export commodity, sugar, steadily declined (Figure 1.10). A similar trend was noted in the second ranking export commodity, bananas, at least until 1983 when a marginal recovery in production occurred. In addition, world market prices for major export commodities from the region have steadily fallen (The Economist 1975, August 10-16:9-10; August 6, 1988:10). The net effects of declining agricultural export revenues and increased importation of food and other agricultural commodities, have been an increasingly unfavourable balance in agricultural trade indicated by the ratio between value of agricultural exports and imports (Figure 1.11). Between 1962 and 1986 the ratio between the value of agricultural exports and imports declined from a favourable 1.22:1 to a less favourable value of 1:0.49. In these predominantly agricultural societies, the

FIGURE 1.10
CARIBBEAN: TREND IN SUGAR AND BANANA PRODUCTION, 1969-1985



Source: Compiled from FAO Production Yearbook 1975-1985

FIGURE 1.11
CARIBBEAN: RATIO BETWEEN VALUE OF AGRICULTURAL EXPORTS AND IMPORTS



Source: Compiled from FAO Production Yearbook 1975-1985

relationship between unfavourable balance of agricultural trade and worsening debt problems is immediately evident.

So far, the assessment of the food situation in the Caribbean has focussed primarily on the economic indicators, but food and agriculturally related studies conducted in the region have repeatedly pointed to socio-historical and socio-cultural considerations, which must be factored into these analyses if a comprehensive picture is to be gleaned. Because small farmers are the primary food producers, these considerations focus on the extent of their access to physical and economic agricultural resources. The general consensus is that extreme deficiency of these resources among these farmers has impacted negatively on improvements in the region's food security (Beckford 1983:1-22; Brierley 1988:71; FAO 1988, Main Report: 39-40; Jefferson 1972:79-84; Spence 1985:203-205).

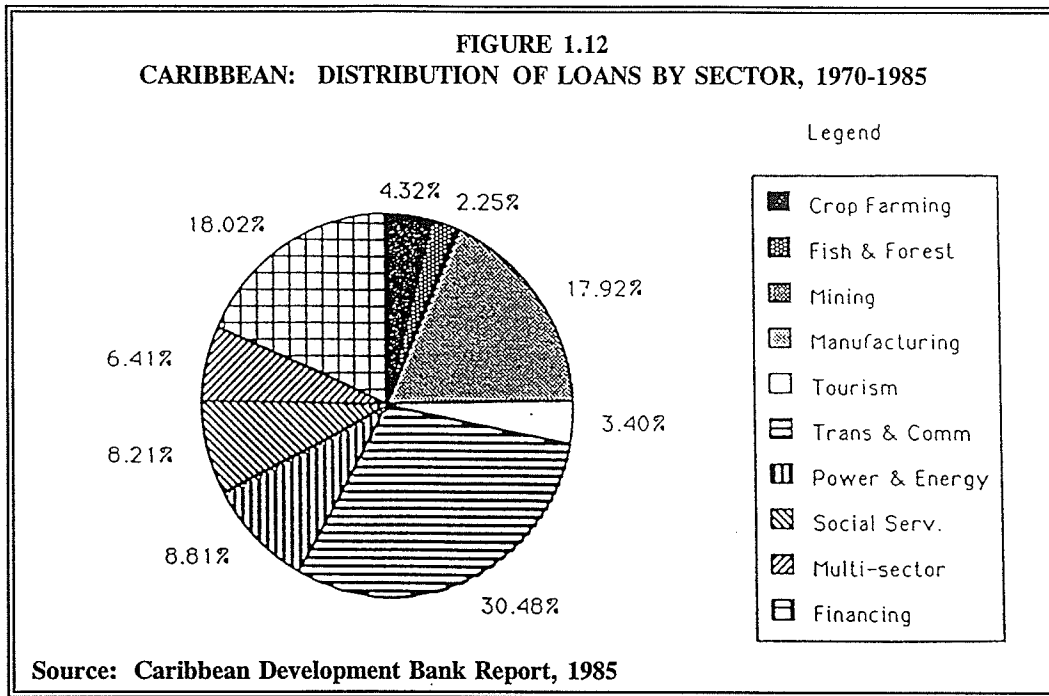
Land Resource Distribution and Use

As indicated earlier, arable land is extremely scarce in the Caribbean region. The FAO classifies 49.1 percent of the region's arable land as 'problem lands', i.e. lands with excessive moisture and/or unsuitable soils, while 47.3 percent was considered good arable land (FAO 1988 Potentials for Agricultural and Rural Development in Latin America and the Caribbean, Annex IV: Natural Resources and the Environment:32). Within this scenario of scarce agricultural land, there

often exists an extreme skewness in the distribution of both type and quantity of arable lands. Although current composite statistics on land distribution by size categories for the region are lacking, the 1981 Grenada Census reported that holdings less than two hectares accounted for 88.3 percent of all farms, yet occupied only 31.05 percent of farmland. In the same vein, findings published for Jamaica, revealed that in 1983, farms with five hectares and under, accounted for 91.3 percent of all farms, but occupied only 26.5 percent of total farm area (FAO 1988, Table 3.6, Potentials for Agricultural and Rural Development in Latin America and the Caribbean: Annex II Rural Poverty:46-47). The implications of this distribution in relation to Caribbean food security lie in the fact that small farms characteristically accounted for the bulk of domestic-food production, while larger farms tend to be export-market oriented. This situation is potentially more critical, since scholars, such as Henshall (1967:194) and Brierley (1974:284), argue that even small-farm production is largely export oriented. In essence therefore, a large proportion of the region's arable lands comprising the most fertile regions, occupied by plantations, along with even more marginal lands cultivated by small farmers, are devoted to export rather than domestic-food production.

Besides these agrophysical resource problems, domestic-food security is hampered by inequities in the allocation of economic resources to the agricultural sector in general and small-scale farmers in particular (FAO 1988 Potential for Agricultural

and Rural Development in Latin America and the Caribbean, Main Report:23; Jainairan 1976:22). Such inequities are symbolized by the sectoral distribution of credit from Caribbean Development Bank sources in 1985 (Figure 1.12). If crop farming is grouped with other agriculturally related sectors, such as fishery,



forestry and land settlement, to assess allocation to agriculture, this sector accounted for a mere 6.6 percent of total sectoral credit. This distribution is ironic given the rhetoric of Caribbean national and regional economists and planners in advocating revitalization of the agricultural sector in general, and small farming in particular, as the most plausible hope for sustainable economic development in the region (Chernick 1978, FAO 1988). At the international level the FAO is of the opinion that if advancement in the Caribbean's agricultural

sector is to be achieved, then small-scale farmers must be the focus of credit initiatives so as to promote equity (FAO 1988, Potentials for Agricultural and Rural Development in Latin America and the Caribbean, Main Report:39).

Thus, the potential role of agriculture in Caribbean regional development cannot be overemphasized. Prior to, and in the aftermath of the region's experimentation with import-substitution, industrial development models in the 1960s, development-related studies have repeatedly stressed the critical importance of agriculture, particularly the small-farming sector in any economic development strategy (Brierley 1974:xvii; 1988:63-64; Barker, Collymore and Spence 1983:2; Collymore 1985:11; FAO 1988:i; Hills 1988:1; Hills and Iton 1983; Jefferson 1972:76; Momsen 1969; O'Loughlin 1961). This crucial role of the rural sector in the development of Caribbean economies is aptly summarized by the FAO:-

The economic crisis of the 1980s has induced planners and policy-makers to reconsider the role of agriculture and the rural sector in development. Agriculture is seen as vital to the performance of the economies in the years of crisis and to the success of efforts towards structural adjustment and stabilization for two main reasons. Firstly, it has proved more resilient and less affected than other sectors by the external constraints and the downswing in overall economic activity. This is the result of the essential character of food, the presence of a subsistent component in farming and the comparatively low import content of inputs to agricultural production. Secondly, the sector's output is actually or potentially wholly tradeable.... (FAO 1988 Potentials for Agricultural and Rural Development in Latin America and the Caribbean: Main Report:i).

In specific reference to the obstacles faced by small farmers in contributing to the region's development process, the FAO study states:

The bias against small-scale producers and peasants in agricultural policies and programmes keeps them from reaching their potential or even sharing equitably in progress (FAO 1988:78).

The Case for a Geographic Study

Against the backdrop of these trends in food production and export, agricultural balance of trade and resource distribution, the maleffects of continued stagnation and decline in Caribbean domestic-food supply are evident, and the need for a comprehensive solution unquestionable. Within the existing status quo, whereby, small farmers account for the bulk of domestic-food production, solutions to problems of domestic-food security must be preceded by identification and comprehension of factors which impede improvements in domestic-food output from the small-farming sub-sector. Since these factors are rooted in a variety of disciplines, mainly in the social sciences, a synthetic and interdisciplinary approach is appropriate. A geographic approach is considered to be appropriate, because it is a discipline of synthesis, having a subject matter and methodology which are truly interdisciplinary.

Although geographers are suitably equipped to understand and explain the agriculture and food situation in the Caribbean, there is a paucity of geographic literature addressing what might be considered the most colossal problem facing

the region. Pioneering geographical studies have been undertaken by a number of scholars, including Brierley (1968, 1974), who provided a comprehensive descriptive and analytical report on small farming in Grenada, modelling earlier studies by Momsen (1969) in Barbados and Maharaj (1969) in Trinidad, in the use of factor analysis as a statistical tool for identifying key variables in the small-farm systems. Momsen (1969), a pioneer and authority on Caribbean agricultural geography, extensively explored land use, and has subsequently broadened the scope of her research to include various other factors of small farming, such as gender roles in the region's small-scale farming (see Momsen 1988 in Brierley and Rubenstein eds. 83-99). Collymore (1985) investigated aspects of agricultural decision-making in St. Vincent. Hills and Iton extensively explored the ecology of Caribbean food forest (Hills and Iton 1982, 1983). During the 1960s and 1970s, Innis provided intensive insights on the rationality of Caribbean small farmers in their agro-environmental decisions (Innis 1961, 1971b, 1973). More recently, Paquette has undertaken perception studies to explain the attitude of small farmers to their environment (Paquette 1982).

In spite of these pioneering geographic works, economic and agronomic studies continue to dominate in Caribbean small farming. In this respect, the need for geographical studies cannot be overemphasized. With the exception of Edwards' (1961) study in Jamaica, most economic-agronomic studies have adhered to a conventional diagnosis of apathy, backwardness and inefficiency among small

farmers (see Dumont and Rosier 1969), but increasingly, research undertaken particularly by geographers and anthropologists is contradicting this stereotype. As such, the time is opportune for a reappraisal of Caribbean agriculture within the context of this newly emerged perception. The appropriateness of this research topic is also justified in light of continuing stagnation and decline in Caribbean domestic-food production and the worsening economic situation in the region. The vital role of the region's small farmers to improve, if not reverse this trend, demands a more intensive focus on the small-scale farming sector of each territory. It is only by this means that a comprehensive regional composite of the conditions and requirements of this sector can ultimately be derived. The necessity for this regional composite becomes more relevant in light of emerging regional perspectives on agriculture within the regional integration movement - CARICOM. CARICOM's major objective in regional agricultural strategies is the attainment of food security, and the high priority given to this objective is reflected in the ratification of a Regional Food Plan (RFP) by Caribbean Heads of Government in 1975. Although an admirable concept, the success of the RFP depends on accurate and comprehensive assessments and evaluations of the regional situation. This can be most effectively achieved through micro-studies to enhance national appraisals of small farming.

The Appropriateness of Jamaica for Study

It is within the context of a regional perspective on Caribbean agriculture that this

study was undertaken to investigate the nature and structure of domestic-food production and small farming in Jamaica. Jamaica is particularly suitable for this study for the following reasons:

- 1) It has the largest total population, as well as population in agriculture of all the territories comprising CARICOM. In this respect this island is representative of the general problems which relate to domestic-food supply in the rest of the Caribbean. In 1993 Jamaica had a total population of 2.5 million and a growth rate of 0.9 percent per year (Planning Institute of Jamaica, 1993: 17.1). Of the economically active population 24.4 percent were employed directly in agriculture (Planning Institute of Jamaica, 1993: 18.3). In spite of its position as the main employer of human resources, agriculture's contribution to the island's economy has steadily declined from about 13 per cent in 1974 to 7.4 per cent in 1993 (Planning Institute of Jamaica 1993: 1.6). Thus, the range of problems related to food security and economic development throughout the Caribbean are represented by Jamaica on a larger scale than by any other CARICOM member.
- 2) Jamaica's low cropland availability (Table 1.2) compared to the other CARICOM members, only amplifies the problem of food security, yet not a single comprehensive study of agricultural in relation to nutritional density has ever been undertaken. Edwards (1961) conducted a comprehensive economic study of small farming in Jamaica and although this research has been of immense value in understanding the island's small-farming sector, it is now out of date, having been undertaken over 30 years since it was undertaken - a factor which lends support to the need for a study at this time.
- 3) Jamaica's range of ecological zones, human and agrophysical resources make it representative of the rest of the Caribbean.

Aims and Methodology

By studying the nature and structure of small farming in relation to domestic-food security on the Caribbean island of Jamaica, the aim is to rationalize the plethora of factors which impact on small farming and by extension, domestic-food supply,

thereby providing an educated basis for the formulation of initiatives to combat the problem of domestic-food security. As such, human, agrophysical and infrastructural resource considerations are the foci of this rationalization.

Having established the appropriateness of Jamaica for this study, it is important to ensure that sampled farms are representative of the main small-farming systems found in Jamaica. Edwards (1961:40) argues that spatial variations in types of farming in Jamaica are influenced mainly by ecological variations, therefore the sample should ideally cover the major ecological characteristics of the island. In this regard there are two possible approaches to choosing such a sample. The first could be to replicate the methodology used by Edwards (1961) by selecting study sites within major ecological zones across Jamaica, and sample farms from each. However, there is a drawback to this methodology in that, because such sites tend to occur in different parishes, their statistical bases are inconsistent and as a result, analyses and conclusions tend to be piecemeal. The second and more geographical-based option was to identify a single statistical unit possessing the widest possible range of ecological characteristics found in Jamaica and sample throughout that unit. Indeed, this is the approach advocated by Casley and Lury (1982:240). A purely physical-oriented set of criteria would be insufficient because the specific identity of farming systems is the result of interaction between physical and socio-economic factors. In this regard, consideration was also given to socio-economic phenomena, particularly those associated with

historical development, population and agronomic practices. In Jamaica parishes are the local administrative units comprising national government, provide the ideal statistical unit for research. In this regard, the parish of Clarendon was selected as the study site because it represents a physical unit defined by the Rio Minho drainage basin in which the major ecological characteristics of Jamaica are present.

Field research was undertaken over the five-month period between September 1987 and January 1988, and involved collection of available data that would indicate the status of domestic-food security and small farming in Jamaica. A questionnaire survey of small farmers provided information on their human, agrophysical and infrastructural resource profiles.

Critical to the sampling process was an explicit definition of small farmers. Throughout the Caribbean a variety of terms and definitions have been used to describe the operators of small-scale farming enterprises in the region. They have been dubbed "peasants" (Marshall, 1968; Smith, 1960; West Indies Royal Commission, 1945), "small holders" (Jefferson, 1972), and "small farmers" (Brierley 1974; Edwards 1961; Hills and Iton 1983; Momsen 1969). Invariably, the terms refer to the area of a land holding accessible by an individual for the purpose of farming. However, this definition is not always clear-cut, especially when the use of expressions such as "landless peasant" serve to confound the

issue. These variations in terminology are undoubtedly related to a lack of consensus in the ways by which a farm and farmer are defined in different parts of the Caribbean and at different time periods.

In Jamaica, a small farmer was officially defined by the Agricultural Census of 1979 as the occupier of ten hectares or less of land. However, because over 91 percent of all farms are four hectares or less (FAO 1988:46-47), researchers frequently apply this lower land-access ceiling in their definition (Edwards 1961; Paquette 1982). Thus, there is a tradition associated with this size limit, hence it is employed in this study. Based on the Preliminary Farm Register for the parish of Clarendon, 10,062 or 62.5 percent of all farmers in the parish were classified as small farmers. A sample of 263 farmers (2.6 percent), representing major ecological zones of the parish, were surveyed. The method of sampling used is discussed within the context of the survey methodology in Chapter 4.

Data generated from the questionnaire survey was transferred to 80-column computer data sheets to facilitate easy input for computer analysis. Analysis was carried out, using a computer statistical package - the Statistical Package for Social Sciences (SPSS).

Preliminary results showed that in order to rationalize the milieu of factors which impacted on small farming, it was imperative to devise a classification scheme.

Five categories of farming were identified, namely: vegetable and legume, domestic provision; traditional export field crop; traditional export orchard crop; and traditional export non-orchard crop. These categories of farming are examined in relation to their human, agrophysical and infrastructural resource profiles, so as to shed light on the nature of their development and its implications for domestic-food security.

Organization of the Study

Besides setting the stage for the research problem, the first part of this study presents a historical review of initiatives which have been undertaken to deal with the problem of domestic-food security in the Caribbean, since current initiatives are often founded in previous plans. This review therefore examines the significance of pre-World War II West Indies Royal Commission Reports; pre-independence initiatives, such as those contained in the Report on Economic Potentials and Capital Needs of the Eastern Caribbean and the Report of the Tripartite Economic Survey of the Eastern Caribbean, post-independence regional development initiatives, namely, the Caribbean Free Trade Association (CARIFTA), the Caribbean Community and Common Market (CARICOM) and the Caribbean Basin Initiative (CBI). This section is followed by a brief examination of the socio-economic characteristics of Jamaica's agricultural economy, focusing on its structure, resource distribution, land tenure and agrarian infrastructure. This section also provides a general social profile of small

farmers. An explanation of the design of the questionnaire and sampling procedure employed in the study, follows. The next three chapters present the human, agrophysical and infrastructural profiles of small farmers based upon analyses of the questionnaire and general observations. The results of these analyses provide a foundation for the classification of small farming by type, and provide a set of norms against which subsequent analyses of the five categories of small farming can be compared and contrasted. Development of the categories of farming is hypothesized and the study concludes by providing suggestions of the applied value of the findings in developing sound initiatives for improving domestic-food security in Jamaica.

Summary

The Caribbean has experienced accelerated negative trends in food security over the past three decades, a factor which partly explains the current economic crisis confronting the region. Undoubtedly, the region has the physical and economic potential to improve its level of food security through domestic-food production, but this potential can be realized only if small farmers, the constraints they face and the systems they operate are adequately understood. Developmental initiatives for small farmers in the region have invariably left planners frustrated when what appears to be sound innovations fail. The basic problem, which neither researchers nor development planners have yet fully appreciated, relates to socio-economic, socio-cultural and agrophysical factors which underlie the

behaviour of small farmers and the farming system they operate. While it would be overambitious of this study to propose solutions to the myriad of problems relating to domestic-food security in the Caribbean, it is hoped that by providing new insights on the human, agrophysical and infrastructural resources of small farmers within the context of their cultivation practices, erstwhile misconceived perceptions and strategies will give way to educated and meaningful developmental initiatives. The underlying premise of the study corroborates with the approach advocated by scholars such as Chambers (1983:163); Eckholm (1982:3); Hills and Iton (1983:26); Innis (1980:4), that small farmers in the Caribbean and in other developing regions are knowledgeable about their agroenvironments, rational in their decision-making, innovative and efficient in their cultivation practices and will embrace external innovations if long-term benefits can be guaranteed.

CHAPTER 2

CARIBBEAN AGRICULTURAL DEVELOPMENT PLANNING: A REVIEW

The gloomy situation in Caribbean food security was highlighted in Chapter 1. This situation has persisted for nearly a century since recognition that small farmers have an important role to play in improving regional food security, and despite countless and diverse initiatives undertaken to resolve this problem. Thus, the need to review and assess small farming development strategies in their historical context is underscored. This chapter examines the main initiatives which have been undertaken in the Caribbean. They begin with the initial official acknowledgement by the 1897 Royal Commission of the region's need for food security and of the crucial role the small-farming sector must play. To this end, the chapter is divided into three chronologically arranged periods, with the beginning of each representing benchmarks in the evolution of Caribbean agricultural policies as they relate to the region's food security. The first period starts with the report of the West India Royal Commission, 1897, and extends to 1945, when the Report of the West India Royal Commission, 1938/39, was published. The second period begins in 1946 and ends in 1962 when political independence became widespread in the Commonwealth Caribbean. The final period is that of the Post-Independence era extending from 1962 up to the time of this study.

EARLY PERIOD (1897-1945)

Caribbean agricultural development policies and initiatives of the early period are largely contained in three major Royal Commission Reports. These are the:

- 1) Report of the West India Royal Commission 1897, with a subsidiary report by D. Morris, 1897 (WIRC 1897);
- 2) Report on the Sugar Industry of the West Indies and British Guiana, West India Royal Commission, 1929-30 (WIRC 1929-30); and
- 3) West India Royal Commission Report, 1938-39, with a subsidiary report by Professor F.L. Engledow (WIRC 1938-39).

These reports, but particularly that of 1938/39, can be regarded as the cornerstones for small-scale agricultural development planning, because past and even some contemporary initiatives have followed the basic guidelines laid down by them. The contributions and relevance these reports have had upon small-farming development and domestic-food security, policy-making and development strategies should not be underestimated.

Report of the West India Royal Commission, 1897

The Report of the West India Royal Commission, 1897, can be regarded as the "Magna Charta of West Indian peasants", because it represents the first official acknowledgement of small farming as an alternative to plantation labour as a source of employment and income for the labouring population of the West Indian colonies, i.e. the region defined as the Caribbean in this study (Marshall 1968: 262; Shepherd 1947:63). Appointed in 1896, the Commission's mandate was to

"provide full and authentic information" as to the true cause of the then occurring depression in the Sugar Industry of the British West Indies. This mandate interfaced with the small-farming sector, because a secondary objective was to evaluate the effect the "total or partial extinction of the Sugar Industry would have on the condition of the labouring classes" (WIRC 1897:1).

Of relevance to this study are the pioneering proposals related to developing the small-farming sector. The Commission's enunciation that small farming, then referred to as peasant cultivation, could co-exist with plantation agriculture without being detrimental to export-crop earnings represents the first official acknowledgement that small-scale agricultural could play a role in the development of Caribbean societies. Aware that the mere settlement of the labouring class as small proprietors would not necessarily improve their welfare, the Commission pointed to "deficiency" of agricultural education as a major drawback to the system of peasant proprietorship. To redress this "want of knowledge" in the small-scale agricultural sector, the need for a system of training in agricultural occupation was stressed (WIRC, 1897:19). Besides recommending the settlement of peasants on the land and educating them in agricultural methods, the Commission acknowledged the need to provide state or state-guaranteed loans to "private persons engaged in agriculture" (WIRC, 1897:21). While this appears to be an indirect hint of the crucial role credit should play in small farming, the Commission stopped short of recommending

this as general policy because provision of,

... state loans or a state guarantee is so liable to be mismanaged, and so likely to end in the loss of the money advanced that we hesitate to recommend its general introduction (WIRC, 1897:21).

This stance by the Commission amounted to a denial of access to credit for small-scale agricultural producers involved in domestic-crop production. No such denial was evident in the case of sugar planters, because although its position with regard to the provision of government loans applied to "private persons engaged in agriculture", in its concluding observations and summary the Commission recommended several financial incentives and provisions for the major industry and, hence, for sugar planters. This attitude towards the peasantry reflected the stereotypical perception of the West Indian labouring class then in vogue. The labouring population in the region was mainly Negroes, who were perceived to be unreliable, "open-handed" and "careless as to the future" (WIRC, 1897:17). This is a minor criticism, however, in light of its bold and well-intentioned proposals for the improvement of the West Indian peasantry.

Despite the Commission's recommendations for initiating self-sustaining development of the small-farming sector, very few attempts were made to implement them. In the Eastern Caribbean, where the Colonies were worst affected by the recession in the sugar industry, Shepherd (1947) noted with regard to land-settlement schemes for peasants, that with the exception of St. Vincent, the Commission's recommendations were not implemented until 1916 when

Antigua's government implemented one. This situation did not imply resultant stagnation in the small-farming sector, because global economic expansion before and after World War I created markets for West Indian agricultural produce. Banana became a major export crop, especially from the larger territories such as Jamaica, and even the ailing sugar industry experienced a fleeting recovery in the early 1920s (Marshall 1968:267). Temporary emigration of Caribbean labourers to work on the construction of the Panama Canal between 1904-1914, provided many individuals with enough capital to purchase land on their return to become farmers. Although banana cultivation on poor soils and hilly locations aggravated the land-resource problem, small farmers were able to improve their financial situation through banana cultivation (Lewis 1936:3). These reliefs in the general economic conditions of the British West Indies were brief, because the global economic recession in the Western world, which began in 1929, dealt a severe blow to the recuperating sugar industry and, indeed, the entire economy of the British West Indies. Despite the negative prospects for recovery of the sugar industry, portrayed in the 1897 Royal Commission Report, the industry's brief recovery in the 1920s might have encouraged the British Government as to its viability, because at the first sign of recession in 1929 the British government immediately commissioned an investigation of the industry.

Report on the Sugar Industry of the West Indies and British Guiana, West India Royal Commission, 1929-30

The West India Royal Commission, 1929-30 (Sugar Commission) was appointed

in 1929, with a similar mandate to that of the 1897 Commission. Its observations and recommendations in relation to West Indian small-scale farmers were almost a verbatim reiteration of those of 1897. Once again, the issue of land settlement and its critical role in regional economic stability for peasants re-emerged, so that, the Sugar Commission considered: "the increased settlement of labourers as peasant proprietors to offer the best prospect for establishing a stable and prosperous economy in the West Indian Colonies" (Shepherd 1947:68).

The Commission was also regretful that "so little has been done to carry out the recommendations of the 1897 Commission in this direction" (Shepherd 1947:68). The failure of colonial administrators to effectively deal with this fundamental problem in West Indian small-scale agricultural development is neither surprising nor unique, because the issue of land reform has historically been a political minefield. The West Indian colonial plantocracy still represented a formidable lobbying force in administrative decision-making, and in many instances, their members occupied key positions in colonial administrations. Land reform, through the settlement of peasants, evidently would not be in their interest. Worsening social and economic conditions of the West Indian peasantry, as well as the genesis of political awareness in the region, culminated in widespread unrest throughout the West Indies in the 1930s. This situation occasioned the appointment of yet another Royal Commission in 1937, to investigate the source and make recommendations to ameliorate these social and economic conditions.

The fact was that the problems identified by the 1897 Royal Commission were still present in the 1930s, except now to a degree that exacerbated the deplorable lot of the common people.

The West India Royal Commission Report 1938-39 (Moyné Commission Report)

The West India Royal Commission 1938-39 was convened under the chairmanship of Lord Moyné. To date, this Royal Commission Report, hereafter referred to as the Moyné Commission Report, represents the most comprehensive assessment of the general economic and social conditions of the Anglophone Caribbean. Hence it served as the basis of much socio-economic planning throughout the region. Although the Moyné Commission's investigation was undertaken between 1938-39, its findings and recommendations were not published until 1945 owing to the sensitive nature of such information during World War II. In its general remarks on the region's agricultural policy the Moyné Commission pointed out the outstanding agricultural needs of the British West Indies, as being those of increased food production in order to support even the existing low standard of life among a rapidly increasing population, and that "the most helpful line is the development of peasant agriculture" (WIRC, 1945:287). The aim of agricultural policy in the British West Indies was considered by the Commission to be "the greatest possible measure of self-sufficiency in essential foods" because the

colonies were importing "large quantities of food" to meet domestic demand (WIRC 1945:287).

Summary of Recommendations of the West India Royal Commission, 1938-39, relating to Small Farming

Foremost in the Commission's recommendations, was the design and adoption of agricultural policies to increase domestic food self-sufficiency of the British West Indies. The means to achieving this goal were through i) the development of the peasant agricultural sector, ii) the promotion of agricultural diversification and iii) the provision of rural employment. While these basic recommendations were undoubtedly welcomed by the West Indian peasantry, strong opposition was voiced by some national planning organizations. For example, the Jamaica Agricultural Policy Committee, while acknowledging that improved agricultural methods would aid the region's agricultural problems, argued that peasant agriculture could not be relied upon to provide employment for the region's increasing population. In the same vein, the Jamaica Nutrition Committee doubted whether the recommended improvements would even maintain the existing level of nutrition, given the rapidly expanding population (Lewis 1951:16). Simey (1946), in a sociological perspective of the topic, **Welfare and Planning in the West Indies**, argued that land and labour assigned to the sugar industry produced much higher returns in the way of flour and saltfish, than the same amount of land and labour put into the growing of yams and beef (Simey

1946:141), thereby advocating continuation of reliance on food imports.

The Moyne Commission's recommendation of policy focus on the peasant sector to enact improvements in food security was admirable, particularly since it occurred at a time when British colonial policies for the economic development of the West Indian colonies were invariably externally oriented. However, it can be argued that by failing to emphasize the issue of land reform, the Commission had in fact side-stepped the fundamental cause of the undesirable state of the region's domestic agriculture, thereby jeopardized the validity of its recommendations for socio-economic reform of the peasant sector. In an apparent compromise, it recommended greater involvement of plantations in domestic-food production, as well as a comprehensive reassessment of West Indian land capabilities. With respect to the latter, it was suggested that the Imperial College of Tropical Agriculture (ICTA) at St. Augustine in Trinidad, itself an outcome of the 1897 Royal Commission recommendations, embark on a comprehensive soil survey of the region. In accordance with its conviction that previous initiatives undertaken to improve small farming in the region had failed, because "they were lacking in scope and were based on inadequate information", the Moyne Commission recommended a comprehensive study of peasant agriculture to enhance policy makers' understanding of the agro-environment of small farmers.

While the Commission stopped short of recommending a specific credit policy for small farmers until their specific needs could be identified, the urgency for "special action" was cited (WIRC 1945:296). The formulation of a credit policy was left to the colonial administrators, but the Commission cautioned that:

... arrangement for the grant of financial assistance to peasant agriculture in the West Indies is unlikely to be successful unless the standard of agricultural knowledge and ability is substantially improved (WIRC 1945:296).

To this end, the Commission suggested that practical aspects of agricultural education be introduced at the elementary level of the education system, particularly in rural areas (WIRC 1945:121-122, 299). Post-elementary agricultural education was to be confined to the Hope School of Agriculture in Jamaica and ICTA in Trinidad. In addition, it was suggested that the holding of agricultural shows and training sessions for young and old farmers alike, would prompt a greater interest in the more informal aspects of agricultural education.

Based on its observation of the absence of "sufficiently informed attention to agricultural policy", the Moyne Commission recommended the appointment of an Inspector-General of Agriculture for the Colonies. The principal duties of this officer would be: to advise the Colonial Governments on agricultural policy and on the organization and working of their individual Agricultural Departments; to decide which problems would be investigated centrally at ICTA; to take steps to ensure the fullest utilization of the results of those investigations; to act on these and other matters as directed by the Agricultural advisor to the Secretary of State

for the Colonies; and to report regularly to him on all these matters (WIRC 1945:297-298).

During World War II some Colonial administrations began to implement some of the Commission's unpublished recommendations, so that an evaluative document, the **Statement of Action on Recommendations**, was published concurrently with the Commission's Report in 1945. This document outlined some of the early responses to policy recommendations of the Moyne Commission, and noted significant improvements in West Indian domestic agriculture during the war years. Whether these improvements were actual responses to the recommendations of the Commission, or whether they were forced by the limited external food sources during the War is debatable, but this positive change was likely accounted for by both factors. Substantial improvements were noted in the area of domestic food-crop marketing, particularly with respect to the establishment of marketing boards and corporations for the systematic collection and sale of small-farmers' produce, with guaranteed prices to farmers (Statement of Action on Recommendation 1945:80).

The provision of agricultural credit to the small-scale agricultural sector was another area in which significant strides were made during the war years. Agricultural-credit programmes and institutions mushroomed throughout the British West Indies during the war years. In Trinidad, the growth of agricultural

credit societies was remarkable. Whereas in 1941 there were 60 registered societies, this number had increased to 123 by 1944. Also by 1944, British Guiana had instituted a Co-operative Credit Bank Ordinance, which provided low-interest loans to small producers. This institution served to discourage exploitation of peasants by local money lenders who normally provided loans at exorbitant rates. In Jamaica, an Agricultural Loans Societies Board was established to educate small farmers in the use of agricultural credit. In Barbados, provision of credit to small farmers was made through the institution of a Peasants' Loan Bank with funding provided under the Colonial Development and Welfare Act. Overall, and despite the absence of a credit policy recommendation in the Moyne Commission Report, the British Government seems to have been sincere in its efforts to encourage this aspect of colonial agricultural development, since many of the newly created schemes were underwritten by the Colonial Office.

The Moyne Commission had recommended the centralization of all major agricultural research at ICTA. By 1944 this institution had undertaken surveys of peasant farmers in the Windward and Leeward Islands in accordance with the Moyne Commission's call for greater understanding of small farmers and their agro-environment. Soil conservation and erosion studies were also given priority on its agenda, so that by 1944 considerable progress had been seen, particularly in Antigua, St. Kitts, St. Vincent and parts of Jamaica (Statement of Action on

Recommendations, 1945:71). In addition, ICTA established an agricultural and veterinary research station in Trinidad to educate farmers on mixed-farming practices through demonstration and experimentation.

One of the earliest responses to the recommendations of the Moyne Commission was the appointment of an Inspector-General of Agriculture for the Colonies in 1940. It is noteworthy that although the Commission's Report recommended that the Inspector-General of Agriculture operate independently of the West India Welfare Fund, the appointee's directives emanated from the Comptroller of that Fund. This is in realization that successful agricultural development cannot be separated from initiatives to improve the quality of rural life (Simey 1946:168).

The integration of education and agriculture was given high priority in the new approach to agricultural development. It was in recognition of the crucial role youth could play in the region's agricultural development that an attempt was made to initiate youth into desirable agricultural practices as early as the elementary level of the school system. Much of this initiative was executed through the creation of the 4-H movement, which did not only provide theoretical and practical agricultural education for youths, but also attempted to instill in them the need to strive for the highest quality and efficiency in their agricultural endeavours. These initiatives were executed through competitions in agricultural

excellence among schools and youth organizations, and the rewarding of the best competitors.

Indications are that substantial and genuine efforts were undertaken by colonial administrators in conjunction with the Colonial Office, to act on the findings of the Moyne Commission. But, despite these efforts, very little had changed in West Indian small farming twenty years later, when many of the colonies became independent nations. Certainly, a radical transformation in West Indian agriculture could not be expected within this short time frame, but even in the late 1950s and 1960s researchers of Caribbean agriculture were reporting that even minimal transformation had not occurred. Thus, in his economic study of small farming in Jamaica, Edwards (1961:249) concluded that the majority of small farmers still followed traditional practices. Likewise, a report on the economic potential and capital needs of the Leeward Islands, Windward Islands and Barbados concluded that in general "the agrarian revolution, or evolution which has led to the emergence of the peasantry as an important element in agricultural production is far from complete", and that in general the agriculture of the smaller territories is impoverished (O'Loughlin 1963:5). Marshall (1968) in a historical summary of small farming in the West Indies, echoed similar sentiments: "The agricultural revolution proclaimed as official policy in Jamaica since 1902 and hinted at in these Reports (i.e. the 1897 and 1945 Royal Commission Reports), has still not occurred" (Marshall 1968:262).

POST WAR PRE-INDEPENDENCE PERIOD (1946-1962)

The late 1950s and early 1960s saw the independence of the larger territories of the British West Indies, following an unsuccessful attempt to promote social and economic development through federation of the colonies in 1959. The West Indian Federation, which was an attempt at political and economic amalgamation of the former British West Indian colonies at the end of the colonial period, anticipated the alleviation of economic hardships of the smaller and worse-off territories through this agreement. But this proved to be a major factor in the failure of the federation movement, since the larger and more prosperous territories were opposed to the idea that they would have to bear the economic burden of the smaller less-fortunate ones.

The failure of the Federation Movement in 1957 and the birth of nation states in the Caribbean did not, however, mean the abandonment of a regional approach to the development process. In spite of their sentiments for nationhood, Caribbean governments have long realized that economic survival and independence of individual territories, are dependent upon regional economic cooperation (Axline 1979:70-71). In this regard, post-independence regional agricultural development strategies have been an integral part of Caribbean regional development initiatives. The quest for regional integration strategies also reflected the developmental thinking of that period, and particularly the "diffusion" or "trickle-down" models of development which were being

experimented with in Central and South America (Axline 1979:70).

POST-INDEPENDENCE REGIONAL DEVELOPMENT INITIATIVES

Three main regional development initiatives have been undertaken in the post-independence period. These are:

- 1) the Caribbean Free Trade Association;
- 2) the Caribbean Community and Common Market; and
- 3) the Caribbean Basin Initiative.

Each will be subsequently discussed in regard to their impact upon the agricultural sector.

The Caribbean Free Trade Association

The Caribbean Free Trade Association (CARIFTA) was ratified by Commonwealth Caribbean heads of Government in 1968. This agreement created a free-trade area encompassing the entire Commonwealth Caribbean (Axline 1979:83). The establishment of CARIFTA represents a watershed in the movement towards regionalism in the Caribbean, and is a legacy of the defunct West Indies Federation, as well as the precursor of the Caribbean Community and Common Market which was established in 1974 (Demas 1966:13-28). Within this agreement the issue of regional agricultural development was addressed through the creation of the Agricultural Marketing Protocol (AMP), as the basis for rationalizing agricultural production in the region; reducing dependence on

food imports from outside the region; and providing benefits for the agriculturally less-developed territories (Axline 1979:112; 1986:73). Despite the good intentions of the AMP, its creation aggravated polarization within the Caribbean, because in addition to being less industrialized, poorer countries of the region, such as St. Lucia, St. Vincent and Dominica, were least competitive in agricultural production. The guaranteed minimum regional price of the AMP stimulated greater production in the more-developed territories, but further weakened the position of the poorer countries. To offset this undesirable outcome, and to build real compensatory aspects into the regional agricultural system, the Guaranteed Market Scheme (GMS) was devised to ensure protected access to the markets of the more-developed countries for the agricultural products from the poorer countries (Axline 1979:12; Roache 1976:21-29). The creation of the Caribbean Development Bank (CDB) as the main regional financial institution also promised further rationalization of Caribbean agricultural production. Many of the regional agricultural development plans, initiated by the CARIFTA agreement, were subsequently refined and formalized by the Caribbean Community and Common Market agreement in 1974.

The Caribbean Community and Common Market

The commitment of Caribbean governments to strengthen CARIFTA and advance the regional integration process led to the creation of a more comprehensive

agreement - the Caribbean Community and Common Market (CARICOM) - in 1974.

CARICOM's goals, as outlined by the Commonwealth Caribbean Regional Secretariat (CCRS), are to overcome the conditions of regional underdevelopment, and agricultural stagnation and dependency, through national and regional policies aimed at promoting social and economic development (CCRS 1972:35-37; Axline 1979:126-127). The global economic crisis of 1974 drew attention to the Caribbean's high degree of dependence on imported food. It also initiated a more positive step towards solving regional agricultural problems by creating the Caribbean Food Corporation (CFC) as a first step in the implementation of a Regional Food Plan (RFP) to combat the food import bill, which in 1974 stood at US\$500 million. The first step in the implementation of the RFP was the amalgamation of the AMP and GMS to improve the overall food distribution system in the region. The objective of these changes was to stabilize the income of the agriculture-dependent poorer members and improve gross regional production (Axline 1979:64). The CFC was spawned from efforts to improve intra-regional agricultural trade through the establishment of joint regional projects. These projects were merged in 1977 into what is now known as the RFP, which established as priority the development of a livestock complex, since the bulk of the food import bill was accounted for by livestock products. In addition, the RFP aimed to achieve self-sufficiency in animal feed, fish and

vegetables (Axline 1980:85). But like previous regional plans for food self-sufficiency, the RFP by 1988 had not achieved its objectives.

The Caribbean Basin Initiative

The essential economic feature of the Caribbean Basin Initiative (CBI) was the allowance of duty-free access to the U.S. market for exports from non-communist Caribbean territories (United States Department of State, 1982:20). The CBI's policy towards Caribbean agriculture is based on the rationale that regional endeavours alone could not meet the requirements of the region's development policies. The agricultural policy objectives of the CBI were thus to 'modernize' Caribbean agriculture to enable it to satisfy increasing food demand, as well as to increase export earnings. This modernization policy has four principal thrusts:

- 1) improving animal and plant health and quality;
- 2) promoting agro-industries;
- 3) expanding agricultural research and training; and
- 4) coordinating bilateral with multilateral agricultural programmes (Palmer 1984:41).

The proposed CBI agricultural modernization calls for massive technological transfer from the U.S. to the Caribbean via the U.S. Department of Agriculture (USDA), as well as through U.S. agribusiness firms. Jamaica was the leading beneficiary, as many U.S. agribusiness firms entered joint-venture agreements with the Jamaican Government as well as with the private sector. The Jamaican

government also responded to the CBI by formulating and implementing the Agro 21 Programme, whose primary objective being to function as a catalyst for private investment in the agricultural sector. Agro 21's main focus was the production of winter vegetables and exotic plants for the U.S. market (Economic and Social Survey, Jamaica 1986:7.2). The export focus of the programme, contradicts, not only the Jamaican government's "commitment" to food-self-sufficiency, but also one of the primary objectives of the CBI, i.e., to enable the Caribbean to satisfy its growing food demand. Agro-21 is widely deemed to have been a failure, while most other CBI agricultural initiatives have not 'taken off'.

Summary

Evidently, the range of initiatives starting with the 1897 Royal Commission's recommendation up to the time of the CBI, have failed to meet their objectives of improved food self-sufficiency in the Caribbean. Indeed, this review of Caribbean agricultural development policies, portrays a pattern of development planning which has gone 'full circle'. Regional agricultural development planning during the colonial era gave way to national strategies in the early post-independence period, only to return to regional initiatives with the creation of CARICOM and later the CBI. The pattern also portrays a see-saw between multilateral and bilateral approaches to Caribbean agricultural problems. Cynically, this pattern could be interpreted as reflecting a development planning

process which lacks direction - a 'ship without rudder' syndrome. Alternatively, it might be argued that the ineffectiveness of Caribbean agricultural development planning results from the magnitude and multitude of obstacles facing food production in the region, as well as the inadequacy of responses to these problems, by regional governments (Axline 1980:64). The catalogue of current obstacles reflects historical issues relating to the transformation of the agricultural sector. The pattern of land distribution, involving small fragmented holdings on poor soil, and underutilized plantations occupying richer soils, lies at the root of the problem (Axline 1980:64). In addition, infrastructural provisions for agricultural sector, and the food sub-sector in particular have been woefully inadequate. Small farmers, who are the mainstay of domestic-food production, operate with a relatively low level of technical skills and are virtually excluded from agricultural-credit systems. National efforts to overcome these problems through the provision of extension services have been grossly inadequate.

Agricultural research and development financing in the region is almost exclusively devoted to traditional exports, and agricultural education is confined to a few secondary institutions in the region. Another historical obstacle has been the acquired taste for imported food by Caribbean peoples, resulting from years of dependence on metropolitan countries to supply their food needs (Paquette 1982).

The problems of small farming, as documented by Caribbean development literature, have been largely generalized. Macro- as well as micro-scale empirical studies undertaken in various parts of the region, indicate that the problems of small farmers vary, not only among territories, but also within territories. Different categories of farmers have different problems, requirements and attitudes. Such findings emphasize the need to design agricultural planning strategies which are cognizant of these variations and are targeted, not only at specific regions, but also at specific types of farming. This amounts to a call for micro-scale agricultural development planning instead of the grandiose macro-scale projects and programmes fancied by regional governments. As a prerequisite, micro-scale studies are required to provide a comprehensive composite of Caribbean small farming, a need to which this study responds.

CHAPTER 3

JAMAICA: PHYSICAL, SOCIAL AND ECONOMIC SETTING

This chapter provides background information on the physical, social and economic of Jamaica's agriculture, including a brief profile of small farmers who are the focus of ensuing discussions and whose foundations lie in the socio-economic evolution of the island's agriculture.

INTRODUCTION TO JAMAICA

Jamaica is located in the Greater Antilles, approximately 145 kilometres south of Cuba and 161 kilometres west of Haiti (Figure 1.1). It is the third largest island in the Caribbean chain, with a total land area of 10,939.7 square kilometres. The island is 236 kilometres long and 82 kilometres at its widest extremity.

The island's topography consists of a highland interior, formed by a backbone of peaks and plateaux running the length of the island, and surrounded by flat coastal plains. Over half of Jamaica lies more than 1,609 metres above sea level, reaching a maximum elevation of 2,256 metres in the Blue Mountains. About two-thirds of the island is covered by limestone, which is concentrated in the central and western parts, and the other third of igneous and metamorphic rocks, shales and alluvium. Soils may be classified into several categories which reflect differences in geology (International Institute for Environment and Development

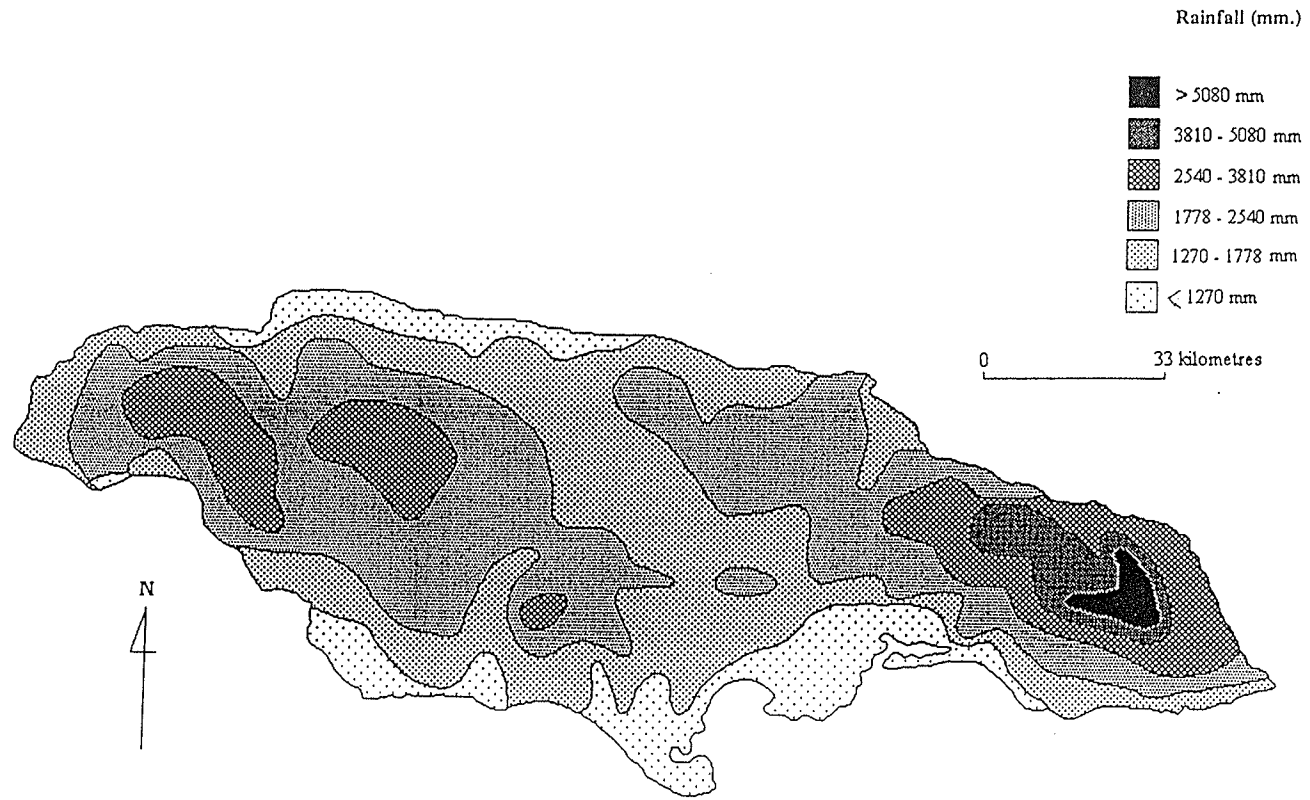
1987:9). Those of the upland plateaux were formed from weathered limestone and constitute approximately 64 percent of the island's soils, while alluvium located on flood plains, river terraces, inland valleys and coastal plains constitutes about 14 percent. Highland soils covering the shales of the eastern and central mountains constitute 11 percent of total soils while the remainder are formed from calcareous shales or weathered from igneous and metamorphic rocks, limestone and shale.

Jamaica's tropical maritime climate is modified by northeast trade winds and land and sea breezes. Rainfall is the most variable of climatic factors and varies with location, altitude and season. Mean annual rainfall for the island is 1958 millimetres but peaks at over 3300 millimetres in the Blue Mountains which lie in the path of the trade winds (International Institute for Environment and Development 1987:10). Lowest annual values (1270 millimetres) are recorded on the leeward side of these mountains (Figure 3.1). Rainfall pattern is bimodal with peaks in May and October and minima in March and June.

Demography

Jamaica's population at the end of 1993 was estimated to be 2.5 million, with an annual growth rate of 0.9 percent (Planning Institute of Jamaica 1993:17.1). Data from the 1982 population census showed that 50.2 percent of the population was classified as urban, while 49.8 percent were rural dwellers. Geographical

FIGURE 3.1
JAMAICA: RAINFALL DISTRIBUTION (mm.)



Source: Compiled from Jamaica Country Environmental Profile, 1987

features significantly affect settlement patterns, thus settlement is considerably restricted in those areas of steep and rugged terrain in the centre of the island and on coastal wetlands. Based on the provisional count of the 1991 census, Jamaica's population density was 205 per square kilometre.

Although a multi-ethnic society, ethnic groups other than those of African origin comprise a small minority of the population. Indeed, in 1991 blacks accounted for over 90 percent of the population (Statistical Institute of Jamaica 1991). However, because Jamaica was a slave society for over 150 years and a colony for over 300, a small minority of European origin, who were able to use their powerful position to exert considerable influence on culture and values, and the local evolution of phenotypic features.

Political Structure

Jamaica maintains a Westminster model of government, with an elected parliament, a parliamentary-appointed senate and a government-appointed Crown representative - the Governor General. This system has its foundations in the Crown Colony system of the British colonial period, which was based primarily on white male adult suffrage until 1944 when the island attained universal adult suffrage. Since independence in 1962, political ideology and strategies for social and economic advancement have alternated between a socialist approach, with high levels of government intervention into market decisions, and more

conservative approaches based on principles of *laissez-faire*. As these approaches relate to agricultural development, the swing of the ideological pendulum has been from domestic market-oriented strategies typified by Prime Minister Manley's regime in the 1970s, to export, market-oriented production of Prime Minister Seaga's regime in the 1980s.

General Economy

Traditionally, agriculture has provided employment for the largest number of people in Jamaica. Major export crops include sugar cane, banana, citrus, cacao and coffee. In the last 40 years, bauxite mining, manufacturing, tourism and the service sectors have become extremely important in the island's economy.

The economic characteristics of Jamaica mirror those of other ex-colonial territories in the Caribbean. These characteristics are identified as follows:

- 1) Foreign ownership (though not exclusively) of the major sectors, such as sugar, finance, mining and manufacturing.
- 2) External decision-making with respect to investments and resource allocations.
- 3) Structural unemployment and under-employment, combined with high salary/wage levels in privileged sectors.
- 4) Absence of inter-sectoral as well as intra-sectoral linkages.
- 5) Little investment in research and development, hence a lack of indigenous technology.

- 6) Concentration of wealth in capital-intensive industries, which provide little opportunity for employment of surplus labour (Gordon 1971:14).

Adverse conditions in Jamaica's economy have always been at the forefront of national debate and foreign policy. In 1993 the island had a total Gross Domestic Product (valued at 1986 prices) of J\$17,890.6 million, and despite its role as the main employer of labour, the agricultural sector's contribution to GDP has been relatively small, averaging 6.9 percent between 1986 and 1993, the lowest contribution of any sector (Table 3.1). The perspective of this contribution is made even clearer by the fact that real GDP declined across those years. Low wages and an unemployment rate, which stood at 16.3 percent in 1993 is most

TABLE 3.1
JAMAICA: PERCENTAGE CONTRIBUTIONS TO GDP BY SECTORS 1986-1993

Sector	Percentage Contribution to GDP							
	1986	1987	1988	1898	1990	1991	1992	1993
Agriculture, Forestry & Fishing	8.6	7.4	6.9	5.9	6.2	6.2	6.9	7.4
Mining and Quarrying	5.4	6.4	5.9	7.5	8.8	9.2	8.9	8.8
Manufacturing	16.4	20.9	21.4	21.5	21.1	19.4	19.3	18.5
Construction and Installation	5.7	8.3	9.3	10.2	9.8	9.9	9.8	9.6
Basic Services	9.9	13.9	14.0	13.8	13.2	14.1	14.1	15.4
Other Services	59.0	48.5	49.0	48.3	48.2	50.2	50.2	52.2
Less Imported Service Charges	5.0	5.4	6.4	7.3	7.9	9.0	9.0	11.9
Total Gross Domestic Product	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Planning Institute of Jamaica 1993.

common among women and, have resulted in high levels of malnutrition specifically, undernutrition, among children. For instance, the prevalence of undernutrition among children 0-35 months was estimated at 6.6 percent in 1993

(Planning Institute of Jamaica, 1993:22.5). Notwithstanding these drawbacks, Jamaica benefited from fairly advanced social programmes particularly in education and housing. Education is compulsory and free at the primary level and literacy levels are at 75.7 percent (Planning Institute of Jamaica 1993:18.13).

Over the past decades Jamaica has experienced adverse imbalances in merchandise trade, with export earnings being about one-half of import cost (Table 3.2). A fluctuating but generally increasing negative trade balances have

TABLE 3.2
JAMAICA: VALUE OF MERCHANDISE TRADE 1983-1993 (US\$ MILLION)

Period of Trade	Imports	Exports	Trade Balance
1983	1281.0	685.7	- 595.3
1984	1183.2	702.4	- 480.9
1985	1143.7	568.5	- 575.2
1986	969.2	589.7	- 379.5
1987	1234.3	708.8	- 525.5
1988	1449.4	883.1	- 566.3
1989	1820.1	998.1	- 822.0
1990	1940.4	1157.5	- 784.9
1991	1799.5	1145.2	- 654.3
1992	1775.4	1063.6	- 721.8
1993	2165.2	1044.5	-1120.7

Source: Planning Institute of Jamaica 1993.

been a major factor in the island's external debt, which stood at US\$3,647.2 million in 1993. External debt servicing in the same year amounted to US\$453.4 million, or 43.4 percent of export earnings from merchandise trade.

Income distribution is heavily skewed towards the most affluent members of society, with the richest 30 percent of households receiving 72.7 percent of incomes and the richest 10 percent receiving 48.8 percent. In contrast, the poorest 50 percent receive a mere 12.8 percent of incomes (Graham and Edwards 1984:83). There is a general consensus among Caribbean scholars, such as Beckford (1972), Jefferson (1972) and Lewis (1951), that these disquieting conditions in Jamaica's and other regional economies, result from the historical evolution of Caribbean societies. As such, any meaningful solution to these problems requires reorganization and reform of the existing social order.

AGRICULTURAL ECONOMY

In regard to employment, agriculture is the largest sectoral employer and in 1992 accounted for 27.3 percent of the labour force, although contributing only 7.4

TABLE 3.3
JAMAICA: VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL
COMMODITIES 1971-1992

Commodity	Volume of Production by Year (000 tonnes)					
	1972	1976	1980	1984	1988	1992
EXPORT CROPS						
Sugar	378.9	362.7	201.2	195.1	219.0	223.0
Banana	129.0	78.2	19.3	11.2	28.0	76.7
Citrus	41.4	35.3	32.9	21.3	45.1	47.6
Coffee	5.6	6.1	7.6	8.6	12.1	13.4
Cacao	2.4	1.6	1.8	2.7	6.3	6.2
Domestic Food	294.4	277.2	402.7	467.1	387.9	506.8
Crops						

Source: Compiled from Economic and Social Survey, Jamaica 1975-1993.

percent to Gross Domestic Product (Planning Institute of Jamaica, 1993:18.3). In general, the production performance of the agricultural sector in the post-war period and, particularly since independence has been dismal. Although recovery trends have been noted since the late 1980s, both export and domestic outputs have stagnated and even declined (Table 3.3). For instance, in 1992 outputs of traditional export crops, such as sugar and banana, were 61 percent and 59 of their 1972 volume, respectively. Although output of domestic-food crops has generally increased since 1980, the gap between food demand and domestic-food production continues to widen as is reflected in an increase in the level of imported food (Table 3.4). Thus, in 1992 the volume of total imports was 16.7

Commodity	1980	1982	1984	1986	1988	1990	1992
Cereals	340.9	256.2	285.1	354.5	426.2	255.2	424.3
Vegetables/Legumes	2.7	2.8	2.1	1.0	1.8	1.9	2.5
Meats/Fish	47.6	53.7	40.3	45.7	49.6	42.6	37.5
Dairy Products	15.1	16.0	23.2	17.9	14.7	12.9	10.0
Total Food Import	406.3	328.7	350.7	419.1	492.3	292.6	474.3
Value of Total Import US\$000	-	197.6	135.8	133.7	172.1	153.9	161.4
Value of Traditional Agricultural Export US\$000	83.2	86.6	99.5	108.7	144.2	145.6	149.9

Source: Planning Institute of Jamaica, 1975-1993.

percent higher than in 1980. Similar upward trends are noted for the cost of food imports, and when compared with the value of traditional agricultural exports, it points to a substantial imbalance in agricultural trade. The level of food import has adverse implications for the development of other components of Jamaica's economy, because food-import costs consistently consume a substantial portion

of import expenditure, averaging 16.4 percent between 1980-1992. Caribbean focussed scholars such as Beckford (1972), Edwards (1961), Eisner (1961), Goldsmith (1961), Jefferson (1972) and Thomas (1988), have often pointed to the dual structure of Jamaica's agricultural economy as a major factor in the perpetuation of this adverse situation.

Jamaica's dual agricultural sector is comprised of both large-scale commercial plantations that produce primarily export crops under a system of monoculture, and small-scale mixed farms that produce crops for household subsistence, the domestic market and export. Caribbean scholars, such as Beckford (1972), consider that the problems facing the small-scale agricultural sector and, by extension domestic-food production in Jamaica, result from the sector's emergence and development within an economic system that has consistently favoured large-scale export-oriented production in the allocation of land and agrarian infrastructure, as well as cultural factors related to land tenure and fragmentation. Since 1976, agricultural administration in Jamaica has undergone substantial decentralization of functions performed by the Ministry of Agriculture, allowing farmers easier access to these services. In this regard, the island was subdivided into three administrative regions, Southern, Western and Northern. These regions are comprised of parishes, which are themselves divided into smaller administrative units called Divisions and Extension Areas.

Land Resource Distribution

Land is the basis of food production as well as the source of social and economic empowerment in Jamaican rural societies. Thus, the distribution of rural wealth and the incidence of poverty and underdevelopment are intrinsically related to the socio-economic order and institutional structure which determine access to land (FAO:1988:65). The causal processes of poverty and rural underdevelopment which malign small farming are not simply a problem of population growth and land scarcity, but are more a reflection of the institutional pattern of land concentration and its interplay with other economic forces. Land concentration is a predominant characteristic of Jamaica's agrarian structure, and there are indications that this situation has become more entrenched (Table 3.5). Although the proportion of farms accounted for by the largest size category did not change during the Agricultural Census intercensal period 1954-1968, the area of total

Farm Size (ha.)	1954		1968	
	% Farms	% Farm Area	% Farms	% Farm Area
Less than 2.0	69.9	13.9	78.0	14.8
2.0-10.0	26.7	23.9	19.9	22.1
10.1-40.4	2.8	10.8	1.6	8.3
40.5-202.0	0.4	11.4	0.4	9.9
Greater than 202.0	0.2	40.0	0.2	44.9
Total	100.0	100.0	100.0	100.0

Note: The latest available Agricultural Census data is for 1968.
Source: Compiled from Jamaica Country Environmental Profile, 1987.

farmland they occupy expanded by nearly five percentage points. In contrast, the

proportion of farms 10 hectares and under (i.e. the category which officially defined as small farms), increased by about 1.3 percentage points, but the area they occupy decreased by about 1.0 percentage point. This trend suggests increased levels of land fragmentation among small farms.

In light of this pattern of land distribution, agrarian reform has been the subject of enthusiastic debates in Jamaica, especially during the 1960s and 1970s. Thus, in outlining its agricultural development strategy in 1972, the Jamaican government emphasized the need for more equitable distribution of farmland and hence, "the urgent need for undertaking an appropriate land reform programme" (Jamaica Ministry of Agriculture 1972:19). Surely, this proposed initiative was not novel since it merely echoed views of the Moyne and other Royal Commissions to the Caribbean. It was therefore in line with socialist policies of the Manley government during the 1970s that Project Land Lease was implemented to redistribute lands deemed to be idle, to small holders and landless people on a lease-hold basis. While some of the redistributed lands were unused Crown Lands, the larger proportion was appropriated from large estates. In 1977, it was estimated that 34,321 hectares were made available to 23,618 tenants under this project (National Planning Agency of Jamaica 1976:99-100). Of this area, 19,283 hectares (56.2 percent) were appropriated from 365 estates. Although supporting evidence is lacking, Project Land Lease seems to have done little to foster a more equitable distribution of farmland, because when the project

was phased out in 1980, when Seaga's more conservative government came to power, much of the leased areas technically became Crown Lands although some lands are now being offered for sale to original lease holders.

AGRARIAN INFRASTRUCTURE

The vitality of any farming system is a function of the organizational characteristics of human and agrophysical resources and, most critically, the level of infrastructural support provided. Five aspects of agrarian infrastructure are critical to Jamaica's agro-economy. These are marketing, credit, extension services, farmer organizations, and agricultural research and development.

Marketing

The system of agricultural marketing in Jamaica mirrors the dualism of the agricultural sector. On the one hand, there is the relatively well-organized marketing network for traditional export crops and, on the other, there is the informal and highly fragmented system for domestic-market oriented crops.

Marketing of traditional export crops, such as banana, coffee, cacao, coconut and citrus, is controlled by five quasi-government and semi-autonomous commodity associations, operating under the umbrella of the Ministry of Agriculture. To a large extent these associations regulate production and export of crops purchased from both large and small farms. Marketing of sugar cane, another major export

crop, is coordinated by individual sugar estates (Babb et al. 1983:15), with some price negotiating influence from the All Island Cane Farmer's Association, which is essentially a farmers' union. Pimento is jointly coordinated by private merchants and government while more recent non-traditional exports, such as ornamental crops (flowers, aloe vera, etc.), vegetables, tubers and some fruits, are organized by an array of private interests. In addition to marketing activities, these export organizations operate their own extension and sometimes credit services.

In sharp contrast to the relatively organized system of export-crop marketing, arrangements for the sale of domestic-food crops are disjointed and disorganized, involving mainly private, but sometimes government institutions. Agricultural higglers (as opposed to urban higglers dealing in manufactured goods) handle an estimated 80 percent of food crops for domestic consumption and operate in over 100 parish markets islandwide. These higglers are itinerant traders, usually women from farm families who purchase their "load" from small farmers in small quantities at the farmgate and transport it by public or chartered transportation to rural parish markets, as well as to the main cities of Kingston and Montego Bay (Katzin 1959:425).

Some small farmers market their own food crops in country markets situated in small towns and villages and on occasions more valuable crops such as vegetables

and fruits are taken to urban centres for sale. Despite long-standing recommendations and forecasts for potential success, there is a marked absence of marketing cooperatives for domestic crops (USAID 1977:0.6), except in the case of the Christiana Potato Growers Cooperative, which has its foundation in the development initiatives of the Christiana Area Land Authority (CALA), one of the earliest integrated rural development projects in Jamaica. Private food processors provide a small outlet for domestic-food crops but throughout most of the 1970s the Agricultural Marketing Corporation (AMC), a government-run agency, was the main market for domestic-food crops. The AMC's operations were scaled down in 1983 for reasons of inefficiency and unprofitability (Planning Institute of Jamaica 1983:7.3).

Credit and Farm Aid

Provision of agricultural credit in the form of loans and deferred payments, and farm aid in the form of seedlings, fertilizers, pesticides and so on, are considered to be components of rural development planning, particularly as they apply to small-scale farming (Morgan 1980:129). This is primarily because small farmers are invariably caught in a vicious cycle of poverty, characterized by low-saving capacity resulting directly from low incomes due to low capital investment (Edwards 1961:123; Mellor 1980:315). Rural credit provides the most plausible means of reversing this cycle, but despite its recognized importance, it is the least studied aspect of Jamaica's agricultural economy (Bourne 1983:1). Nevertheless,

there is a variety of formal and informal institutions which disburse credit to farmers.

Formal Sources of Credit and Farm Aid

Provision of formal credit has been in constant change, particularly since the early 1970s when rural planning began to develop a new fervour. Since that time, sources of agricultural credit have included commercial banks, public sector agencies, special development programmes and, to a lesser extent, commodity associations.

Since 1981, public-sector credit agencies were reorganized under an umbrella institution, the Agricultural Credit Bank (AC Bank). The mandate of this institution was to rationalize and increase levels of funding to the agricultural sector (Agricultural Credit Bank 1987;1). As such, the AC Bank is not a lender in the first instance, but rather functions as a wholesaler of loan funds to the agricultural sector through commercial banks and an island-wide network of People's Cooperative Banks. AC Bank funds are disbursed through commercial banks, PCBs, the ACB and the Jamaica Agricultural Development Foundation (Planning Institute of Jamaica 1988:7.10). Table 3.6 shows the annual allocation of AC Bank funds between 1983 and 1988, indicating an increase of over 70 percent in credit allocation during this six-year period. While this performance might seem impressive, it should be borne in mind that volume of credit is, by

itself, not a reliable indicator of performance and effectiveness of rural credit, because formal credit sources are systematically biased against specific credit

TABLE 3.6
AC BANK ALLOCATION OF CREDIT BY AGRICULTURE
SUB-SECTOR 1983-1988

Year	Volume of Credit J\$000	Export Crops	Domestic Crops	Livestock	Farm Infrastructure	Total Percent
1983	43,194.4	30.4	31.0	34.9	3.7	100.0
1984	53,420.6	50.1	20.0	17.9	11.1	100.0
1985	66,856.5	44.3	24.9	24.2	6.6	100.0
1986	93,386.0	60.1	13.7	14.8	11.4	100.0
1987	127,190.4	60.8	11.2	20.6	7.4	100.0
1988	144,928.5	59.2	4.9	23.8	12.1	100.0

Source: Planning Institute of Jamaica, 1983-1988.

TABLE 3.7
PERCENTAGE FARM SIZE DISTRIBUTION AND ACCESS TO CREDIT

FARM SIZE (HECTARES)	% FARM HOLDINGS	% CREDIT RECIPIENT	% OF TOTAL CREDIT
0.2-2.0	81.0	68.0	40.0
2.0-4.0	12.0	23.0	17.0
4.0-10.0	5.0	7.0	22.0
10.0-10.0	0.9	1.3	7.0
20.0 and over	1.1	0.4	14.0
Total	100.0	100.0	100.0

Source: Bourne 1983 p. 10.

applicants and inflation considerations must be factored into these values (Bourne 1983:9). Farm-size specifications of formal creditors results in uneven access to such credits (Table 3.7). Thus, according to Bourne (1983:10), 81 percent of the farms in Jamaica were under 2.0 hectares, but they accounted for only 40 percent of total credit allocations. In contrast, farms over 20 hectares accounted for 14

percent of total credit, although they represented only 1.1 percent of all holdings. In addition, there is inherent bias towards export crops in the allocation of agricultural credit (Table 3.6). For instance between 1983 and 1988, the export-crop sub-sector accounted for an average of 50.8 percent of total AC Bank credit, compared with 17.6 percent for the domestic-crop sub-sector. It could be argued that the disparity in credit allocation between export-crop and domestic-food production is not as extreme as it appears, because the livestock sub-sector is a component of the domestic-food sector. However, except for two years during this period, combined allocations to domestic crops and livestock, sub-sectors were still below those to export crops. Moreover, livestock like export-crop production is a large-farm operation. Therefore, the comparatively large allocations of credit to the livestock sub-sector serves to accentuate disparities between large and small farms.

Farm aid occurs mainly in the form of seedlings, fertilizers, pesticides and occasionally, soil-conservation treatments. These are not repayable and are usually administered under special projects, such as the Integrated Rural Development Project and the Cocoa Resuscitation Project, on an intermittent basis. Small farmers are extremely receptive to farm aid, but the sporadic nature of this type of assistance reduces its potential impact on small-farm development.

Informal Credit

Although time-series data on volume of agricultural credit from informal sources are non-existent for Jamaica, Bourne (1983:6) and Henry (1980:11) concur that such credit was small relative to those from formal sources. Informal credit is however more common among small farmers, and sources include relatives, friends, local merchants and sometimes higglers. Most small farmers do not categorize these informal sources as farm credit, because the amounts involved are small and are used to "keep the family going" until the next harvest, rather than to finance any significant aspect of the farm operation.

Agricultural Extension

Although agricultural extension services fall within the mandate of the Ministry of Agriculture, there is little coordination of activities and various agricultural interests also provide some service. However, since 1990 attempts have been made to rationalize extension activities by placing them under an institution, the Rural Agricultural Development Authority (RADA), which oversees agricultural matters at individual parish levels. The role of extension officers in Jamaica has been described as probably the most extensive of any country (Arnon 1981:54).

These roles include:

- 1) discussing with farmers, problems relating to development of their farming;
- 2) determining constraints that hinder farmers;

- 3) assisting farmers to develop desirable attitudes in relation to the acceptance and implementation of innovations;
- 4) encouraging farmers to adopt modern methods of agriculture such as chemical fertilizers and pesticide use;
- 5) organization of field days and lectures for farmers; and
- 6) assisting farmers to prepare application forms for loans as well as ensure delivery of seeds to farmers.

Farmer Organization

Organization of rural people is an important part of agrarian development in Jamaica. To this end, a variety of farmer support organizations exists but the Jamaica Agricultural Society (JAS), a "professional society open to any farmer or other individuals interested in agriculture or animal husbandry" (USAID 1977:0.5), is the only nationwide farmers' organization. Dating back to 1895, the JAS is also the longest established farmer organization on the island (Wigley 1988:59). Membership numbers have been extremely variable, but in 1977 USAID estimated national membership to be about 80,000, with 900 chapters. The JAS functions cover a wide range of activities, such as organization of credit and subsidies, operation of retail outlets for farm supplies (mainly tools, pesticides and fertilizers) and sometimes the negotiation of farmgate prices for domestic-food crops. The JAS is also the main organizer of the national agricultural fair, the Denbigh Show. With the exception of the Christiana Potato Growers Association and the Jamaica Livestock Association, all other farmers' organizations are commodity associations.

Agricultural Research

Agricultural research in Jamaica is undertaken by a variety of institutions such as the University of the West Indies (UWI), the Caribbean Agricultural Research and Development Institute (CARDI), international organizations such as the FAO, some commodity associations and the Ministry of Agriculture. Traditionally, the agricultural research agenda has been influenced by problems confronting large rather than small farms, and by extension, export rather than domestic production. To quantify this bias, Coke and Gomes (1979:103) drew attention to the focus of agricultural research papers published by regional institutions between 1922 and 1974 (Table 3.8). Bias towards export crops is indisputable. Research relating to root crops, vegetables, cereals, legumes and oilseeds, which together comprise the bulk of domestic-food crops, accounted for only about 34 percent of the number of papers devoted to export crops. Recent proposals have

TABLE 3.8
AGRICULTURAL RESEARCH PAPERS PUBLISHED BY REGIONAL RESEARCH
INSTITUTIONS 1922-1974

Research Classification	Number of Papers	Percentage
Plantation (export crops)	971	36.0
Unclassified	529	21.0
Soil and Climate	361	14.0
Animal Husbandry	245	10.0
Cereals, Legumes, Oilseeds	181	7.0
Economics and Management	164	6.0
Root Crops	90	3.0
Vegetables	58	2.0
Timber and Tree Crops	28	1.0
Totals	2573	100.0

Source: Coke and Gomes 1979 p. 8.

been made to redress this imbalance and institutions such as CARDI have been

implementing programmes to promote research on domestic crops (CARDI, 1981).

LAND TENURE AND FRAGMENTATION

In Jamaica, land rights have both a legal dimension, derived from Europe and defined in Jamaica's legal code, and a traditional informal dimension, a customary system of freehold tenure called "family land" (Besson 1984:57-83). Family land is a form of joint tenure for consanguinal legitimate and illegitimate children of a particular farmer. Both systems coexist, although outright ownership of land is generally acquired either by inheritance or by purchase. Land is inherited from persons with whom the farmer has/had strong emotional ties, such as family members, but it is not unusual for non-relatives to share in inheritance (Edwards 1961:94). However, there is a distinct difference in the time of inheritance between family and non-relatives. Family members generally receive their inheritance on the death of the benefactor, while non-family beneficiaries obtain theirs while the benefactor is still alive. This is because in the absence of a formal will, right to land is often a source of intra-family conflicts, and non-family beneficiaries could easily be eliminated in such conflicts. Inherited land has strong sentimental values, especially if it contains the "family plot", i.e. the family's burial site. Purchased land on the other hand has emotional value because of sacrifices involved in accumulating funds for its purchase. Private ownership of land, either by individuals or shared by co-heirs,

is the principal form of tenure in Jamaica (Wigley 1988:41). Babb et al. (1983:39) estimated that 80 percent of landholders in Jamaica claim ownership on the basis of inheritance, purchase or usufruct, but do not possess clear legal titles to their land.

Besides private ownership, land tenure is based on a variety of formal and informal arrangements. More common ones include leasing/renting, caretaking, squatting and government land-settlement programmes, such as Project Land Lease (supra p.62).

Renting/Leasing

The difference between renting and leasing is not always clear-cut, since both involve an agreement to pay the landowner a stipulated fee for use of land. Generally though, lease arrangements are of longer term than rental (i.e. longer than one year). Rental arrangements are more common, particularly among smaller landlords, because they allow greater flexibility in planning future land use since tenants can be dismissed on short notice.

Caretaking

Caretaking is an informal tenorial arrangement in which a landowner appoints an overseer for his property, because the land cannot be regularly administered by him. In lieu of wages, the caretaker is allowed to use portions of the property

for non-permanent enterprises. If no unused portion of property exists, the caretaker is allocated a share of the output. If for example, the property is a livestock farm, then the caretaker might be allowed to rear his own animals alongside those of the landowner at no charge for use of related facilities. This type of arrangement is more common among larger than smaller farms, as few small farmers are absentee.

Squatting

Squatting is the unauthorized occupation of land, and is the least secure of tenurial arrangements. In Jamaica, this activity is generally associated with landless people at the bottom of the social ladder. Targeted areas are usually Crown Lands or unused portions of large estates. Squatting became especially popular in the 1970s, when government appropriation of underutilized estates for fostering redistribution of land was preempted by landless people "capturing" the targeted properties. These activities gave rise to a group of new communities universally referred to as "capture land". Although not condoned by government, once settled, squatters were difficult to evict and many have been given priority in the purchasing of these lands. Geographically, squatting is most common in lowland areas of the western parishes, because these are where some of the largest estates containing underutilized lands are located.

Land Fragmentation

Land fragmentation is a process in which contiguous blocks of land are subdivided into two or more parts (Igbozurike 1970:520). This is a salient feature of land tenure among small rather than large farms in Jamaica and is related directly to the system of inheritance whereby small farmers' offspring share equally in inheritance. Land fragmentation has been viewed as a major constraint to the growth and development of small-scale agriculture. As such, economists and geographers have drawn attention to the problems of fragmentation (Brierley 1974:99; Edwards 1961:18; Lewis 1951:55). Nobel laureate W. Arthur Lewis proposed that progress in Caribbean agriculture could be achieved by an exchange of fragments, designed to bring each farmer's plots together without increasing the average amount of land worked by each (Lewis 1951:65). Although a variation of this proposal has been experimented with in Guyana to mitigate cattle-crop conflicts on the coast (Environmental Solutions Ltd.), problems of land fragmentation remain, because no solution has been found whereby adequate compensation can be provided to farmers whose attitudes towards land are such that land and its possession are valued in and of themselves (Rubenstein 1987:211). Besides strong emotional ties to land, persistence of fragmentation can also be explained by the fact that small farmers' behaviour is not always influenced by stereotypical economic motives. Studies related to the evaluation and assessment of small farming and which utilize an 'emic' approach, have indicated that farmers do not perceive fragmentation to be a colossal

economic problem (Collymore 1985:74). On the contrary, many small farmers consider fragmentation desirable if risk-minimization is to be maximized in locations where agrophysical factors such as degree of slope angle, aspect, soil type and soil moisture vary significantly over short distances. This explains why even in societies where landrights are based on usufruct, and cannot be passed directly to offspring, land fragmentation still occurs (Spence 1988:121). Thus, in ex-colonial societies such as Jamaica, initial fragmentation among the emerging peasantry was likely based on the physical characteristics of land as it related to type of crop production rather than on the mode of inheritance.

The socio-economic setting of Jamaica's agriculture would be incomplete without presentation of a profile of small farmers against the backdrop of the evolution of the island's agro-economy.

SOCIAL PROFILE OF SMALL FARMERS

The ensuing discussion of the social profile of small farmers is based on pioneering social studies undertaken by scholars such as Clark (1957), Cumper (1958), Edwards (1961), Solien (1960) and Smith (1960). Although these studies are now dated, there is a notable absence of more contemporary sources, possibly because the findings of these early research are as relevant today as they were in the 1950s and 1960s.

Virtually all small farmers are offspring of people who were/are themselves small farmers. As such, small farming is much more than an occupation for those involved. For them it is a tradition, a way of life and in this regard, the cultural, social and economic factors which influence their development, attitude and behaviour must be understood not only within the context of family life, but also of the community at large. This is because rural communities represent an extension of family life. The concept of family in Jamaica, and indeed the Afro-Caribbean, is unique and substantially different from traditional anthropological definitions (Clarke 1957:28; Solien 1960:102). It is within this context of the Jamaican rural family that Henriques (1960:34) suggests that "the best method of classifying family grouping appears to be the adoption of the term domestic group as the unit of family structure on the island". Although small farming is male dominated, some farmers are female. Cumper (1958:88) suggested that a significant distinction can be drawn between life cycles of male and female farmers, so that distinctive profiles emerge on the basis of gender.

Male Profile

Children of small farmers, male or female, are born into a variety of family situations. If a boy is the first child, then he is likely to have been born before his mother left her parental household. Hence, the child will spend his initial years in the household of his maternal grandparent(s). His mother will likely depart the household to marry either by common-law or according to Christian

forms, but is likely to change partners in the process. Although Cumper (1958:89) suggested that the typical small farmer would have spent his early childhood in a household consisting of his mother and her spouse, this is more so for later than earlier children. The household possesses its own cultivation plot and a few livestock, and by the age of eight years the boy would be required to help with related chores.

Parents pride themselves in educating their offspring and although school attendance at the elementary level is mandatory, enforcement is lax. Thus, the boy will attend local elementary school, except on occasions when he is needed to assist with household chores. During these formative years his aspirations to be "something better" than a small farmer are usually reinforced by the desires of his parents. Thus, in a study of educational and occupational choice among 2,050 schoolboys between the ages of 10 and 15 years, 64.6 percent listed occupations other than farming (Smith 1960:350). The most favoured occupational choices were professional careers and skilled tradesmen. More recent data provided by Spence (1985:38) concurs with the findings of Smith (1960), 25 years before. These results reflect the depressing nature of rural life and the desire of parents that their children escape from it by obtaining non-rural employment. These aspirations are reinforced by an elementary school system which traditionally presented a curriculum designed for urban school children in developed countries. The net effect of such a curriculum was to devalue small

farming as a way of life, inexplicitly and profoundly (Smith 1960:351).

About the age of 14 years the boy finishes his elementary schooling, but this does not mark a turning point at which he must decide on a career which will afford him economic independence. Except for the few who become apprenticed to skilled trades, and an even smaller minority who pass onto higher education, and probably remove themselves from the community structure, the boy continues to work on the family farm and reside at home (Edwards 1961:68). Before he can set up his own family, certain foundations for independence must be established. Specifically, a man must have "land to put his spouse", land to build on and to cultivate, and generally, enough economic "backitive" (backing) to enable his wife to abstain from "outside work". Such backing should ideally come from the possession of a farm of several hectares. However, the chance of acquiring this quantity of land, except by inheritance, is slim. Therefore, a young man's prospect of establishing his own family according to desirable standards of society is limited by the economic and social circumstances of his parents, because if a man's father is unable to give him land due to family poverty, then the founding of an independent family may be delayed until the death of his parents allows him access to family land. This situation is aggravated should his family be landless, because it tends to condemn offspring to a state of abject proverty. Associated with this circumstance is low social prestige, because landlessness is perceived

to result from "wutlissniss" (worthlessness), socially defined as laziness in conjunction with lack of ambition.

For the male small farmer, there exists a period of uncertain status and responsibility between the dependent state of childhood and the mature man heading his own household. A physically mature young man is unlikely to accept the day-to-day authority of his parent(s) and will adopt ways of circumventing this authority without actually acquiring total independence. In this regard, his parents may permit him to occupy a "houseplot" to set up his own accommodation. More commonly though, he attempts to accumulate funds to "set up" himself by working as a wage labourer, in addition to cultivating land allocated by his parents or rented from other farmers. At this time in his career there is the possibility of being selected for the Overseas Farm Workers' Programme, a scheme which allows seasonal migration of farm workers to North America. Rural youth crave participation in this programme because it represents a quick means of getting the funds required to "start life". However, the programme selects only about 825 workers islandwide annually, so that an individual's chance of participation is remote (Planning Institute of Jamaica 1976-1988). At this stage of his personal evolution the young man will enter into different types of liaison with women within and outside his community. Cumper (1958:60) suggests that the "serious" liaison, which eventually leads to marriage, is likely to be with a young lady who still resides at home. Choice of partners

is not only determined by the desire for a capable woman to bear his children, but probably moreso by her ability to assume responsibility for the economic and social management of the household (Edwards 1961:70).

If the general economic preconditions for starting a family are met, then legal marriage may take place. If these conditions are lacking, a period of common-law may ensue, but could eventually lead to legal marriage. From about age 35, the man will assume responsibility for a household consisting of his spouse, his children, and possibly his wife's children from a previous liaison. This is a period of maximum responsibility, because other children are usually born in quick succession, making it critical that he expand his means of supporting a growing family as well as to establish for himself a respectable status in society. His quest is therefore to secure and consolidate land tenure as well as accumulate additional parcels of land. His desire to improve socially and economically at this stage is made even more difficult by the fact that farm labour input from his wife is minimal, owing to her domestic demands related to childbearing and childrearing.

By his mid to late forties, the successful male can be established as a mature and economically secure member of the community (Cumper 1958:90). Some of his children will have matured sufficiently to help with farmwork and the child-bearing rate of his spouse will have sufficiently slowed down to allow her to

increase her farm-labour contribution, especially as this relates to the marketing of crops. This period of improved agro-economic security coincides with greater commitment to farming as a way of life, because by this age non-farm occupational options have all but disappeared. Such commitments may continue to the end of his life and, in the absence of a clear concept of retirement, he will continue farming until he is physically incapable of doing so. Although mature children will leave the household to restart the cycle which characterizes the profile of these farmers, his household is not necessarily reduced in size, because the nature of the cycle is such that, in all likelihood at least one of his daughters will have borne children while living in the parental household.

Female Profile

The life of a typical rural female parallels that of the male until the late teens, except that she is entrusted with caring for younger children, rather than cultivating crops and tending livestock. Typically she will pass directly from her parental household into a common-law union although she may have borne children prior to this. In the earlier stages of this union her concerns are largely with household matters although she sometimes sells produce in local markets (Cumper 1958:92). From time to time she will assume the headship of her household, for instance, when her spouse goes overseas or to other areas in Jamaica for seasonal employment. Cumper (1958:92) suggested that because of the age differential between couples and the greater longevity of women, there is

a high probability that the typical female in her 50s or early 60s will head her household or join that of a married son or daughter. Whether or not a widow joins the household of one of her children depends on whether there is a male relative available to assist her with the farm and thus maintain the viability of her household.

Summary

It is against this agro-economic setting, which is generally characterized by decline and which has persistently disfavoured small-scale domestic-market oriented production, that the Jamaica small farmer operates. These farmers are largely the product of social, cultural and economic factors existing in society at large, as well as within their parental households. These factors mold their attitudes towards their occupations and, hence, their *modus operandi*.

CHAPTER 4

THE STUDY AREA

The nature of any agricultural system is influenced by the socio-economic and environmental setting in which cultivation occurs. Clarendon's appropriateness as a site for this study is, therefore, better appreciated against the background of its social and agrophysical environments.

The parish of Clarendon, located in south-central Jamaica, is the nation's fourth largest parish, occupying an area of 1,055 km². It is bordered on the west by the parish of Manchester, on the east by St. Catherine and on the north by St. Ann (Figure 4.1). According to the latest population census undertaken in 1982, Clarendon's population was 194,885, or 9.3 percent of Jamaica's total population. Demographically and spatially, the population of this parish mirrors closely that for the island as a whole (Table 4.1). The urban population of the parish resides

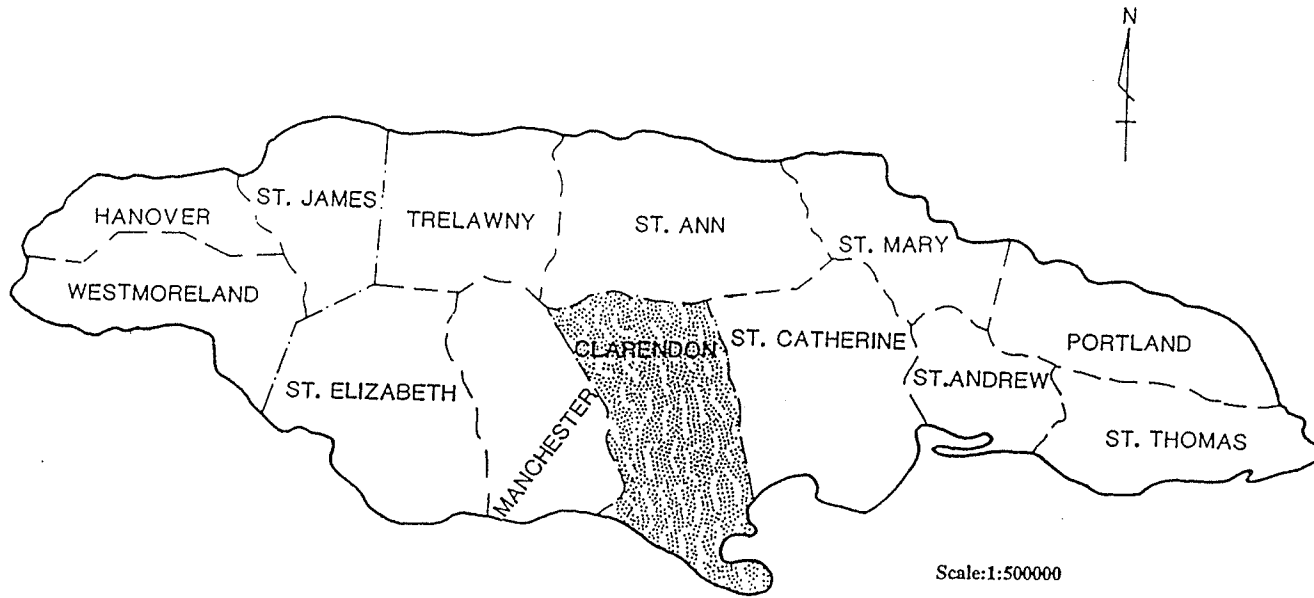
TABLE 4.1
CLARENDON: COMPARATIVE DEMOGRAPHIC STATISTICS (1982)

Statistics	Clarendon	Jamaica
Percentage of population < 18 years	51.5	49.2
Population density	185.0/km ²	183.0/km ²
Annual rate of growth	0.9	1.0
Percentage rural	73.0	68.0

Source: Compiled from Population Census of Jamaica, 1982.

in five main centres (Table 4.2). Besides being sources of goods and services

FIGURE 4.1
LOCATION OF CLARENDON, JAMAICA



for the predominantly rural population, these urban centres are also markets for agricultural produce. Like the rest of Jamaica, the agricultural economy of

Urban Centre	Population	% of Total Urban Population
May Pan (parish capital)	37,682	72.1
Chapelton	5,042	9.6
Lionel Town	4,658	8.9
Frankfield	1,972	5.6
Spalding	1,914	3.7
Total	52,628	100.0

Source: Population Census of Jamaica, 1982.

Clarendon has its roots in the plantation system of the British colonial period. Thus, the alluvial plains in the south of the parish, which are among the most extensive lowland areas on the island, were attractive to early settlement (Floyd 1979:40). The parish was a leading sugar-producing area throughout the colonial period, both in terms of the number of estates and the level of technology employed. Thus in 1854, this parish contained 12 percent of the island's sugar estates and ranked first among parishes in the number of steam-powered mills in operation (Hall 1969:71).

Following the full emancipation of slaves in 1838, Clarendon experienced an upsurge in freehold tenure, indicating an early establishment of small farming in the parish. It is estimated that freeholdings of 4.0 hectares and less, increased from 95 in 1840 to 2,555 in 1845, or twenty-seven fold (Hall 1959:19).

Although most of Clarendon's sugar estates have either been abandoned or consolidated, the parish remains a major sugar-producing region. A single sugar estate is currently in operation on the alluvial plains, and caters mainly to farmers in central and southern Clarendon. Sugar cane is extensively grown by small farmers in the northern sections of the parish, but owing to proximity, it is sold to a processing facility at the Worthy Park Estate in the adjoining parish of St. Catherine.

Among parishes, Clarendon is an outstanding contributor to the domestic-food output of Jamaica. In 1984, for instance, it was the principal food-producing parish with an output of 73,000 tonnes of domestic-food crops, or 20 percent of the island's production (Minister of Agriculture 1986: Section 3). Indeed, Clarendon has consistently ranked no lower than fifth in the production of principal food-crops over the past decade (Table 4.3). This consistent performance in production has resulted in this parish being recurrently used as a "testing ground" for national agricultural initiatives to improve food output. For instance, in 1979 the Two Meetings and Pindars River Watersheds in Clarendon were sites of the USAID/Jamaican Government mega-project, promoting integrated rural development and focusing on increased food output among small farmers, through improved soil-conservation methods. Again, in 1983, the southern plains of Clarendon became the centre of the Agro-21 initiative, a programme aimed at promoting agricultural development through private sector

commercialization. The highlight of this programme was the creation of the high-

TABLE 4.3
CLARENDON: RANKING IN DOMESTIC FOOD-CROP PRODUCTION

CROP	RANKING		
	1975	1980	1984
Vegetables	1	2	2
Legumes	1	3	2
Tubers	2	1	2
Plantains	1	4	3
Yams	1	5	4
Condiments	5	4	1
Potatoes	2	4	4
Cereals	3	5	5
Fruits	5	5	5

Source: Jamaica Ministry of Agriculture Data Bank 1980-84

technology farm at Spring Plains in southern Clarendon. This farm focussed on the production of winter vegetables for the U.S. market. In 1985, the parish was selected as the main site for yet another USAID-funded project, the Small Farm Programme (SFP). The SFP was an extension of the mother-farm/satellite-farm concept promoted under Agro-21 and was intended to provide development support to small satellite farms.

THE PHYSICAL ENVIRONMENT

In light of the low levels of technology employed by small farmers, the nature of agriculture among them is largely determined by the physical capability of their land in its natural state. In this regard, this section examines those physical factors whose impact is greatest on agriculture, namely, soils, slope and climate.

However, owing to the strong influence of geology and topography/physiography on these agrophysical factors, they are introduced by a brief description of Clarendon's geology and topography. This description is based largely on the **Soil and Land-Use Surveys** of Clarendon undertaken by Starke (1959) on behalf of ICTA.

GEOLOGY

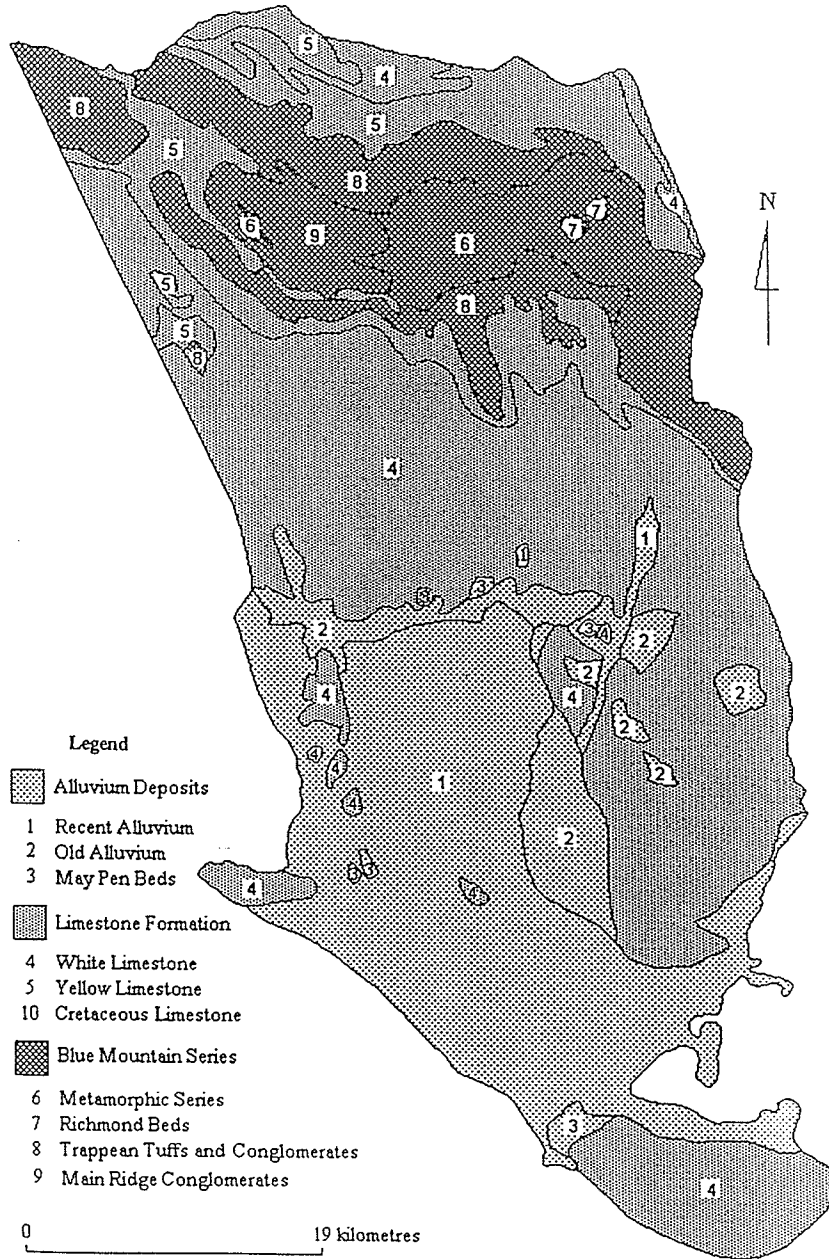
Geology influences farming because it is critical to the evolution of soils and slopes. Three distinct geologic formations are evident in this parish, namely, the Blue Mountain Series, the Limestone Formations and the Alluvium Deposits (Figure 4.2).

The Blue Mountain Series

This geologic grouping is the oldest in the parish and is exposed as "geological windows" in white and yellow limestone at points where major rivers, such as the Rio Minho, have eroded deeply into these formations (Starke 1959:11). The Blue Mountain Series comprises three sub-groups:

1. The Trappan Series are most common in the northeastern portions of the parish and consist of ash, shales and conglomerates which weather rapidly, leading to the formation of deep clay and loam. However, fertility of these derived soils is adversely affected by the heavy rainfall regime of areas where these series occur, and which results

FIGURE 4.2
CLARENDON: GEOLOGY



Source: Compiled from Starke, 1959.

in extensive leaching of bases when land is cleared for farming.

- 2) The Metamorphosed Series form a narrow band extending across the northern portion of the parish. Although patches of less resistant shales and conglomerates occur along this band, these rocks are generally of considerable hardness and resistance to weathering, resulting in a youthful topography characterized by frequent mass-wasting and the formation of thin clayey loam soils.
- 3) The Richmond Beds occur as small outcrops within the Metamorphosed Series. They are characterized by steep slopes, which when subjected to intensive farming have become one of the most extensively eroded portions of the parish (International Institute for Environment and Development, 1987:13).

Along with the Limestone Formations, the Blue Mountain Series are the domain of Clarendon's small farmers.

The Limestone Formations

These formations are comprised of yellow and white limestone, which jointly cover 40 percent of the parish. Yellow limestone, which consists of impure limestone, shale and sand, is generally overlain by white limestone, but is sometimes exposed at the geological windows. The shales within this formation are deeply weathered to form a red clay, which, although easily worked is often badly eroded.

White limestone, on the other hand, consists of pure hard limestone, which is resistant to weathering except along the occasional soft chalky stratum. They

occur in Clarendon as part of the Limestone Plateau of Jamaica, with a typical tropical karst topography, i.e. one characterized by dry valleys, poljes and numerous sink holes. This formation constitutes the largest geological and lithological unit in Clarendon and extends throughout the physiographic range of the parish. Southern sections of the formation are covered by old alluvial deposits, particularly in the lower Rio Minho Valley. Weathering of White Limestone has formed clay deposits in pockets along valley floors, and these have been occupied by small farms (Starke, 1959:11).

Alluvium

Alluvium covers about 25 percent of Clarendon and occurs mainly in the lower Rio Minho Valley. These soils are slow-draining clays, some of which are saline, indicating that their deposition was below sea level. This geologic formation is largely occupied by large sugar plantations, such as Monymusk, and to a lesser extent by tobacco plantations owned by the Cigarette Company of Jamaica. Its attractiveness to this type of agricultural land use is due to the comparatively large expanses of gently sloping land which is conducive to mechanization.

TOPOGRAPHY AND PHYSIOGRAPHY

Like all parishes in Jamaica, Clarendon's topography varies, in Davisian terminology from the youthful stage, where minor streams are actively down-

cutting, to the mature stage where major streams, such as the Rio Minho, have widened their channels and developed alluvial bottom lands. The northern half of the parish is mountainous, ranging in elevation from 150 metres on the limestone plateau to over 900 metres in the Bull Head Mountains (Figure 4.3). Most of the region is deeply dissected by fast flowing streams, most of which are tributaries of the Rio Minho. The resultant topography is rugged, posing a formidable challenge to agriculture. This topography in conjunction with geology, has given rise to three distinct physiographic regions in Clarendon, namely, the Mountains, Limestone Plateau and the Alluvial Plains (Figure 4.4). These regions have exerted strong physical influence on spatial variations in agriculture.

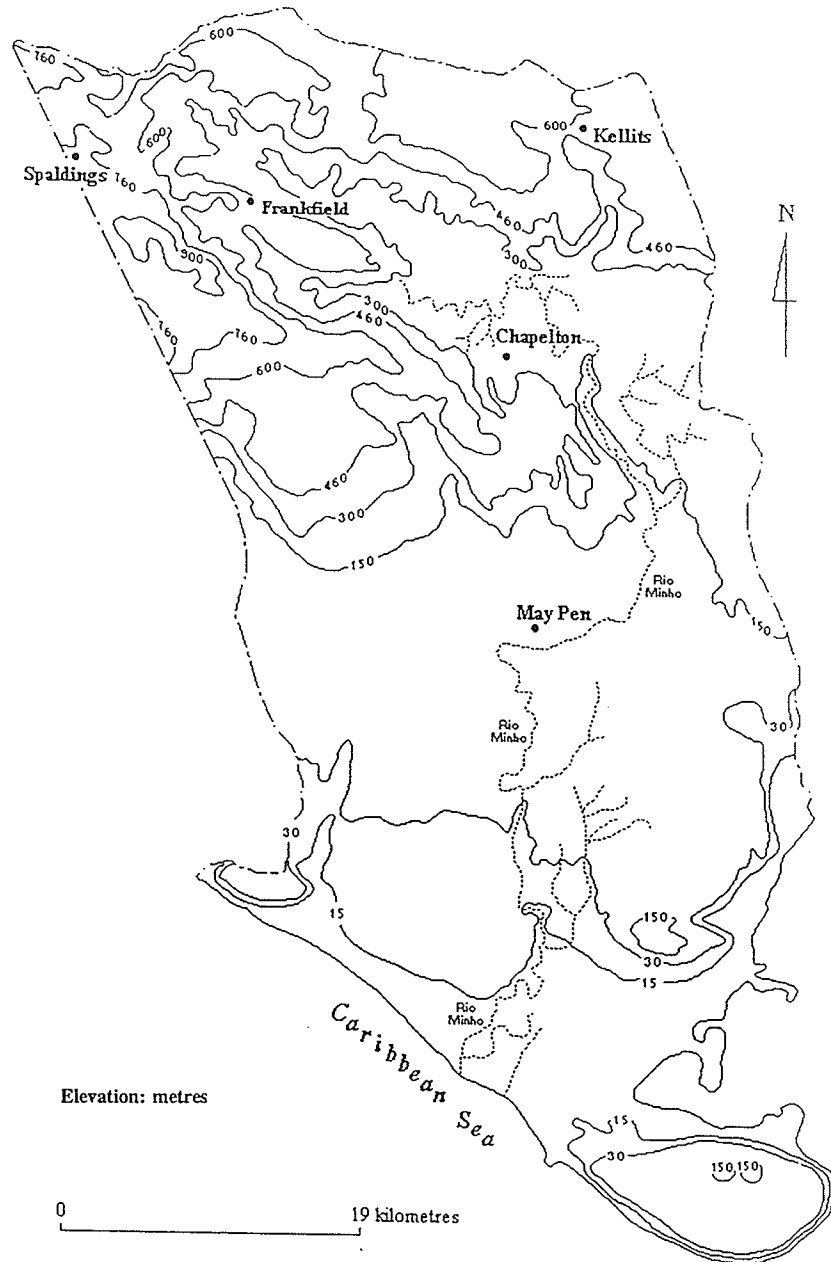
The Mountain Region

This region embraces the upper Rio Minho drainage area and incorporates the entire geologic formation of the Blue Mountain Series. The topography is rugged, with slopes averaging between 20 and 30 degrees. Gorge-like river valleys are present and the lithosolic soils are extremely vulnerable to erosion when cultivated.

The Limestone Plateau

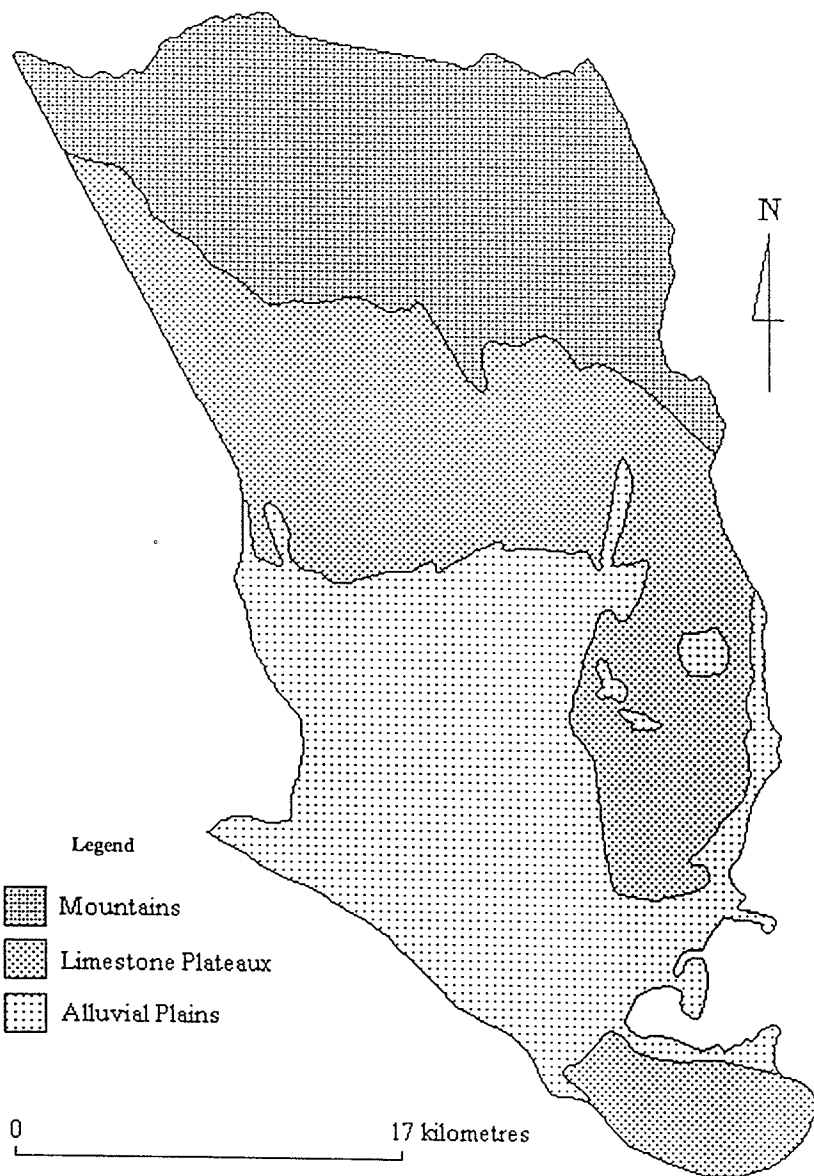
This is the most extensive of the physiographic regions and largely coincides with the Yellow and White Limestone formations. Alluvial flats with deep soils occur

FIGURE 4.3
CLARENDON: TOPOGRAPHY AND DRAINAGE



Source: Compiled from Starke, 1959.

FIGURE 4.4
CLARENDON: PHYSIOGRAPHY



Source: Compiled from Starke, 1959.

where the Rio Minho and its tributaries dissect this region. These flats are ideal for farming, but soil depth decreases where slopes steepen, posing a serious limitation should the soils come under intensive use.

The Alluvial Plains

This region coincides with the Alluvium Formations. Here, soils are uniformly recent in origin and slopes generally less than two degrees. These conditions are most attractive to agriculture, but are the domain of large plantations rather than small farms.

SOILS

The only definitive work on the soils of Jamaica is the **Soil and Land-Use Surveys of 1955-59**, undertaken by the Imperial College of Tropical Agriculture. These surveys were in response to the recommendations of the Moyne Commission (supra p.37) and purports to provide Jamaican farmers with a rational approach to land use. To this end, the surveys:

- 1) distinguish the major soil groups and their sub-groups and maps their distribution;
- 2) denote average slope associated with each soil type on the basis of six categories, A to F, where A has 0-2° slope, B 2-5°, C 5-10°, D 10-20°, E 20-30° and F greater than 30°;
- 3) classify the erodibility of soils under conditions of slope; and

- 4) recommend the land-use capability of each soil type within a given slope category.

The results of this survey form the basis of the ensuing discussion.

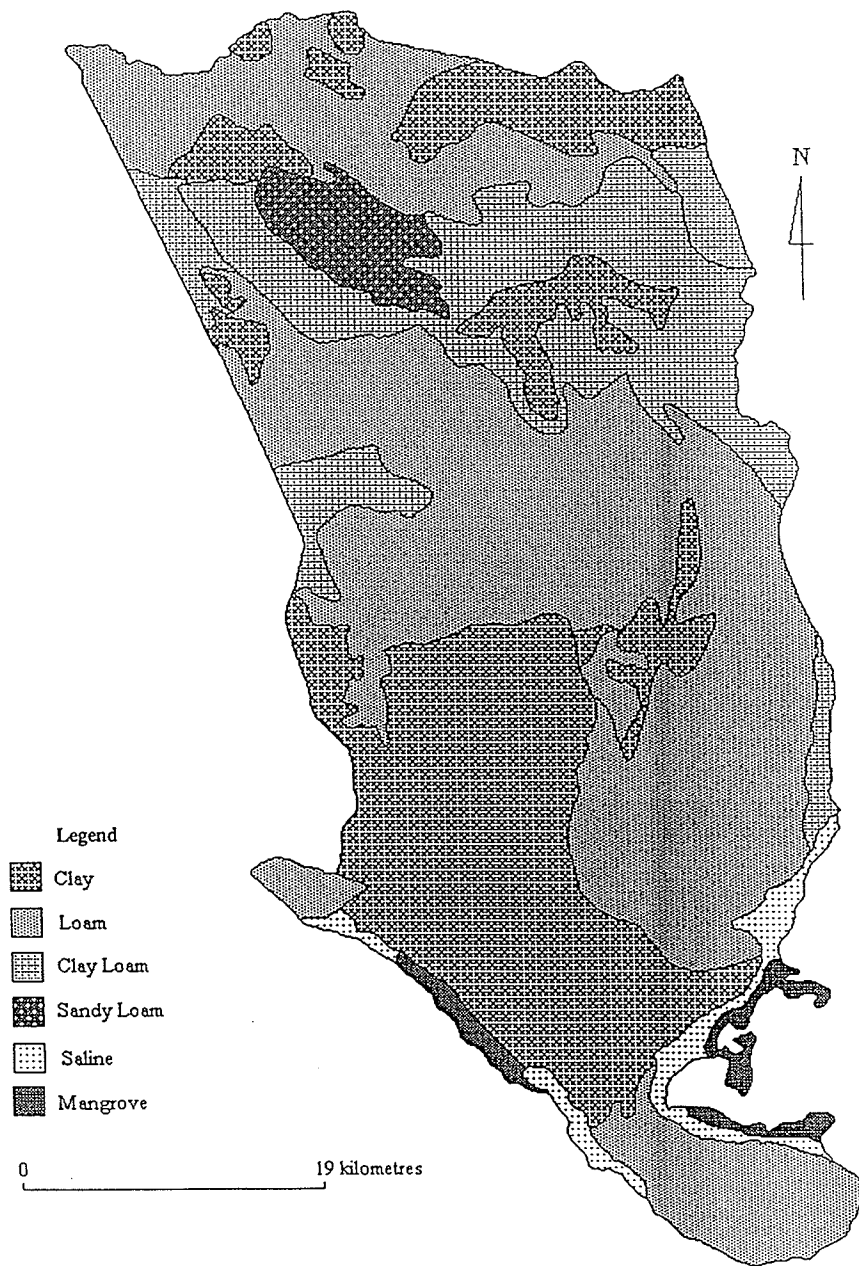
Soil Groups

Among the parishes of Jamaica, Clarendon's prominent place in agriculture is undoubtedly related to the predominance of loam and clay loams among the major soil groups (Table 4.4). Together, these two groups account for 61.4 percent of

Soil Group	Area (ha.)	Percentage of All Soils
Loams	38,182	36.2
Clays	36,017	34.1
Clay Loams	25,354	24.0
Sandy Loams	5,989	5.7
Total	105,542	100.0
Source: Calculated from Starke, 1959		

of major soil groups in the parish. The spatial pattern of soil distribution can be described as a base of loams and clays, with pockets of clay loams and sandy loams in interior regions, and salina and mangrove swamps along coastal fringes (Figure 4.5). These soil groups are discussed separately, focusing on appropriate land use for the types of slope on which they occur.

FIGURE 4.5
CLARENDON: DISTRIBUTION OF SOILS



Source: Compiled from Starke, 1959

The Loam Group

Two major types of loam occur in this group, namely, Bonnygate Stony Loam and Donnington Gravelly Loam, which together constitute about 33 percent of the soils in Clarendon.

- 1) Bonnygate Stony Loam: As a single soil type, Bonnygate Stony Loam is the most extensive, accounting for 26.1 percent of all soils. This soil is thin, either brown or reddish in colour, covers most of the limestone plateau, and usually occur on slopes in excess of 20 degrees. Although moderately fertile, cultivation of these soils is hampered by low-moisture retention capacity and erodibility. The **Soil and Land-Use Survey, 1959**, for the Parish of Clarendon recommends the planting of timber and/or the encouraging of natural forest growth on this type of soil, due to its low-moisture capacity.

- 2) Donnington Gravelly Loam: This type of soil occupies a narrow band in the northwestern portion of the parish and accounts for 6.6 percent of all soils. Although its natural fertility is considered good and moisture-retention capacity fair, erodibility is extremely high because of its thinness. It is, nevertheless, considered suitable for most crops, although strongest recommendations are made for root crops, food forest, coffee, cacao, timber, vegetables, sugar cane and improved pasture.

The Clay Group

Clays are by far the most numerous soil group in Clarendon and are found in all physiographic regions. At least 28 different types of clays occur, however, the more significant ones are Agualta, Carron Hall, Rymesbury and Waitabit.

Together, these four types account for 70 percent of the soils in this group, and nearly 23 percent of all soils.

- 1) Agualta Clay: Agualta Clay is the most common soil in the Clay Group, accounting for 35 percent of that group and 11.5 percent of all soils in Clarendon. A poorly drained, heavy soil, it is most extensive on the alluvial lowland of the southern part of the parish, where the dominant slope range is between 0 and 2 degrees. Although located in the driest part of the parish, good moisture-retention capacity contributes to its suitability for a wide range of crops. Most suitable are sugar cane, rice and improved pasture, although ancillary consideration is also given to root crops, citrus and food forest.
- 2) Carron Hall Clay: This sub-group accounts for 15 percent of the Clay Group, or five percent of the soils in Clarendon. High alkalinity has bolstered natural fertility, and although slopes are moderately steep, only a slight erosion hazard exists. These soils are particularly suitable for the cultivation of sugar cane, root crops, vegetables and tobacco.
- 3) Rymesbury Clay: This soil accounts for nine percent of the Clay Group, or 3.1 percent of the soils in the parish. Heaviness, poor drainage and high salinity limits the range of crops that are recommended, to rice and pasture.
- 4) Waitabit Clay: The significance of Waitabit Clay among soils in the parish is identical to that of Rymesbury Clay. It is a heavy, deeply weathered and overlies conglomerates in the northern uplands where slopes vary between 30 and 50 degrees. Drainage is rapid and erodibility is high, but this soil is nevertheless suitable for cultivation of sugar cane, pasture and food forest, if extensive soil conservation measures are employed at all slope levels.

The Clay Loam Group

Although 11 types of clay loams occur throughout Clarendon, the most significant are the St. Ann and Diamonds Clay Loams, which together account for nearly 74 percent of soils in that group and 16.8 percent of the soils in the parish.

- 1) St. Ann Clay Loam: This soil accounts for 10.6 percent of the soils in Clarendon and is the red bauxite soil found on the Limestone Plateau. Rapid drainage in conjunction with high acidity, moderate to high erodibility and low natural fertility has limited the agricultural potential of this soil. Root crops, food forest and improved pasture is recommended, but soil conservation precautions in the form of contour planting is required in all slope categories.

- 2) Diamonds Clay Loam: Accounting for 6.2 percent of soils in Clarendon, Diamonds Clay Loam is a thin, well-drained soil overlying the geologic formations of the Mountain Region. The dominant slope range is over 20 degrees and moisture retention is variable, ranging from fair to low due, to rapid moisture movement through this soil. Slightly alkaline, Diamonds Clay Loam is low in natural fertility and has a high erosion potential. Recommended uses include cultivation with root crops, coffee, cacao, food forest, timber and the establishment of improved pasture. Ancillary consideration is given to sugar cane, vegetables, pineapples and coconuts.

The Sand Loam Group

This is the least significant soil group in Clarendon. Of the ten soil types comprising this group, the most dominant is Cuffy Gully Sandy Loam, which accounts for 60 percent of soils in this group, or 3.4 percent of the soils in the

parish. Its occurrence is confined to a small area in the northwest portion on slopes, in excess of 20 degrees. Although well-drained, its moisture- retention capacity is rated as moderate. Soil pH is nearly neutral and natural fertility is low. Erosion potential ranges from moderate to high, so that recommended land use and requisite soil conservation precautions are similar to those of Diamonds Clay Loam.

SLOPE AND SOIL EROSION

Small farming in Clarendon is influenced as much by the degree of slopes as by the type of soil. Although reference has been made to the implications of slope in the discussion of the land capability of the soils, their importance warrants elaboration.

Although nearly 31 percent of the total area of Clarendon can be considered level land, with slopes 10 degrees and less, most small farms are located, however, on hilly lands with slopes in excess of 20 degrees and which cover about 62 percent of the parish (Table 4.5). Level lands are therefore at a premium and are largely confined to the southern third of the parish, as well as on alluvial flats in valleys of the Rio Minho and its tributaries. Steepest slopes, i.e. those in excess of 30 degrees, occur in the southern two-thirds of the mountain region and are dominated by soils which are low in natural fertility, such as Waitabit Clay, Diamonds Clay Loam and Cuffy Gully Sandy Loam.

The large proportion of steep land results in high levels of erodibility and, hence, the need for intensive soil management if agriculture in those areas is to be

TABLE 4.5
CLARENDON: DISTRIBUTION OF LAND BY SLOPE CATEGORY

Slope Category	Gradient (degrees)	Area (km ²)	% of Total Area
A	0-2	230.3	19.0
B	2-5	47.3	3.9
C	5-10	94.5	7.8
D	10-20	86.0	7.1
E	20-30	680.0	56.1
F	Over 30	73.9	6.1
Total		1212.0	100.0

Source: Calculated from Starke, 1959

successful. However, there is not necessarily a direct correlation between degree of slope and extent of soil erosion, because, as indicated in earlier, there is variation in the erodibility of different soil types. While erodibility of soil is one of the factors which influence the nature of farm production, its impact can be checked by use of appropriate soil conservation measures and soil-management practices. The small farmers of Clarendon have traditionally employed low-technology, low-cost conservation measures, such as contour and drains, vegetative barriers, stake barriers and the permanent cultivation of steepest slopes i.e. those over 20 degrees. Evidently, these measures are inadequate, because the watersheds of Clarendon experience some of the highest annual soil-loss rates in Jamaica (Wigley 1988:87). While soil-loss values for the Parish could not be ascertained, the **Jamaica Country Environmental Profile, 1987**, has listed the Rio Minho among the nine most seriously eroded watersheds in Jamaica, losing

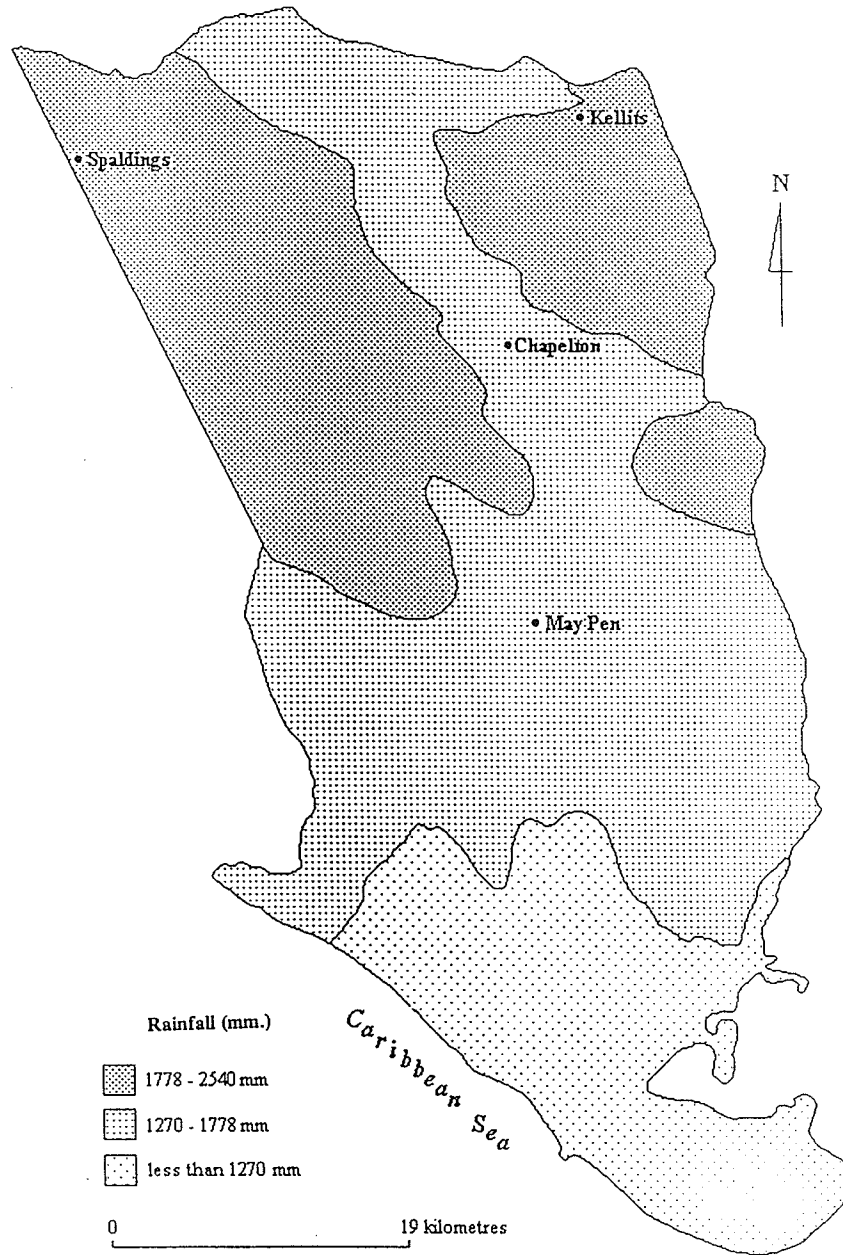
an average of 100 to 120 tonnes of soil per hectare per year. It was in response to this phenomenon that the USAID/Jamaica Government funded Second Integrated Rural Development Project (IRDP), one of the largest soil conservation projects ever undertaken in Jamaica, was implemented in the watershed regions of Clarendon to combat soil loss. The objective of the project was to reduce soil loss, especially on small farms through the introduction of technologically advanced soil-management practices, such as hill-side ditches, bench terraces, orchard terraces and ballasted waterways. Other components of this project included forestation of non-agricultural lands, and engineering works related to construction and rehabilitation of access roads; rivers and stream control.

Climate

Like the rest of Jamaica, rainfall is the most variable and, therefore, the most significant aspect of Clarendon's climate. Variations in rainfall are a function of altitude. Thus, there is progressive decline in mean annual rainfall from the upland regions towards the coast (Figure 4.6). Throughout much of the Mountain Region, the average annual rainfall varies between 1,778 and 2,540 millimetres, while most of the Limestone Plateau averages between 1,270 and 1,778 millimetres of rainfall each year. The southern portions of the Alluvial Plains receive a mean annual rainfall of less than 1,270 millimetres.

FIGURE 4.6

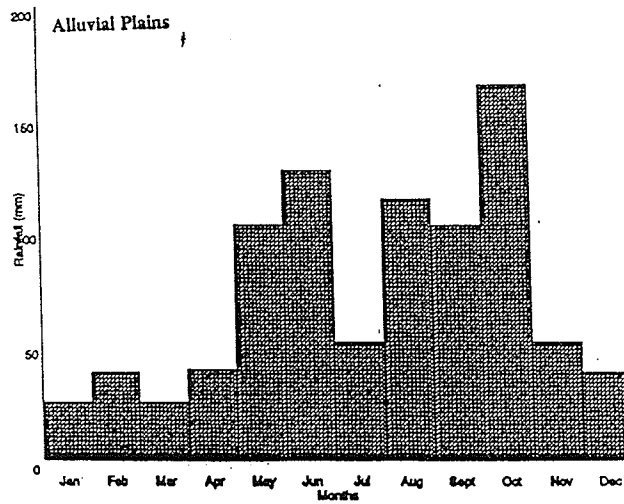
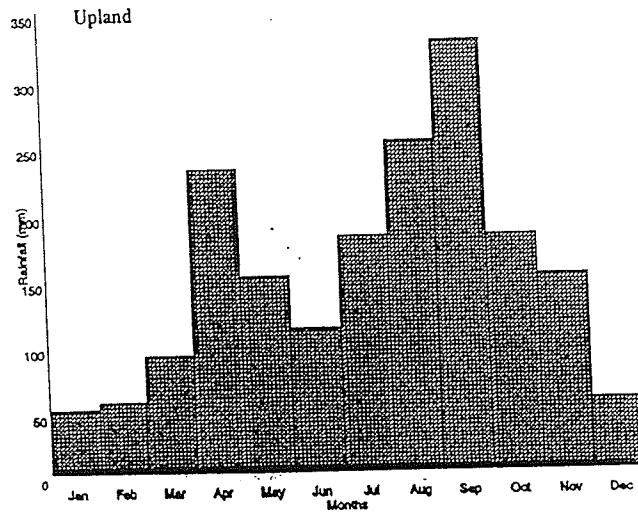
CLARENDON: DISTRIBUTION OF ANNUAL MEAN RAINFALL



Source: Compiled from Country Environmental Profile of Jamaica, 1987.

FIGURE 4.7

CLARENDON; RAINFALL REGIME



Source: Calculated from Country Environmental Profile of Jamaica, 1987

The rainfall regime of Clarendon divides the year into two alternate wet and dry seasons (Figure 4.7). The first dry season extends from December to March in upland locations, when rainfall averages about 62.5 millimetres over that four-month period. April to June is wet and although average monthly rainfall for July is similar to that of November in these upland locations, higher temperatures result in lower moisture budget for July. Thus, July and early August mark the second lull in rainfall, while late August until mid-November represents the second peak. The regime of lower elevations near the coast is only slightly different, but difference in the amount of rainfall is significant. With generally higher temperatures, problems of moisture budget are further amplified in these lowland locations. Although annual mean rainfall is lower on the plains than in upland areas, this does not always hamper agriculture, because the Rio Minho which originates in moisture-surplus areas to the north, is harnessed for irrigation by larger farms, under the supervision of the Mid-Clarendon Irrigation Authority. Extensive use of irrigation has, however, created farming problems, because the constant flooding of fields has resulted in saline intrusion in some areas.

Summary

The agricultural representativeness of Clarendon with regard to its socio-economic and physical environments, and thus its appropriateness for this study has been attested to in the preceding discussion. Early foundation of freehold tenure

among ex-slaves in the immediate post-emancipation period has resulted in a long-established and solid small-scale farming base in this parish.

Of the various aspects of the physical environment, high erodibility of soils which occurs as an adjunct to steep slopes and inadequate soil management practices, pose the greatest challenge to small farming in Clarendon. Agricultural development projects designed for small farmers have, therefore, to a large extent focussed on soil conservation.

Appreciable differences in the physical environment occur throughout the parish, particularly in relation to topography, physiography, slopes, the erodibility of soils and rainfall. The extent to which environmental factors influence small farming becomes evident in the chapters relating to the nature of small farming.

CHAPTER 5

THE QUESTIONNAIRE DESIGN AND METHOD OF SAMPLING

Before examining and analyzing data relating to domestic-food production and small farming, it is relevant to outline the survey methodology, particularly with regard to the questionnaire design, the sampling technique employed and the manner in which questionnaires were administered.

An agricultural questionnaire reflecting the research objectives (supra p.22) was the principal data-collection tool used in the field (Appendix II). Being of a descriptive nature, rigorous testing of hypothesis was not considered to be warranted in this study. Nevertheless, the following research statements were formulated in order to design the questionnaire and to focus discussion.

1. Although small farmers are widely regarded as pillars of domestic-food production (supra p.29), their crop emphasis is overwhelmingly export oriented. Such orientation reflects economic factors related to the greater attractiveness of infrastructural provisions for export, in contrast to domestic crops, and social factors related to the age of farmers (Momsen 1969; Spence 1985).
2. Although small farmers have regularly identified scarcity of labour as a major constraint to improving in their operation (Edwards 1961:71; Spence 1985:72; Wigley 1988:104), underutilization of household labour is common, because parents often dissuade their offspring from becoming involved in small farming as a way of life.

3. In spite of the small average size of farms, the phenomenon of underutilized or idle land commonly associated with large estates, is also prevalent on small farms (Edwards 1961:54; Spence 1985:63). This phenomenon is related to the ageing of small farmers as well as social attitudes and economic expectations which discourage younger ones from becoming involved in small farming.
4. Contrary to the claim by some scholars specializing in Caribbean development problems, notably Brana-Shute and Brana-Shute (1982:261-289); Palmer (1974:572-587); and Swanson (1979:39-56), remittances in the forms of pensions from abroad, financial support from children and siblings residing overseas, and incomes generated from temporary employment abroad, are recurrent sources of capital investment into small farming and enhance societal development (Rubenstein 1987:248).
5. Agricultural development initiatives tend to treat small farmers as a uniform group and, therefore, has provided homogeneous development packages for them (USAID, 1977; Goldsmith 1981). On the contrary, distinct categories of small farmers are discernible, not only on the basis of crop emphasis, which is itself a function of the physical environment, but also on the basis of social factors such as age.

OBJECTIVES AND FORMATS OF THE QUESTIONNAIRE

As the primary data collection tool, it was essential that the questionnaire translate the research objectives into specific questions. In turn, those questions needed to be couched in such a way that respondents would readily comprehend the questions and so provide both accurate and necessary information (Nachmias and Nachmias 1987:253). The principal aim of the questionnaire was, therefore, to elicit from each respondent, relevant information relating to the circumstances

under which he/she employs resources in relation to their agricultural production. Information about the socio-economic background of farmers was also considered to be critical to this investigation, because it would have bearing on farmers' behaviour in relation to their enterprises.

Small farmers are sometimes suspicious of the objectives of research projects such as this one, regardless of the efforts which might be taken to alleviate such suspicions (Spence 1985:10). The reason for this suspicion stems from the fact that most do not pay taxes on property or income and consequently are in constant fear of being investigated by the authorities. Hence, their initial tendency is to associate the interviewer either with a government taxation office or with an imminent agricultural project, which would bring immediate material benefits to them. Whatever the basis of their perception of the interviewer, the tendency would be to give misleading information so as to exaggerate their plight. The success of interviews was therefore dependent upon the ability to gain the confidence of farmers and obtain truthful information. To this end, and based on suggestions by Moser and Kalton (1971:317-324) and Nachmias and Nachmias (1987:253-271), particular attention was paid to the following points in the designing of the questionnaire:

1. The content of questions: In this regard the questionnaire incorporated both factual and opinion/attitude questions. Factual questions would enhance quantification of socio-economic and

agrophysical variables, while opinion/attitude questions provide a basis for the interpretation of specific behaviours. Direct questions on potentially sensitive issues, such as income, were avoided except in case studies.

2. The type of questions: Both open-ended and close-ended questions were used in the questionnaire. Close-ended questions were appropriate where the interviewer was aware of the potential range of responses to a specific topic. Where uncertainty existed about potential responses, or where the opinions of respondents were required to assess a phenomenon, open-ended questions were considered suitable. There was bias towards the use of close-ended questions, because this facilitated the precoding of responses, thereby accelerating the collection of data with a minimum amount of writing during the course of administering the questionnaire.
3. Questionnaire format: The attitude of respondents to interviews is adversely affected by the length of questions and the apparent bulk of questionnaires (Casley and Lury 1982:10). Thus, bulky questionnaires are more likely to elicit negative or inaccurate responses than more compact ones, because the respondent becomes less insightful as they attempt to shorten the interview (Casley and Lury 1982:10). In this regard the questionnaire was arranged to accommodate a maximum number of questions per page, with printing on both sides of pages. Checkboxes were used to allow speedy recording of responses and computer data entry. Questions were structured in a lucid and terse form and when necessary, translated into the vernacular so as to maximize respondents' comprehension of, and interest in the interviews.

Personal experience from studying small farming in Jamaica as well as other documented reports such as that of Wigley (1988) had focused attention on the tendency of some small farmers to exaggerate their problems. In other cases,

attempts were made to respond favourably to questions in order to impress the interviewer. Such factors can seriously jeopardize the reliability of responses and was safeguarded against as much as possible by the strategic placing of reliability-check questions in vulnerable sections of the questionnaire. For instance, Question 43(d) is a reliability check for Question 38(a). If the response to 38(a) is in the affirmative, then it would be expected that the second option would be selected in 38(d).

THE SAMPLING TECHNIQUE

In the absence of current agriculture census data, sampling could have been accomplished in two ways. One would be to use a common geographical approach which generates good reference points on a large-scale topographical map, using a table of random numbers. Sampling could then be undertaken within grid reference areas corresponding to the grid coordinates. This approach was attempted in the initial stage of the research, but the available topographical map sheets of the study area were found to be far too dated and contained too many inaccuracies to be a reliable source of a sample.

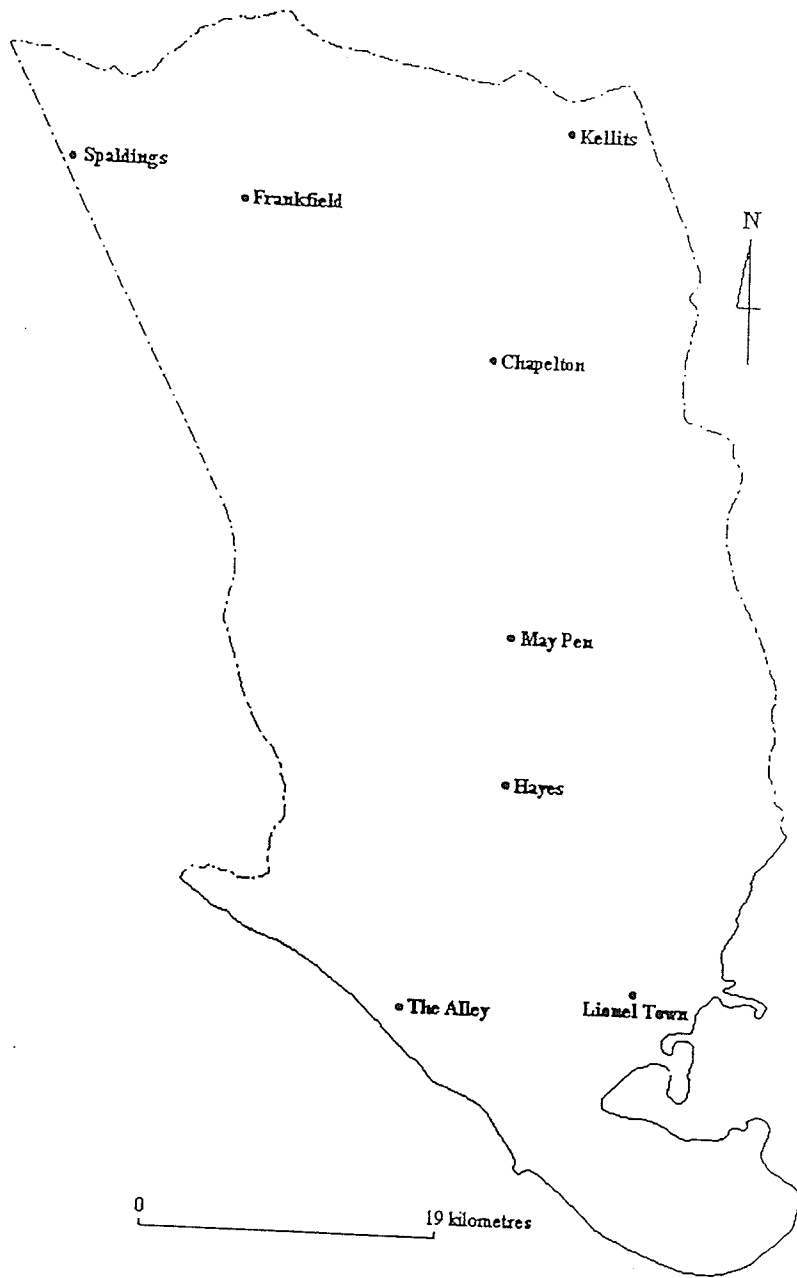
An alternative was to sample from the Preliminary Farm Register for the Parish of Clarendon. As is the case of other parishes, this register is intended to be the primary data base used by the Rural Agriculture Development Agency (RADA) in the monitoring of agricultural activities at the parish level. In this regard, the

register is structured in accordance with the local administrative hierarchy of RADA, sub-dividing Clarendon into eight Divisions and 40 Sub-divisions. Location of the divisional offices are shown in Figure 5.1.

Although all Divisions were represented in the register, only 16,095 of an estimated 22,000 farmers in Clarendon were registered at the time of the survey, owing to the preliminary nature of the document. Registration is intended to be an ongoing process but the majority of outstanding registrations were expected to be completed within a "reasonable" time. Data on each farmer consisted of name, sub-divisional address, basic land uses and size of holding. Size of holding was based on individual and family ownership of land, but excluded land occupied in less secure tenure, such as rented or leased. Thus, the size of holding recorded for each farmer is an approximation, because a farm typically consists of multiple fragments, sometime with different tenurial arrangements.

Based on the definition used in this study (*supra* p. 25), 10,062 of those contained in the register qualified as small farms. A purposed three percent sample amounted to 302 farms, but owing to inclement weather at the start of the survey, only 263 interviews were completed.

FIGURE 5.1
CLARENDON: LOCATION OF RADA DIVISIONAL OFFICES



Source: Compiled from Preliminary Farm Register, Clarendon, 1987

Although tallies are made on a divisional basis (Table 5.1), farmers were sampled randomly and in proportion to the small-farmer population registered in each Sub-division. This procedure ensured maximum spatial representation of the sample.

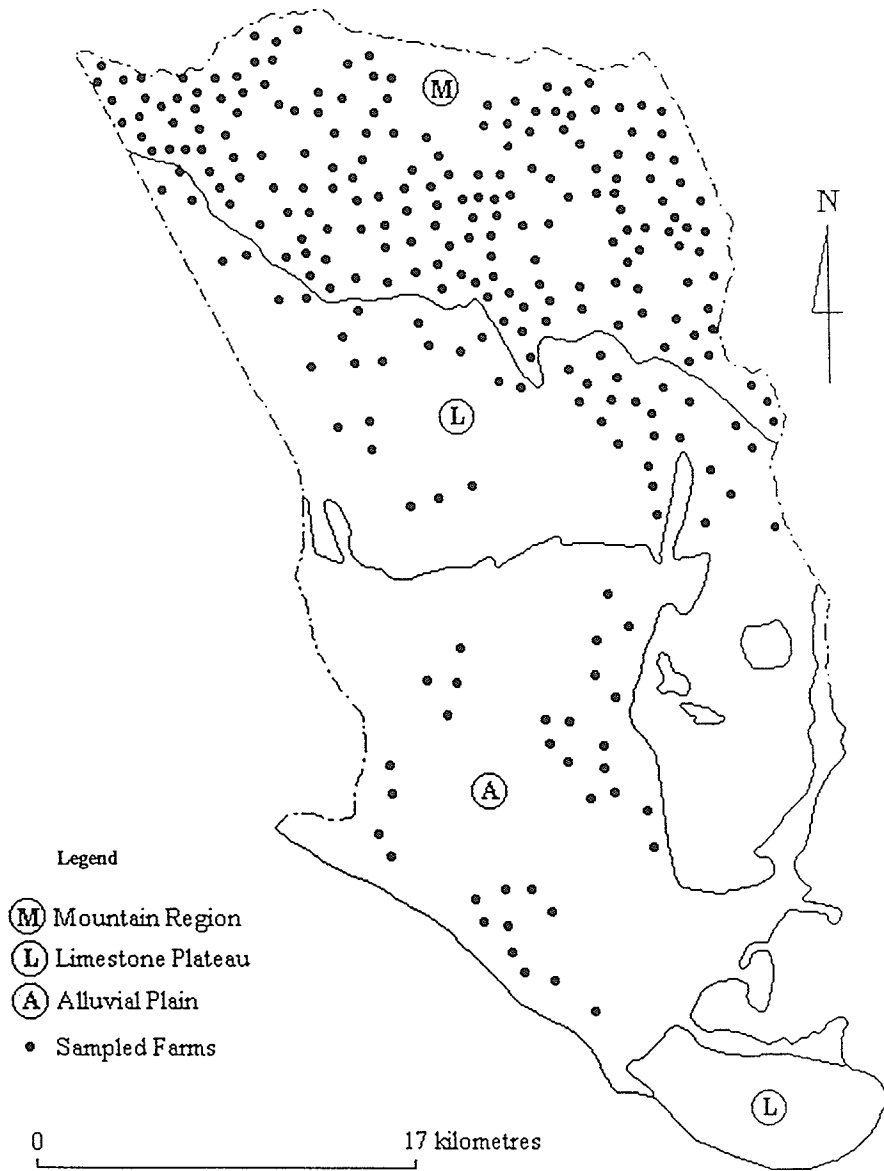
Name of Administrative Division	Number of Registered Small Farmers	Final Sample Number
Kellits	2767	83
Frankfield	1833	55
Chapelton	1566	47
Spaldings	1500	45
May Pen	989	17*
Hayes	833	10*
Lionel Town	362	0**
The Alley	212	6
Total	10062	263

* Sample Incomplete. ** No Sample Taken.

Sampling was on a three-tiered basis, so that there were two alternatives for each farmer selected; a procedure considered to be a necessary safeguard in the event that selected case did not meet the small-farmer criterion, given that only an approximation of farm size was recorded in the register.

The spatial distribution of sampled farms is shown in Figure 5.2. As typifies the rest of Jamaica, small farms are heavily concentrated in hillier regions. Accordingly, 230 (87.5 percent) of the sampled farms were situated in either the Mountain or Limestone Plateau physiographic regions, with only 33 (12.5 percent) being located on the Alluvial Plains.

FIGURE 5.2
CLARENDON: DISTRIBUTION OF SAMPLED FARMS BY
PHYSIOGRAPHIC REGIONS



This sampling technique has two potential shortcomings. First is the evident underrepresentation of Clarendon's farm population, owing to the preliminary nature of the register. However, because all Sub-divisions were represented in this register, there is no evidence of spatial bias in the registration of farmers, which would otherwise influence the representativeness of a proportional random sample. Moreover, given the unavoidable lag time between data collection and publication even for agricultural census, underrepresentation of the farming population is a characteristic of any such document.

The second potential problem arises because the register's records are based on ownership of holding, potentially excluding farmers who are involved in other forms of tenure. However, previous small-farming related studies such as that of Edwards (1961), Goldsmith (1980), Babb et al. (1983) and Wigley (1988) have reported that over 90 percent of the small farms they surveyed were owner-occupied. The agricultural census of 1968 recorded similar trends. Thus, the proportion of farms not occupied by their owners, such as landless farmers or those not owing the land they occupy is considered to be sufficiently small as not to present a serious bias in sampling.

ADMINISTRATION OF THE QUESTIONNAIRE

The fieldwork for this study commenced in early October 1987 and continued until late January 1988. The initial intention to conduct a pilot survey of 30

farms in the earliest phase of fieldwork was postponed, because the presence of a tropical wave and associated rainfall over Jamaica during the first week of October made travel within the study area virtually impossible. Instead, time was spent reviewing the questionnaire with scholars at the University of the West Indies, who had experience with small-farm surveys, as well as with RADA officers at the National Office at Hope Gardens in Kingston, and at the regional offices in Clarendon. These reviews resulted in minor modifications to the questionnaire, particularly with regard to ambiguities in and limited scope of pre-coded questions. A pilot survey was conducted, however, during the second week of October, which prompted further modifications to the questionnaire, especially with regard to the removal of redundant questions. For instance, questions related to the specific quantity of crops produced, led to the frustration of respondents, because they neither keep written records nor could they mentally recall the information requested. By the third week in October, the revised questionnaire was used in the field.

In most instances, interviews were conducted at or near the residence of respondents, so as to standardize observations made in relation to levels of living and the state of the property. However, in cases where the main fragment was non-residential, a request was made of the respondent to observe his/her activities there as well. The survey began in the northern part of the parish and progressed in a southerly direction. Temporary accommodation with prominent members of

the communities, such as teachers and preachers, was established at different locations throughout the study area. Although these residents were not always a part of the sample, because they are respected in their communities, cooperation from respondents was deemed to be enhanced by virtue of the interviewer's acceptance by these community members. In addition, this approach minimized the travelling time between locations and allowed an informal rapport to be developed with farmers while residing in their communities. Indeed, many evening hours were spent in local bars and around domino and draught games socializing with farmers, gaining their confidence and receiving valuable information in relation to their families, farms, general outlook on life and career aspirations.

The survey was undertaken with the full cooperation of the Jamaican Ministry of Agriculture through a directive from the Permanent Secretary, to the director of the RADA regional office in Clarendon. This director and his officers were extremely helpful in making suggestions about the way in which interviews could be conducted and in establishing the contacts for the accommodation of the interviewer in the various communities. However, offers by extension officers to provide escort in the field were declined, because past experience surveying small farmers in the presence of agricultural officers in Jamaica, suggested that respondents often provided replies which they considered to be favourable to these officers, in the hope of obtaining special treatment, or at least preventing

adverse treatment in the distribution of agricultural assistance.

Because translation of questions into the vernacular was often necessary, the interviews were conducted in a relaxed and informal environment, because farmers did not have to become bogged down with the interpretation of questions. Being relaxed, respondents tend to be more elaborative, as they had a better sense that they were playing an informative and critical role in the study.

Each interview took an average of one hour to complete, but there were cases where up to two hours were spent with a single respondent. The daily tally of interviews averaged four, with the maximum never exceeding seven. This tally depended upon the accessibility of farmsteads and the amount of time spent in locating the heads of households, to whom questions were addressed. There were three cases in which designated male heads of household were unavailable, but whose spouses had temporarily assumed the headship role and were eminently knowledgeable about the farm operation. This procedure was considered acceptable, especially in light of increasing acknowledgement by official international organizations, such as the FAO and Canadian International Development Agency (CIDA) through their publications, that rural women in developing societies are equal partners, if not the main small-farm decision-makers. This highlights the topical issue of the role of women in rural development. The majority of farmers cooperated with the questionnaire survey

and in only two cases were interviews aborted because of lack of cooperation. Another had to be discarded due to inconsistencies in responses, determined by reliability check questions. While some farmers attempted to mislead by exaggerating their hardships in anticipation that the research might somehow provide immediate relief, the majority understood the nature of the survey and were anxious to provide the requested information. It was refreshing to hear far-sighted respondents rationalize their assistance to the survey, by remarking that the results of this investigation might aid the design and implementation of future agricultural development schemes in their communities.

Summary

The validity of the findings is to a great extent, a function of the research methodology employed. Since many of the findings of the research rely on the questionnaire survey, it is hoped that there were no serious oversights or shortcomings in the questionnaire, or in other aspects of the research methodology. Reliability of the questionnaire records is dependent upon the integrity of respondents as well as on standardization of the interview procedure. In this regard, it is thought that most respondents understood and appreciated the purpose of the research and realized that ultimately, any benefits accruing from this study, depended on the honesty of their replies. The greater their honesty, the more authentic the portrayal of their situations and, thus, the better it is to formulate more relevant policies and strategies to alleviate some of the inherent problems of Jamaican small farmers.

CHAPTER 6

THE HUMAN RESOURCE PROFILE OF SMALL FARMING

This chapter, in conjunction with Chapters 7 and 8, provides a comprehensive review of the resource profile of small farming based on the survey data. The objective of this profile is two-fold. First, it represents the initial of a three-tiered rationalization of the milieu of factors influencing domestic-food production and small farming in Jamaica; the other tiers relating to the classification of farms and debate regarding the development of categories of farming. Second, it provides a baseline, or norm against which different categories of farming can be compared, analyzed and understood. Human resources in small farming are discussed within the context of the farmers, their household and farm labour.

THE FARMERS

The human resource discussion of the farmers, examines eight related factors within the context of their relevance to small farming. These factors are: sex-ratio; age; marital status; level of education; occupational status; and factors influencing agrarian decision-making.

Gender

Small farming is a male-dominated activity. Therefore, of the 263 farmers surveyed, only 42 (16 percent) were female, 22 of whom had assumed full

responsibility for the operation of farms because their spouses were either overseas or working elsewhere in Jamaica. Eleven women acquired their holding following the death of their spouses, six were single women who had inherited land, while the remaining three had been divorced/separated from their spouses.

Although the extreme imbalance in the gender ratio of farmers in this survey does not lend itself to convincing statistical comparisons, only inconsequential differences were evident between males and females, with respect to key variables such as farm size, cultivated area and labour input (Table 6.1).

Selected Variables	Male	Female
Mean Age	51.60	52.60
Mean Farm Size (ha.)	2.02	2.00
Cultivated Area (ha.)	1.64	1.52
Mean personnel labour input (hrs./day)	5.70	5.10
Membership in farmer organizations (%)	46.60	40.50
Use of basic soil conservation (%)	95.00	93.00

Essentially therefore, the level of farming among women rivals that of men.

Age

Farmers' age is important to discussions of the small-farming environment in relation to domestic-food production, because it does not only reflect the potentials for productivity based on personal endeavours, but it also holds possible

clues to the understanding of small-farming development and dynamics. Given the physical and strenuous nature of small-farming activities, it would be expected that younger farmers would provide greater physical contributions to farm production than older ones.

At 51.8 years, the mean age of sampled farmers was approximately two years lower than the national average of 54.0 years (Spence, 1975:112). That nearly 44 percent of them were over 55 years, is an indication that these farmers are fast approaching the threshold of their ability to effectively continue their operations, through physical endeavours (Table 6.2). However, this observation is not the

Age Category (yrs.)	Number of Farmers	Percentage
Less than 40	57	21.7
40-55	91	34.6
Over 55	115	43.7
Total	263	100.0

Mean age = 51.8 years.

perception of most farmers, because the concept of retirement is largely non-existent and, unless incapacitated by disease or injury, most will continue farming to the end of their lives. Despite their age, most were in good health; a factor which partially explains their generally positive attitude towards development initiatives. This was evident in their enthusiastic response to the survey, which

they perceived as having the potential to assist in developing appropriate agricultural projects in their communities.

Marital Status

Marital status is an important index of social and economic stability and responsibility in Caribbean rural societies (Brierley 1974:74), and as such, can be translated into stability, growth and development of small-farm production. It is in this regard, that young male farmers aspire to establish stable unions with prospective and capable females (supra p.81). This aspiration is indicative of intra-societal awareness and acknowledgement of the academically debated and often misconstrued role of women in rural development.

In light of the preceding discussion, the potential for social and economic stability and responsibility among the sampled farmers, can be considered to be high, because 182 (67 percent) had established stable unions in the form of married and common-law relationships. Forty-six (18 percent) were single, 23 (9 percent) were widowed and 12 (5 percent) divorced or separated. The implications of unstable unions for small farming is reflected by the fact that, except for widowed farmers, who were often old and physically disabled, single farmers devoted less time to their land than any other category. They were also less inclined to participate in farming-enhancing activities, such as joining farmer organizations, or attending training sessions organized by the extension services. Therefore, it

seems that the attitude of single farmers to their occupation, reflects the absence of familial responsibilities and, hence, their adoption of a relatively carefree approach to farming (Brierley 1974:75). However, differences in land resource between single farmers, most of whom are younger than the average age, and those in more stable unions, which itself is a function of age, might proffer alternative explanations (see Table 7.3).

Educational Attainment

Although rural parents in Jamaica take great pride in educating their children, this objective sometimes conflicts with the need to have as many household hands as possible undertaking a range of farming chores. Today, most sampled farmers endeavour to keep their children in school and, as much as possible, dissuade them from farm labour. However, when they were children, they provided an integral part of the household workforce. It was, therefore, not uncommon for them to be "stopped" from school so as to attend to farm chores. Consequently, few sampled farmers attained more than a primary-level education (Table 6.3),

Level of Education	Number of Farmers	Percentage
Primary	212	80.6
Secondary/Vocational	43	16.3
University/College	5	1.9
No Formal Education	3	1.2
Total	263	100.0

and many did not even complete this level. Those who attended secondary schools were relatively younger, having graduated from the New Secondary Schools, which were set up in the late 1960s through early 1970s, in order to phase out the All Age school system. The objective was to extend the years of schooling and the level of training offered to children. These schools have not been effective in meeting this objective and are widely regarded as being sub-standard and "little better" than the elementary level. The point here, is although graduates from these schools have the label of secondary attainment, they may function on the same level as those having primary education. The five farmers with university/college education, were trained teachers, three of whom had completed certificate courses at the University of the West Indies, while the remainder had not gone beyond teachers' college.

A low level of education is one of the most permeant characteristics of small farming. As such, education seems to have little influence on existing variations in levels of farming (Collymore 1985).

Occupational Status

Low and discontinuous incomes among small farmers, causes a high propensity for part-time jobs among them. However, this propensity might also be related to the lingering aspirations of especially younger farmers, to be "something better" than a small farmer (supra p.78), and as such, has implications for

continuity of small farming, and for domestic-food security. The propensity for part-time jobs is reflected by the fact that 159 (60.5 percent) of the sampled farmers who worked off-farm, mainly as casual labourers, on a seasonal or intermittent basis (Table 6.4). Those who were regularly employed, worked as

Basis	Number of Farmers	Percentage
Regular	59	37
Intermittent	51	32
Seasonal	49	31
Total	159	100

low-income professionals, e.g. teachers, low-income civil servants (postal workers), skilled labourers (drivers), and tradesmen (mechanics, carpenters and masons) (Table 6.5). Those with regular employment were generally middle-aged

Category	Number of Farmers	Percentage
Casual Labourer	83	53
Tradesman	31	19
Skilled Labourer	17	11
Shopkeeper	15	9
Low-Income Professional	7	4
Low-Income Civil Servant	3	2
Fisherman	2	1
High-Income Civil Servant	1	1
Total	159	100

and, therefore, part-time farmers. However, their off-farm employment did not

seem to deter them from small-farming activities, providing not only a regular source of income for the household, but also a possible source of investment capital for the farm.

That 76.4 percent of the sample have aspired towards non-farming occupations in their youthful years, is an indication that their involvement with small farming was mainly by default. For especially younger farmers, this default was hoped to be temporary and, as such, farming was regarded as a "holding" occupation, until something more lucrative and status-enhancing came their way.

Agrarian Decision-Making

A vital component of small farmers' human resource, is the ability to undertake decisions for the effective operation of their agricultural enterprises. Agrarian decisions are based largely on their source of acquisition of farming knowledge and skills, as well as the social environment in which management decisions are made. Irrespective of education, farmers identified common formal and informal sources of knowledge and skills (Table 6.6). Discussion of these sources follows. In accordance with the findings of Edwards (1961:79), this survey found that farmers' acquisition of agrarian knowledge was essentially of an informal nature; a factor underlining the strength of traditionally held beliefs and practices.

TABLE 6.6
SOURCES OF AGRARIAN KNOWLEDGE AMONG SAMPLED FARMERS

Source	Number of Farmers	Percentage
Informal Sources:		
Parents	239	91
Experimentation	111	42
Friends/Neighbours	83	32
Personal Observations	38	15
Employers (Especially Estates)	10	4
Formal Sources:		
MacDonald's Almanac	166	63
Extension Officers	41	16
Farmers' Supplement	34	13
Farmers' Guide	15	6
Demonstration/Field Days	14	5
School	11	4
JAS Occasional Publications	10	4
Farmers' Handbook	1	1

INFORMAL SOURCES OF AGRARIAN KNOWLEDGE

Discussion of informal sources of agrarian knowledge, focuses on those most frequently cited (Table 6.6).

Parents

Parents are the single most common source of agrarian knowledge among the sampled farmers. The critical role, especially of women in the continuity of small farming, is highlighted by the fact that most farmers were initiated into agricultural practices in the kitchen gardens tended by their mothers or grandmothers (Brierley, 1988). Initiation begins with infants mimicking adults as they prepare, plant, tend and reap gardens. This mimicking is usually encouraged by the adults and it is not unusual for infants to cultivate a few plants

of their own within the kitchen garden. In addition, girls in particular, were often taken along to market with their mothers, where skills in marketing are fostered in preparation for managing the agricultural affairs of their own families.

Experimentation

Over the past three decades, an increasing body of evidence has emerged acknowledging that small-scale traditional farmers are highly skilled, innovative, and possessing and utilizing an impressive functional knowledge of their environment (Barker et al. 1983:4; Barker and Spence 1985:205; Hills and Iton 1983:27; Innis 1961:20, 1973:11, 1980:6). This innovativeness is often evident in their conducting informal experiments, such as those to determine which new crop combinations are most successful, or the determination of soil status by the use of indicator plants (Barker and Spence 1988:205).

Among sampled farmers, the distinction between personal experimentation as a source of knowledge and inherited techniques was fuzzy. This is because many of the unique agrarian techniques used by these farmers were the result of their parents' experiments, which have been handed down as part of the pool of traditional knowledge. Nevertheless, an impressive array of localized techniques were used. For instance, fireplace ash was commonly sprinkled on vegetable crops to eradicate snails, caterpillars and worms. This method seems scientifically plausible because breathing in these organisms involves the exchange

of air across skin membrane. To eradicate rats, a method was devised whereby bitter cassava (*Manioc Esculenta*) which contains a toxic juice (prussic acid), was mixed with cornmeal. When eaten by rats, it results in insatiable water-demand, to the point where the animal's stomach ruptures.

While these methods may have become part of the communal pool of traditional knowledge, personalized experimentation was also evident among sampled farmers. For instance, a farmer who was instructed by extension officers to plant yams in continuous mounds in order to increase yield and standardize tubers, i.e. using mini-sett technology, realized that he could maintain standards and secure even better yields by planting in individual mounds but at higher densities than was traditional. Another farmer explained that during the operations of the IRDP he was advised by agricultural officers to plant his banana at greater depth to safeguard against wind destruction and sheet erosion. This method required greater use of chemical fertilizer, but was nevertheless, successful in meeting its objectives, except that yields began to decline after the second ratoon. The personal experimentation of this farmer involved inverting the soil profile in the vicinity of his crops, so that, instead of fertilizer and a B-horizon in the vicinity of his plant roots, he now had a mixture of topsoil and fertilizer. By using this method, he was able to maintain satisfactory yields well after the fifth ratoon.

Friends/Neighbours

Farmers often consulted each other when confronted with unfamiliar problems. Usually, those persons consulted were considered to be well informed and have experience in dealing with the problem. In the course of this survey, farmers were observed at bars, not only socializing in good spirits and companionship, but also exchanging ideas, advising each other or merely giving updates on their farm operations.

FORMAL SOURCES OF AGRARIAN KNOWLEDGE

The formal sources of knowledge considered, are those which have been acquired from published documents such as the MacDonald's Almanac, the Farmers' Supplement, Farmers' Guide, Farmers' Handbook and from the extension services.

MacDonald's Almanac and Other Agricultural Publications

The **MacDonald's Almanac** is the most popular source of formal knowledge about farming, and was acknowledged by 63 percent of the sampled farmers. This Almanac is an astrological publication printed in the United States. It considers the lunar cycle as a factor in farming and, as such, advises farmers on the best dates (based on the phases of the moon) for planting "below" and "above" ground crops. Use of the Almanac occurred irrespective of age, education or exposure to scientific knowledge, a finding similar to that of

Edwards (1961). Without exception, farmers extolled the dependability of this publication, and those who did not use it explained that they found it to be complicated or never had access to a copy. Some of those who did not acquire copies of their own were able to "get the dates" from other farmers. There were three cases in which farmers who confided they were illiterate, nevertheless kept copies of the Almanac. In such circumstances, interpretation was done by spouses, children, or members of the community who could be confided in, since a farmer would not openly admit his/her illiteracy. Despite changes in the annual dates of the lunar phases, only 32 farmers had current (1988) Almanacs. A most extreme case was a farmer who still relied on a copy published in 1968. This lends support to the argument that the appeal of this document is related to astrological beliefs inherent in Afro-Caribbean societies.

Other publications consulted by farmers include, **The Farmers' Supplement**, **The Farmers' Guide** and **The Farmers' Handbook**. The Supplement is published each Thursday as a section of **The Daily Gleaner**, a national newspaper printed by the Gleaner Company of Jamaica. This weekly column provides useful tips for farmers, as well as publishing price changes of specific commodities. It was mainly consulted by vegetable growers. The 1962 edition of **The Farmer's Guide**, which was first published in 1954 by the Jamaica Agricultural Society (JAS), was owned by only four of the sampled farmers. The Guide is a comprehensive document presenting details of farming activities, and is essentially

a textbook for farming in Jamaica. Its limited popularity among small farmers is probably related to its advocacy of comparatively scientific farming - a typical textbook approach, which farmers have not found appealing. The Handbook is also a JAS publication, but was consulted by only one farmer. Its unpopularity relates to the fact that it contains a host of miscellaneous information, focusing on government assistance to farmers. In light of the poor record of government assistance to small farming, scepticism about the document seems warranted.

Extension Services

Given the key role assigned to extension in small-farming development (FAO 1984:1), its contribution to the agrarian knowledge and skills of sampled farmers was surprisingly low. Indeed, of the 141 (53.6 percent) farmers who had contact with extension officers during their career, 63 (45 percent) did not have a single contact in the three years prior to the survey, and for those who were contacted, there was an average of only one visit. Arnon (1981:27) attributes this situation to an overwhelming shortage of extension personnel in Jamaica, as well as the extensive nature of the duties assigned to these officers. However, the low incidence of extension officers as a source of small-farming knowledge does not undermine their importance in small-farming communities, because they play a key role in incorporating farmers into national and regional organizations, which are sometimes responsible for the organization of training sessions and demonstrations. For instance, extension officers work closely with the Jamaica

Agricultural Society and coordinate farmers' participation in annual agricultural fairs such as the Denbigh Show.

OTHER INFLUENCES ON DECISION-MAKING

Besides the formal and informal influences on decision making discussed, other, more passive factors influence the state of farmers' knowledge and decisions in relation to farm management. Of particular importance are their spouses, close and trusted associates, such as "church brothers", as well as social norms which elicit conformity within their communities.

Spouse

Edwards (1961:88) reported that spouses, particularly wives, play a critical role in small-farm decision making, especially with respect to the annual dynamics of crop cultivation. In this regard, 140 (77 percent) of the sampled farmers who had stable unions, i.e. married or common-law, actively consulted with female partners when making farming decisions. Wives were considered to be particularly influential with regard to the type and quantity of crops grown. This was especially true where partners were active "market women" or higglers and, therefore, in a position to advise on production strategies based on their familiarity with temporal fluctuations of demand and prices in market places.

Close Associates

Small-farm decisions are also influenced by friends and close associates, such as fellow church members. While the extent to which this occurs is not always quantifiable, various aspects were observed during the course of this survey. For instance, informal labour arrangements, such as day-for-day, which are often undertaken by friends or church brethren, was an important forum for exchange of farming ideas. Likewise, the typical Friday afternoon get-together among male "rumpanions" at local bars, also provides a forum for discussing the merits and demerits of new techniques or recent experiments. While individual farmers may be reluctant to take initiatives to introduce new methods, or embark on new ventures, once such initiatives have successfully been taken by friends or by other farmers in the community, they will be more likely to follow suit.

Influence of Community

Any farmer wishing to advance or maintain his/her respectability in a community, is under pressure to conform to its expectations and the direction in which it moves (Edwards 1961:91). This characteristic helps to explain the low incidence of refusal to be interviewed in the case of this survey because, once an influential member of a community consented to be interviewed, then other members followed. Members of small-farming communities in Jamaica have no reservation about vocally and physically pressuring nonconformists. For instance, a farmer who expressed reluctance to accept innovations considered by his peers to be

useful, is called "ignorant" and can be the focus of public ridicule. Edwards (1961:71) cited incidences of community members beating iron pans outside the house of a farmer whose actions were considered to be deviant from the rest of the community. Community solidarity however, can have negative consequences with regard to improving farming. Small-farming communities are sharply divided by social status (Clarke 1971; Cumper 1958), with the majority of farmers having a low social status. Individuals at the upper end of the social scale, include large landholders and professionals, such as teachers and preachers, whose status is acknowledged and respected. A low-status farmer is often reluctant to pursue techniques and opportunities which might enhance his/her economic and social status for fear of becoming the target of "grudgefulness" and Obeah, a form of witchcraft. Smith and Kruijer (1957:59) deliberated that there is an inherent belief in small-farming communities, that Obeah was directed at people who have improved economically and socially, and have begun to prosper. Farmers who openly aspire to better themselves are referred to as "fly highs" and are often condemned for doing so. With popular feelings against them, such individuals tend to be forced back in line with the majority of their peers (Edwards 1961:91). Although there was no attempt to quantify its extent in this study, various paraphernalia which are personally known to be associated with the supernatural were observed in some fields during the course of the survey. This emphasizes the need for agricultural development initiatives to consider and

interact with total communities instead of focussing attention on selected "progressive" farmers.

THE FARM HOUSEHOLD

This component of human resource in small farming concentrates upon the size and composition of households, as they relate to dependency and labour potential, as well as living standards among these households.

Size and Composition

The size and composition of households are indicators, not only of the social and economic responsibilities of farmers who head them, but also of a potential and reliable source of farm labour. Households were typically large, with 52 percent of them having five or more residents (Table 6.7). Children and other relatives, such as grandchildren and infirmed parents of the farmer/or spouse, accounted for nearly 60 percent of the household population (Table 6.8). Grandchildren of either the farmer or spouse accounted for 24.8 percent of total household population, reflecting a social norm in rural Jamaica whereby, children on departing their parental homes often leave their illegitimate children behind (supra p.77). About two percent of the household population consisted of aged and/or infirmed parents of either the farmer or spouse. Again, this is a common phenomenon in Jamaican rural societies, because in the absence of geriatric institutions, ageing individuals often move into the house of one of their children,

or conversely, a son/daughter rejoins the parental household with his/her children,

TABLE 6.7
DISTRIBUTION OF HOUSEHOLD SIZE AMONG SAMPLED FARMERS

Number of Persons Per Household	Number of Households	Percentage of Sample
1	26	9.9
2	27	10.3
3	35	13.3
4	38	14.4
5	42	16.0
6	34	12.9
7	26	9.9
8	17	6.5
9	6	2.3
10	5	1.9
12	2	0.8
14	1	0.4
16	1	0.4
Total	263	100.0

Mean Household Size of Sample = 4.7

Mean Household Size, Jamaica = 5.1

TABLE 6.8
COMPOSITION OF HOUSEHOLD BY RELATION TO HOUSEHOLD HEAD

Relation	Number of Relation	Percentage of Gross Population
Farmer/Spouse	445	36.3
Children/Other Relatives	730	59.5
Non-Relatives	52	4.2
Total	1227	100.0

as its head. In these cases all capable household members share jointly in the care of "Yah-Ya" or "Nah-Na" or "Granny" in the case of aged females, and "Dah-da", "Tata" or "Grampa" in the case of males.

Of the 52 non-relatives residing in these households, 39 were children of economically worse-off members of the communities, who were informally

adopted into households where farmers had few children, or where children had grown-up and departed the parental household. These "adoptees" were expected to assist with farm work and provide messenger and helper services (Edwards 1961:73).

The age composition of households indicates dependency levels and, therefore, the human pressure on farming resources. Where households contained large proportions of young children or unfit adults, the pressure on agricultural resources is likely to be high. In this regard, the dependency ratio among sampled households was about 1:1.5 of which children < 15 years old accounted for virtually all (Table 6.9). However, caution needs to be exercised in the

Age/Fitness Category	Total Number	Percentage of Total Population
Males 15 years and under	226	18.4
Females 15 years and under	214	17.4
Fit Males over 15 years	396	32.3
Fit Females over 15 years	343	27.9
Unfit Adults	48	3.9
Total	1227	100.0
<p>Dependency ratio, sample = 1:1.5 Dependency ratio, Jamaica (1988) = 1:1.3</p>		

interpretation of the implications of this level of dependency, because the phenomenon of extended families means that external resources are often harnessed to support particular households. For instance, grandchildren may be supported by parents who reside and work outside the and work outside the

farmstead. Likewise, unfit adults, such as the parents of household heads, might be pensioners or have other external sources of support, such as from children residing overseas and sending remittances.

Standard of Living

In the absence of income data, assessment of living standards of the sampled households is indirect, being based on personal observation and interpretation of selected indicators of material well-being. Such indicators included type of housing material used, the size and state of repair of the housing unit, and the facilities present in these units.

Economic status and social standing in Jamaican rural societies can generally be gauged by the material from which houses are made, in conjunction with the size of housing unit. At the lowest level of the socio-economic scale are houses constructed of wattle and daub, usually with a thatched roof. These residences are constructed by first lacing twigs and then cementing them together by hardened clay or cow-dung. This was the least common housing material among sampled households (Table 6.10). Houses made of lumber, with galvanized steel roofs, ranked immediately above wattle and daub, while concrete houses represented the highest economic status. It is apparent that farmers strive towards concrete housing, a process which often involves transition from one housing type to another. This transition can cover an extended period and some units were

observed in a state of incomplete transition, involving more than one type of material. It was also possible to observe in the same yard, a complete evolution

TABLE 6.10
TYPE OF HOUSING MATERIAL AND SIZE OF UNITS OF SAMPLED FARMERS

Type of Material	Number of Units	Percentage	Average Number of Rooms/Unit
Lumber	152	57.8	3.1
Concrete	93	35.4	4.6
Multiple Material	10	3.8	4.4
Wattle and Daub	8	3.0	1.4
Total	263	100.0	13.5

of housing type and by extension, economic status. This is because previous houses are usually not demolished, but maintained as outbuildings for the accommodation of adult male children or aged/invalid relatives.

The occurrence of convenience facilities in a household can be summarized by an index of occurrence which is as a measure of comparison between the actual occurrence of a number of criteria and the highest number possible. This index can be formulated as:

$$\text{Index of Occurrence for X} = \frac{\text{Sum of Occurrences in X}}{\text{(Maximum number possible)}}$$

The higher the index of occurrence for a household, the higher the standard of living and socio-economic status is likely to be. In this regard, these indices can quantify the relationship between housing material used and the standard of living of farmers (Table 6.11). The pattern of indices of occurrence for different

housing types supports the reliability of housing materials as an indicator of

TABLE 6.11
LEVEL OF LIVING BY HOUSETYPE AS INDICATION BY
POSSESSION OF CONVENIENCE GOODS

Type of Housing	Number of Units	Radio	Electricity	Sewage	Plumbing	Gas Stove	Refrigerator	Motor Vehicle	Index of Occurrence
Concrete	93	93	79	28	48	52	59	20	0.58
Multiple Material	10	8	5	3	5	3	4	2	0.43
Lumber	152	115	80	17	21	31	30	11	0.29
Wattle and Daub	8	5	-	-	-	-	-	-	0.14
Total	263	221	164	48	74	86	93	33	0.39
% Total	100	84	62	18	28	33	35	13	

standard of living. The occurrence of some convenience facilities among different housing types warrants clarification. For instance, the incidence of electricity was relatively high for most types of housing and results from the Rural Electrification Programme implemented by government in the late 1970s. However, in order to qualify for this programme, housing units had to meet a specified standard of safety and repair. The low occurrence of this facility among lumber houses and its non-existence among wattle and daub units, reflects their generally low state of repair.

Other factors related to standard of living among sampled farmers included remittances and other income sources generated abroad, and the general health of the household head. Sixty-eight farmers acknowledged regular receipt of

remittances from children residing overseas. Although these monies were sometimes used to assist the farm operation and/or purchase land, home improvements and food purchases were identified by them as their most common use of remittances. The same was true for the 60 farmers who had worked overseas, mainly as farmworkers.

Despite the general poverty of sampled farmers, most were in a good state of health. Only 21 (27 percent) had suffered any serious illnesses during the two years prior to the survey. But as stated by Edwards (1961:202), and was apparently the case at the time of the survey, the material level of living masks the precariousness of the conditions under which households exist. The slightest dislocation, such as a farmer falling ill, could spell disaster for a household in the absence of substantial external assistance such as remittances, given the virtual lack of any reserved capital resources among farm households (Pollard and Heffernan 1983:56).

LABOUR

Labour is the most vital of human resources in small farming, because it is this resource which dictates the productive potential of a farming unit. Household labour along with wage and informal non-wage arrangements were utilized throughout the study area.

Household Labour

The household labour force of sampled farmers was difficult to ascertain, because it was not always clear at what stage household members, particularly children, became full-fledged members of the workforce. There is general consensus however, that the labour availability of a farm household is a function of age and gender (Edwards 1961:75). The age-sex composition and fitness status of households were therefore used as a proxy for labour availability.

Household members, 15 years and under, were generally unavailable for heavy physical work, because they either were not strong enough, or attended school most of the time. Nevertheless, they assisted with important light tasks, such as fetching water for farm labourers, tending livestock, weeding and reaping. In hillier sugar-cane growing areas of northern Clarendon, males in this age group are an important component of labour exchange among families, because they are usually assigned the task of "working" donkeys and mules used to transport the crop over steep slopes, to roads accessible to motor vehicles. The large proportion of fit adults, combined with the large average size of these households, implied a potentially favourable supply of labour. However, the average labour input per household was a mere 49.9 hours per week, or 17.8 hours per fit adult (Table 6.12). Assessment of labour input was based on a five-day week, because Saturdays and Sundays were not considered by farmers to be regular working days, even though they may perform light tasks, such as tending livestock on

those days. Calculation of the labour input of household heads is based on the

TABLE 6.12
LABOUR INPUT OF SAMPLED HOUSEHOLDS

Labour Input	Hours per 5-day Week	Hours per Day
Per Household	49.9	10.0
Per Household Head	28.6	5.7
Per Fit Adult	17.8	3.5

busiest period of their annual farm cycle, which for the majority (76.8 percent) occurs between January and April. Seasonal variations in labour input applies mainly to the household head, and why the average input per five-day week was 12.6 hours lower in the slow than busy period, calculations based on the busy period serve to highlight the extent of underutilization of labour on small farms. Household heads alone accounted for 57.3 percent of household labour, but their efforts were evidently inadequate for the optimal operation of farms, especially since 158 (60.1 percent) of them cited labour shortage as a major problem. The consensus among 129 (81.6 percent) of them, was that they would have been able to improve productivity if no labour shortage existed. The basic point is that while household labour potentials seemed grossly underutilized, labour shortages and, by extension, low productivity was all too evident.

The phenomenon of underutilized labour has its basis in economic and social factors related to small farming. LeFranc (1981:66) points to the contradiction of rural-labour shortage in what is known as a labour-surplus economy. Edwards

(1961:75) and Smith (1956:43) have suggested that such an underutilization of labour occurs because the propensity for off-farm work has deprived the farm of labour from older and younger adults alike. While this might be true in some instances, off-farm work was largely seasonal among the farmers surveyed, and because it was undertaken during slack periods on the farm, it did not appear to be in serious competition for farm labour. While the need for cash is ever present in small-farming households, and farm chores were sometimes placed on hold in favour of immediate cash-generating opportunities, scarcity of farm labour is rooted in more subtle social attitudes to farming. Youths, who have watched the hard toil and small rewards of their parents, have for the most part turned their back on small farming (**Daily Gleaner**, April 1, 1991:16). This attitude was strongly supported, if not encouraged by parents, especially since 217 (82.5 percent) of those surveyed hoped that their children would obtain non-farm jobs.

Wage Labour

Underutilization of household labour has made wage labour the most important source of small-farm labour in Jamaica (LeFranc 1981:100). In this regard, 233 (88.6 percent) of the sampled farmers used hired labourers. Wage labour existed in two forms, namely, day and piece (task) work. Day-work arrangement involves engaging the services of individuals for a day (usually seven hours), for a fixed sum of money and the provision of a mid-day meal. Usually the farmer works alongside the "men" (labourers) in order to discourage tardiness. At the

time of the survey, the rate for day work labour was between J\$120 and J\$180, depending on the type of activity involved. In the case of piece work, the labourers agree to undertake a set task at a fixed rate per unit of the task. Payment is made at the completion of the task, provided the work is done satisfactorily. The unit used to define a task varied according to the type of work involved. For instance, the clearing of bush or forking of a field is defined in square chains, i.e. a length of 22 square yards or approximately 20 square metres, while the construction of yam mounds (hills) is defined in units of 100 mounds. Irrespective of unit, different tasks carry different price tags. For example, the rate for "siling" (cutting low) grass in a fruit orchard was J\$150 per 20 square metres, while forking the same quantity of land cost J\$330. No supervision is required for piece work, but the labourer is expected to complete the job within reasonable time.

Most farmers hired labour seasonally, that is, during peak periods of labour demand, such as land preparation and harvesting of crops, such as sugar cane,

Basis	Number of Farmers	Percentage
Seasonal	172	73.8
Intermittent	45	19.3
Regular	16	6.9
Total	263	100.0

coffee, pimento and citrus (Table 6.13). An average of 3.8 workers were hired

per cropping cycle, but mean labour cost per farmer could not be ascertained because most farmers were unable to estimate, especially their task-work expenditures. The amount of hired labour employed is related to the type of farming activity, which is itself related to farm-size. Thus, sugar-cane cultivation, which is extremely labour-intensive, albeit seasonal, is carried out on larger than smaller farms, and therefore larger numbers of labourers are hired. The implications of this pattern are further elaborated upon in the context of categories of farming (infra p.292). As previously indicated, hired labour was used mainly for land preparation, which was probably the most strenuous of farm activities, employing the use of a garden fork and hoe. However, in four cases within one of the hilly sugar-cane growing regions of northern Clarendon, draught animals were used for ploughing land.

Securing the services of hired hands was not always easy for farmers, and 60 percent of them indicated they had difficulty in finding wage labourers. The general explanation for this problem was that youth in particular, have shunned farm labour. This attitude of young people in these communities represent a macrocosm of the factors which underlie the underutilization of household labour (supra p.149). A small proportion of respondents suggested that their inability to access sufficient farm labour was related to competition with the illicit activity of marijuana (ganja) cultivation. While the validity of this claim could not be determined, given the clandestine nature of this operation, previous research has

suggested that any analysis of rural-labour shortage, especially within the hilly interior of central and western Jamaica, is incomplete unless it addresses the nature of the competition between "normal" small farming and ganja cultivation (Spence 1985:134). The reason is that ganja cultivators pay much higher wages than normal small farmers and therefore have greater access to manpower.

Informal Non-Wage Labour

Informal non-wage labour often involves reciprocal arrangements among farmers. A variety of such arrangements was used by 136 (51.7 percent) of the farmers surveyed (Table 6.14).

Day-for-day labour exchange was by far the most popular, and occurs in two forms. The first is a casual and infrequent arrangement in which a farmer requests assistance from others for the undertaking of a specific task, with the intention of reciprocating a similar favour if requested to. This form is used for

Type of Arrangement	Number of Farmers	Percentage
Day-for-day	108	79.4
Partner	45	33.3
Morning Sport	38	27.9
Evening Sport	13	9.5
Digging	9	6.7

special projects, such as construction of a farm building or excavation of

trenches. The second form is similar in terms of reciprocity, but was more frequently used for every day farm activities, such as land preparation, "staking" of yams or preparation of seeds. In both cases, at least one meal is provided by the host.

Morning sport is so-called because it is usually a morning exercise which is associated with light activities related to harvesting, e.g. peeling of ginger and "fanning" of pimento. Because female members of households were largely responsible for these activities, they were the main organizers of morning sport. As with day-for-day, there is an assumed promise of reciprocity and it involves the serving of a mid-morning meal by the host. Evening sport is the afternoon version of morning sport, except that reciprocity is not as binding and meals are not served.

Partnership is not a reciprocal agreement in the same sense of those previously discussed. Rather, it is a collective arrangement in which a small group of farmers cultivate land together and share equally in the returns. Some partnerships operate on a regular basis, but most are occasional arrangements. Among sampled farmers, these arrangements were principally engaged in by younger farmers, probably because they are considered to be more liberal in their outlook and, hence, likely to realize the benefits of cooperation, than older farmers who tend to be more independent. In addition, younger farmers are less

able to finance their enterprise through individual initiatives and, therefore, are more likely to resort to corporate financing. Of the farmers who were involved in partnership arrangements, five were older men who belonged to a pocomania (African spiritualist) group, indicating that religious affiliation probably influenced this occurrence.

Digging is an arrangement in which a number of men are invited to assist a farmer with the reaping of yams. Because reaping of yams is considered "a man's job", even where the farmers are females, their duties at diggings were relegated to preparing food for their male guests. Digging has a festive flair, because large quantities of food and rum are provided. Consequently, it can be a costly occasion given the large number of people involved and the quantity of food and drink necessary. However, much of this potential cost is defrayed, because except for rum, the bulk of the provisions come from the farmstead.

Summary

The nature of human resources and its use on small farms, places constraints on the improvement of farming systems and their productivity. Small farming is dominated by older men, most of whom are older than 50 years and past the peak of their physical abilities. Although the propensity for part-time wage jobs to supplement meagre farm incomes was high, this did not always adversely affect farm labour availability, because off-farm employment were generally undertaken

during slack periods on farms. This propensity for off-farm work among younger farmers often resulted from their aspirations to be "something better" than a small farmer, therefore suggesting that their present occupation is a default.

Agrarian decisions were influenced by a multitude of human factors, most prominent of which was the knowledge which farmers obtained from their parents. This factor underlines the strength of traditional beliefs and practices as a human resource; one which is fostered by superstitions and social pressures for conformity. Jointly, these can restrict acceptance of modern scientific farming and perpetuate traditional modes of production and conservatism in rural areas. Advancement of farming systems is further restrained by the low level of contact between farmers and extension personnel, who are entrusted with the dissemination of scientific farming knowledge in rural areas.

Households were characteristically large, and despite the advancing age of household heads, consisted of large numbers of young children because of extended families. This has resulted in a dependency ratio which like the rest of Jamaica is considered to be high (Planning Institute of Jamaica 1900:26). However, its interpretation requires caution, because of the potential for external support associated with extended families. The standards of living of these households were characteristically low, although different levels of living were

identifiable, based on type of housing material used and the incidence of occurrence of certain convenience facilities.

A most outstanding factor in the organization of human resources was the apparent gross underutilization of household labour potential. This phenomenon stems from social negativism associated with small farming, and is encouraged within households by parents. It extends to communities at large, resulting in the paradox of acute shortage of wage labour in what are considered to be labour-surplus communities. These attitudes reflect astute economic rationality related to incomes and profitability.

CHAPTER 7

THE PHYSICAL CHARACTERISTICS OF SMALL FARMING

Land is the basic physical resource of small farming and in conjunction, with human and infrastructural resources, influences the nature and intensity of agriculture. The fundamental character of small farmers' holdings are influenced by the combination of farm size, the system of joint inheritance which results in fragmentation, tenure and land use. Underlying these, is the independent element of physiography. While agronomic practices are related to the physical characteristics of small farming, they are more appropriately discussed within the context of different categories of farming later in this thesis. Knowledge of the above characteristics and their interrelationships is essential, not only to the general understanding of small farming as it pertains to domestic- food security, but for providing a basis whereby contrasts and comparisons between different types of farming can be studied. Discussion of small farmers' land in this chapter, represents the second step of the preliminary analysis leading to a comprehensive profile of small farming. In this regard, the focus is on farm size, fragmentation of holdings, patterns of land tenure and use in relation to fragmentation, and the overall significance of physiography.

FARM SIZE

Both Brierley (1974:263) and Momsen (1969:481) have identified size of farms

as the most important single variable determining the nature and level of agrarian practices among small farmers in the Eastern Caribbean, while Edwards (1961:93) alluded to the importance of this variable in the Jamaican setting.

The sampled farms ranged in size from 0.2 and 4.0 hectares. Their mean size of 2.05 hectares and median of 2.02 hectares are indications that a large proportion of these holdings were under 2.0 hectares (Table 7.1). This

Size Category (ha.)	Number of Farms	Percentage
Less than 2.0	128	48.7
2.0 to 3.0	71	27.0
More than 3.0	64	24.3
Total	263	100.0

distribution of farm size cannot be compared with national values, due to differences in definition of small farm (supra p.25), but it concurs with the FAO (1988) finding that farms of 4.0 hectares and less, accounted for over 90 percent of the farms in Jamaica (supra p.25).

Size of holdings is influenced by physiography and age of farmers. With regard to physiography, the average size of farms on the Alluvial Plains was 2.78 hectares, i.e. 0.73 hectare or 36 percent larger than the average, resulting in this region having the largest proportion of farms in the greater than 3.0 hectare category (Table 7.2). This preponderance of larger farms on the Alluvial Plains

is the result of the distribution of lands accessed under Project Land Lease (supra

TABLE 7.2
DISTRIBUTION OF FARM-SIZE BY PHYSIOGRAPHIC REGIONS
AMONG SAMPLED FARMERS

Size Category (ha.)	Percentage Distribution By Physiographic Region		
	Mountain	Limestone Plateau	Alluvial Plain
Less than 2.0	56.3	63.8	39.4
2.0 to 3.0	28.4	23.4	30.3
More than 3.0	15.3	12.8	30.3
Total Percentage	100.0	100.0	100.0
Mean Farm Size (ha.)	2.08	2.05	2.77

p.62), whereby fragments obtained through that project were about 60 percent larger than the average. With respect to age, farmers over 55 years had a higher proportion of their farms in the largest farm-size category than any other age group (Table 7.3). This factor is related to the age-land accumulation process

TABLE 7.3
PERCENTAGE DISTRIBUTION OF FARM-SIZE BY AGE CATEGORY,
AMONG SAMPLED FARMERS

Farm Size Category (ha.)	Age Category (years)		
	Less than 40	40-55	More than 55
Less than 2.0	64.5	66.3	42.6
2.0 to 3.0	27.4	20.9	33.0
More than 3.0	8.1	12.8	24.4
Total Percentage	100.0	100.0	100.0
Total in Age Category	57.0	91.0	115.0

characteristics of small farming (supra p.171), and is discussed in further detail within the context of the evolution of categories of farming.

Thus, from the standpoint of physiography, many of the largest and potentially most viable farms were located in the region best suited for the production of export crops, such as sugar cane. From a social perspective, the concentration of larger farms among older farmers - passed 55 years, does not augur well for improvements and sustainment of domestic-food supplies.

FRAGMENTATION AND TENURE

Fragmentation

The nature of land fragmentation and its relevance to small-farm production strategy was discussed in Chapter 3. The sample of 263 farms was comprised of an aggregate of 540 fragments, encompassing a total of 538.8 hectares. Thus, the mean number of fragments per farm was 2.05, hence the average size of each fragment was 1.0 hectare. The maximum number of fragments per farm was four, the mode was 2.0 and the largest fragment occupied 2.8 hectares. These numbers, combined with the fragment notation (F) denotes ranked distance from the homestead. Hence F1 is the houseplot, F2 is the second closest plot, and so on. Fragments were located at an average distance of 2.6 kilometres from the houseplot and had been occupied for an average of 15.7 years. A distinct relationship was evident between the distance of fragments and their period of occupancy and size (Table 7.4). Mean period of occupancy varied inversely with distance from F1, suggesting that the age-related accumulation of land (supra p.159), occurs at increasing distance from the homestead. This pattern of

TABLE 7.4
FRAGMENTATION AND TENURE AMONG SAMPLED FARMS

	FRAGMENTS			
	F1	F2	F3	F4
Distance/Occupancy/Size	N=263	N = 194	N = 73	N = 10
Mean distance (km.)	0.0	2.0	2.3	3.1
Mean period occupied (yrs.)	20.2	19.3	18.2	5.3
Mean size (ha.)	0.9	1.2	1.9	0.6
Area (ha.)	233.5	234.5	65.8	5.0
Percentage total area	43.3	43.5	12.2	0.9
Tenure				
Percentage of no. of fragments:				
Owned	75.6	61.0	39.0	25.0
Family	19.0	7.0	14.0	0.0
Rented	4.0	24.0	39.0	75.0
Leased	0.0	7.0	8.0	0.0
Caretake	1.0	1.0	0.0	0.0
Squat	0.4	0.0	0.0	0.0
No. of fragments:				
Owned	199.0	118.0	28.0	3.0
Family	50.0	14.0	11.0	0.0
Rented	10.0	47.0	28.0	7.0
Leased	0.0	13.0	6.0	0.0
Caretake	3.0	2.0	0.0	0.0
Squat	1.0	0.0	0.0	0.0
Percentage of Area:				
Owned	72.0	69.0	34.0	15.8
Family	21.0	7.5	15.8	0.0
Rented	3.1	13.0	36.1	84.2
Leased	2.0	9.2	14.1	0.0
Caretake	1.7	1.3	0.0	0.0
Squat	0.2	0.0	0.0	0.0

Summary

Total area (ha.)	
Owned	355.2
Family	75.7
Rented	63.9
Leased	37.4
Caretake	6.0
Squat	0.6
No. of fragments =	540

accumulation results from the tendency of homesteads to cluster, causing greatest

competition for, and scarcity of land within the proximity of the farmers' homes. Further acquisition of land must, therefore, occur at increasing distance from F1. The distance-size relationship of fragments is less evident. However, the general tendency is for farthest fragments to be larger. This is because of the competition for and scarcity of land in close proximity to households.

While fragmentation might be a desirable feature of land accumulation among small farmers (*supra* p.76), the distance that these ageing farmers are required to travel between fragments, undoubtedly hampers optimal productivity.

Land Tenure

The importance of security of land tenure in fostering a small-farm investment environment conducive to the growth and development of small farms, and by extension, domestic-food security was previously discussed (*supra* p.72). Land tenure among sampled farmers was analyzed on the basis of individual fragments, because the typical farm was comprised of fragments with varied tenure and all categories of tenure outlined in Chapter 3 were evident in the sample (Table 7.4). Owned land, whether collectively as family land or individually owned, accounted for nearly 80 percent of total sampled farm area. Despite this high level of tenurial security among sampled farmers, the potential for growth and development of farmsteads could not be realized, likely because this process depends on

access to agricultural credit. While legal title to land is often the required collateral, nearly 70 percent of farmers did not have legal documents to support their claim to the land they considered themselves to own.

A pattern between distance from F1 and the prevailing type of tenure was also evident on the sampled farms (Table 7.4). An inverse relationship existed between fragment distance (as determined by fragment number) and the occurrence of individually owned land. Conversely, the incidence of rented land increased with distance from the homestead. This pattern of land tenure results from the limited possibility of gaining access to land within the immediate community. The importance and esteem accorded land makes it taboo for those other than family members or very close friends to work individually owned or family land. Rented land is, therefore, part of large holdings located on the fringes of these communities. Homesteads are almost always established on fragments which are either owned or family land; a factor endorsing the crucial importance of land ownership in Caribbean rural societies. In general, there is strong aversion to residing on land which is not owned, because it is humiliating for a farmer to be told during altercations to "shet yu mout cause yu haffi lib pon rent lan". In other words, a person residing on rented land cannot contribute anything of consequence to social dialogue.

Noticeable regional patterns of tenure emerged from the analysis. It is not coincidental that the Alluvial Plains had the lowest proportion of individually owned and largest proportion of rented/leased lands (Table 7.5). This pattern

Physiographic Region	Number of Fragments	Percentage:			
		Individually Owned	Family Land	Leased/Rented	Other
Mountain	364	63.5	19.6	0.0	0.8
Limestone Plateau	96	77.9	12.9	0.0	3.2
Alluvial Plain	80	46.8	15.2	26.6	2.3

reflects regional variations in small farmers' access to land as well as related regionality in the focus of government agricultural policies, such as Project Land Lease. With regard to regional differences in access to land, the historical domination of the lowlands by large estates acted as a deterrent to land ownership by small farmers, because estates have traditionally owned most of the existing farmlands and have rarely subdivided them for sale to small farmers. The regional focus of government land-lease projects resulted from the scarcity of land for small farming in regions where large estates dominated. It is for this reason that acquisition and redistribution of estate lands under Projects Land Lease, benefited the Alluvial Plains.

The most significant aspect of land tenure, as it relates to improvements in small farming, is that although extensive ownership of land represents security at the community level where local recognition of land rights exist, development is not realized, because access to official assistance is dictated by legal documentation of right to land.

LAND USE

Reference has been made to the fact that land use is influenced by the geographical distribution of fragments comprising a farm, as well as by their tenancy. Analysis of land use among sampled farms, focusses on patterns of crop and livestock distributions, and on the allocation of land among broad categories of competing land uses. Consideration as to the efficiency of land use, with regard to its either being productive or non-productive, is also factored into the analysis of land use at the farm level. Although the pattern of land use on individual fragments is acknowledged as being important to the understanding of small farmers' behaviour, especially with respect to decision making, discussion of this topic is postponed until the different categories of farming are analyzed, because intra-fragment land use on small holdings is influenced by the dominant crop emphasis of that farm.

Crop and Livestock Distribution

Discussion of crop distribution among the sampled farms is focussed entirely on

their occurrences. Assessment of the area planted in specific crops would have contributed to more meaningful evaluation of land use, but this was not undertaken in this study for the following reasons. First, high-density intercropping is common on small farms and, as a result, it is virtually impossible to determine with any degree of accuracy the area covered by a specific crop. Secondly, although a plant census of each farm would have provided a more quantitative proxy of the importance of each crop, this method would have been sufficiently time-consuming for it not to have been feasible for this study.

Attention is drawn to the fact that the distribution of crops observed on a small farm at any point in time, rarely represents the full complement of crops cultivated by a farmer in a calendar year, because short-term crops are constantly rotated within a cropping cycle. Even semi-permanent crops, such as banana and plantain, may undergo periodic rotation. With this fact in mind, the distribution of crops observed at the time of survey is presented in Table 7.8.

Crops cultivated on the sampled farms were classified in accordance with the categories used by the Planning Institute of Jamaica in its annually published **Economic and Social Survey of Jamaica**. Although cacao had the highest occurrence among export crops, farmers were of the general consensus that its income-generation capacity was surpassed by both coffee and sugar cane. The reason for this fact related to the poor state of cacao plants, and at the time of

TABLE 7.6
OCCURRENCE OF CROPS ON SAMPLED FARMS

	Incidence of Occurrence	Percentage Occurrence on all Farms
EXPORT CROPS		
Cacao	140	53
Coffee	135	51
Citrus	135	51
Sugar Cane	85	32
Tobacco	24	9
Pimento	16	6
DOMESTIC FOOD CROPS		
Roots/Tubers		
Yams	233	89
Sweet Potato	182	69
Dasheen	140	53
Cassava	96	37
Coco	74	28
Sorrel	49	19
Irish Potato	49	19
Badoo	48	18
Beetroot	7	3
Arrowroot	7	3
Vegetable/Legume		
Red Pea	104	40
Lettuce	70	27
Tomato	61	23
Cow Pea	60	23
Congo Pea	58	22
Cabbage	45	17
Cucumber	39	15
Peanut	29	11
Carrot	28	11
Pumpkin	27	10
Bok Choy	27	10
Cho-Cho	24	9
Okra	23	9
Sweet Pepper	15	6
Eggplant	11	4
Calaloo	3	1

Table 7.6 (Continued)

	Incidence of Occurrence	Percentage Occurrence on all Farms
Condiments/Spices		
Ginger	56	21
Hot Pepper	47	18
Annatto	17	6
Thyme	15	5
Eskellion	14	5
Mint	6	2
Onion	3	1
Fruits		
Breadfruit	176	67
Banana	166	63
Plantain	105	40
Ackee	104	40
Mango	90	34
Soursop	49	19
Starapple	30	11
Jackfruit	29	11
Plum	26	10
Coconut	24	9
Naseberry	23	9
Sweetsop	19	7
Guava	18	7
Melon	16	6
Roseapple	15	6
Cashew	14	5
Guinep	13	5
Papaya	6	2
Custard Apple	1	1
Cereals		
Corn	133	50
Rice	11	4

survey a cacao resuscitation project was underway to combat this problem (infra p.328). The prominence of export crops is noteworthy, because it suggests a strong export-oriented production on these farms - a fact with negative implications for improving domestic-food supplies. Undoubtedly, this orientation

is motivated by the desire for guaranteed cash incomes and profits. Yam was by far the most ubiquitous of domestic-food crops and, indeed, of all crops. Its pervasiveness reflects the wide range of agro-environments in which the many varieties of yam can thrive. Except for banana, plantain and mango, most fruit trees are not specifically cultivated for commercial gains, but represent a part of the food-forest (1) complex found on most farms.

Although a wide variety of crops were grown by farmers throughout the research area, broad patterns of crop distribution by physiographic regions were identifiable (Table 7.7). Discussion of them is relevant because, in addition to reflecting ecological variations in the agro-environment of small farmers, they also show the intimate knowledge small farmers have of, and the concord between the physical environment and appropriate land use.

A noteworthy feature of the Alluvial Plains was the rare occurrence of domestic-food crops. Here, sugar cane predominated, as its cultivation was suited to both topography and medium to low rainfall. The undulating topography allows easy cultivation and reaping of fields, while the rainfall levels maintain a high sucrose content of the plant (All-Island Jamaican Cane Farmers' Association 1984:8). Both the Mountain and Limestone Plateau Regions were dominated by export as well as domestic-tree crops, roots and tubers, and some vegetables and legumes. These upland regions are particularly suitable for tree-crop cultivation, since the

TABLE 7.7
PERCENTAGE OCCURRENCE OF CROPS BY PHYSIOGRAPHIC REGIONS

	Physiographic Regions		
	Mountain N = 184	Limestone Plateau N = 46	Alluvial Plain N = 33
EXPORT CROPS			
Cacao	60	40	8
Coffee	64	36	3
Citrus	57	81	9
Sugar Cane	26	30	73
Tobacco	4	21	21
Pimento	7	9	0
DOMESTIC-FOOD CROPS			
Roots/Tubers			
Yams	97	100	27
Sweet Potato	69	79	58
Dasheen	54	70	24
Cassava	30	34	36
Coco (Coco Yam)	34	26	0
Sorrel	6	8	10
Irish Potato	27	0	0
Badoo	20	23	3
Beetroot	3	0	3
Arrowroot	4	0	0
Vegetable/Legume			
Lettuce	25	55	9
Tomato	23	13	39
Cabbage	19	21	0
Cucumber	17	17	0
Carrot	10	19	0
Pumpkin	20	4	18
Bok Choy	17	8	0
Cho-Cho	9	15	0
Okra	9	6	12
Sweet Pepper	7	3	2
Eggplant	3	4	12
Calaloo	2	0	0
Red Pea	56	62	51
Cow Pea	36	18	21
Congo Pea	3	33	20
Peanut	0	30	45

Table 7.7 (Continued)

	Mountain N = 184	Limestone Plateau N = 46	Alluvial Plain N = 33
Condiments/Spices			
Ginger	27	13	0
Hot Pepper	5	15	0
Annatto	8	4	3
Thyme	6	4	0
Eskellion	4	6	9
Mint	2	2	6
Onion	0	2	3
Fruits			
Breadfruit	67	85	42
Banana	66	81	24
Plantain	45	38	9
Ackee	40	45	27
Mango	34	28	45
Soursop	16	11	42
Starapple	10	13	15
Plum (June Plum)	11	9	6
Coconut	8	10	12
Jackfruit	13	9	6
Naseberry	3	11	9
Sweetsop	69	79	58
Guava	7	4	9
Melon	4	6	15
Roseapple	6	4	6
Cashew	4	13	0
Guinep	5	2	6
Papaya	2	2	3
Custard Apple	0	0	3
Cereals			
Corn	53	47	41
Rice	0	0	30

roots and leaves of trees enhance soil conservation therefore, allowing for utilization of steep slopes in high rainfall areas.

Variations in crop occurrence was also evident intra-regionally. For instance, sugar cane is commonly cultivated in the eastern portion of the Mountain Region, but is virtually absent in the west. This pattern reflects the relatively gentler topography of eastern areas. The more rugged topography in the central and western portions of this physiographic region was dominated by tree crops, such as cacao, coffee and citrus. Here again, the acute environmental awareness of these farmers is manifest by their agronomic practices which aid in sustainable soil conservation on these steep slopes. Both inter- and intra-regional crop distribution among the sampled farms, coincided with the land-use recommendations of the **Soil and Land-Use Survey**, 1959 for the parish of Clarendon.

Livestock were kept on 234 (89 percent) of the small farms, with poultry, which were kept for both meat and eggs, being most common (Table 7.8). Although other animals occurred on most farms, their average number per farm was sufficiently small so as to make the keeping of livestock a minor economic activity. Most animals were kept for domestic use, however, occasionally they were slaughtered for special occasions, e.g. Christmas festivities, or used as a source of ready cash in times of financial emergencies. Regional variations in the distribution of various types of livestock was evident. For instance, goats were found predominantly on the drier areas of the Limestone Plateau and the Alluvial Plains, where foraging was possible on the low vegetation of non-arable limestone

outcroppings. Donkeys and mules were confined to the hillier Mountain Region,

TABLE 7.8
DISTRIBUTION OF LIVESTOCK ON SMALL FARMS

Type of Livestock	Number of Farms	Percentage	Number of Livestock	Mean Livestock Per Farm
No Livestock		11	0	-
Fowls	29	83	3057	11.6
Pigs	218	56	381	1.4
Cattle	148	47	337	1.3
Goats	124	44	484	1.8
Donkey/Mules (Beasts)	115	20	73	0.3
Rabbits	52	5	64	0.2
	13			

where they are invaluable for transporting crops over rugged terrain to areas that are inaccessible to motor vehicles. Some degree of relationship exists between the type of farming activities and the type of livestock. For example, pigs and cattle were more common among sugar-cane and citrus producers, as unrealed cane, as well as the leafy portions of sugar-cane stalks (cane ban), can be fed to cattle and pigs. Similarly, the pulp of over-ripened citrus was normally fed to cattle and pigs. Some root-crop producers also kept pigs, supplementing their diet with badoo grown specifically for that purpose and with the peel from yam (peeling skin), sweet potato and other root crops. Rearers of pigs often had a "contract" with other families for the collection of their "peeling skin".

Land-Use Patterns at the Farm Level

Analysis of land use at the farm level has two objectives. First, it serves to

illustrate the effect that distance between plots has on land-use decisionmaking and, secondly, it provides a foundation for the claim that the situation in domestic-food supplies is aggravated by the export-emphasis of small farmers' production. In addition, these analyses highlight the occurrence of idle land. Since a basic theme of this thesis is the production disparity that exists between export and domestic-market oriented crops, the analysis focusses on the allocation of land for domestic crops, export crops, pasture and ruiante. Technically speaking, domestic crops, export crops and pasture can be considered as productive uses, while ruiante is regarded as non-productive. However, like so many other aspects of small-farming analysis, there are grey areas requiring cautious interpretation. This is particularly true with regard to pasture and ruiante, because there is a tendency among farmers to regard any portion of their property containing grass as "pasture", regardless of whether it is used as a source of fodder. In the same vein, the terms ruiante and "resting" land, are often used interchangeably to describe unused portions of property. Sometimes, unused lands are genuinely "resting", i.e. in fallow, but it is also true that when required "fallowed" lands are often immediately brought into production, thus making it difficult to determine the true extent of fallow and/or idle land.

Overall the allocation of land to export-oriented crops on small farms is evident from Table 7.9. This phenomenon results, not only from more favourable infra-structural provisions for export as opposed to domestic crops (supra p.67), but is

also an age-related factor, inherently involved in the evolution of small farms, which becomes a major focus of discussion relating to categories of farming later

Area (ha.)					
Fragment	Export Crops	Domestic Crops	Pasture	Ruinat	Total Area
F1	98.7 (42.3)	65.3 (28.0)	18.7 (8.0)	50.8 (21.8)	233.5 (100.0)
F2	63.4 (27.0)	58.4 (24.9)	0.7 (21.6)	62.0 (26.4)	234.5 (100.0)
F3	21.7 (33.0)	10.2 (15.5)	14.5 (22.0)	19.4 (29.5)	65.8 (100.0)
F4	2.3 (46.0)	1.2 (24.0)	0.0 (0.0)	1.5 (30.0)	5.0 (100.0)
Total	186.1 (34.5)	135.1 (25.1)	83.9 (15.6)	133.7 (24.8)	535.8 (100.0)

Note: Values in parentheses denote percentage of total farm area.

in this thesis. This analysis reveals that the area of land in ruinate is similar in extent to that allocated to domestic food-crop production. Not only do small farmers allocate the largest proportion of their land to export production, but they also are keeping nearly one-fourth of their lands idle. This situation cannot be entirely explained by the ageing of small farmers, because a similar proportion of idle lands occur on farms operated by younger farmers (see Chapter 13). In acknowledging that they were not maximizing the utility of their land resources, 55 percent of the sampled farmers explained that they were unable to do so because they lack the financial means to develop and maintain more land than they currently cultivated.

Goldsmith (1981:28) claimed that although small farmers in Jamaica dominate the production of domestic-food crops, they also make a substantial contribution to the nation's export. Reliable estimates of their contribution are not easily

obtained, however a USAID study on Jamaica suggested that farms under 10.1 hectares (officially defined by the Jamaican Government as small farms) accounted for 25 percent of the value of agricultural exports (USAID, 1978:10). This proportion is telling of the situation in Jamaica's agro-economy, as farms of less than 10.1 hectares account for a mere 37.8 percent of total farm hectareage, yet represent 96.6 per cent of all farms. It has been claimed that the export-crop emphasis of small farmers is due not to personal preferences, but to coercion such as tagging farm assistance to the production of specific export crops, by some agricultural development agencies (Hills and Iton 1983, Spence 1985, Wigley 1988). The validity of this view with regard to this study was tested by comparing the actual land use of farmers with their stated preferential land use. The assumption here is that if the observed land use is a function of coercion or results from the better infrastructural provisions made for export crops, then the removal of these coercive factors ought to result in land-use patterns which are indicative of farmers' preferences. In order to establish their preferential land use, farmers were asked to rank in order of preference, four predetermined land uses for a hypothetical situation assuming they could have unconditional access to any infrastructural requirements for farm-income improvement. These land uses represent the land-use capabilities of the study area, as outlined by the **Soil and Land Use Survey, 1959** for the parish of Clarendon and include production of:

- 1) mainly export crops;

- 2) mainly domestic crops;
- 3) combination of export and domestic crops in equal proportions; and
- 4) livestock.

The results of this ranking are shown in Table 7.10 and indicate the coincidence between actual and preferred land use in the case of export crops. This finding

Land Use	Percentage Sample Ranking Land Use:			
	1st	2nd	3rd	4th
Mainly export crops	49.0	18.3	16.0	12.9
Mainly domestic crops	16.7	27.4	24.7	28.1
Equal production of export crops	8.4	32.7	36.2	37.3
Livestock	23.6	19.7	20.9	2.3
Non-participants*	2.3	2.3	2.3	2.3
Total	100.0	100.0	100.0	100.0

* Respondents who were unable to establish ranking.

corroborates that of Henshall (1967), who in a study of small farmers in the Eastern Caribbean, concluded that the production orientation was towards an export model. While price and income expectations influence this model, farmers are also attracted to lower market risks associated with the sale of export than domestic crop. Given that only 0.8 percent of sampled farms emphasized

livestock, the lack of coincidence between actual and preferred land use in this case is evident. Livestock emphasis is desirable because the social status of farmers is often reflected by the number of livestock, especially cattle, owned (Spence 1985:153, Campbell 1993:32). However, very few farmers have attained this status because they lack enough capital, particularly land, required for status-enhancing livestock rearing. Therefore, it is reasonable to assume that under the hypothetical situation outlined, accessing land for livestock rearing would be high on the priority list of farmers.

Another outcome of this classification scheme is the fact that production of crops for the domestic market was the second least popular first choice of farmers. This situation is undoubtedly related to the low price and income expectations associated with domestic crops and further endorses the magnitude and complexity of improving domestic-food self-sufficiency in Jamaica. Strategies to improve domestic-food security must therefore be cognizant of causative factors behind the unpopularity of domestic-crop production, so that a meaningful resolution of this situation can be devised.

Distance-related spatial patterns in the productive utilization of land were discernible among fragments. Closer fragments were more productively used and therefore had a lower proportion of their area in ruinate than more distant ones (Table 7.9). The more intensive cultivation of closer fragments was

influenced by the incidence of praedial larceny as well as the ability of farmers to pay more frequent visits. About 26 percent of those sampled, had reduced or abandoned crop cultivation on some distant fragments due to losses from praedial theft. The tendency was, therefore, to cultivate crops which were particularly vulnerable to praedial larceny, on or near the houseplot where they could be "watched". Where vulnerable crops were cultivated on more distant fragments these were also closely watched during or near harvest when they are most susceptible to theft. Sometimes farmers sometimes appealed to popular belief in Obeah to protect their crops and in this regard, displayed paraphernalia symbolizing Obeah in their fields. Some were rumoured to "needle" (poisoned) some of their crops, but the validity of this claim could not be ascertained.

The ensuing discussion attempts to establish the degree of land-use efficiency by examining the area of farmland in cultivation. This is a rather simplistic approach, given the complex issue of differentiating between land in fallow (land undergoing natural regeneration), wasteland (uncultivable land), and ruinate (unused, but potentially cultivable lands). The point when land in fallow becomes ruinate is unclear, because there are no set limits for fallow periods and the extent of fallowing is often determined by the ability or desire of individual farmers to bring unused land into productive use. A similarly grey area occurs in differentiating between ruinate and wasteland, because land categorized as wasteland sometimes merely reflect the inability of a particular farmer to use the

most marginal lands. Regardless, the proportion of unused land on a farm indicates the extent to which a farmer attempts to, or is able to maximize the use of his/her land resource.

While fallowing is an integral part of small-farming systems, respondents normally agreed that if agricultural incentives were available, much of the resting lands would be brought into production, fostering suspicion that the "resting" explanation was a mask for more deep-rooted problems in small farming. These problems relate primarily to an absence of agrarian infrastructure and labour shortage.

Land use is intrinsically related to tenure. For instance, Edwards (1961:111) argued that there is no impediment to the use of individually-owned land by virtue of tenure. Thus, the security associated with individually-owned land allows farmers flexibility in land-use decision-making. It is for this reason that permanent crops and structures found on sampled farms were invariably located on individually owned fragments. The case of family land varies according to circumstances surrounding its ownership and occupation. Therefore, where family bonds are strong and hostility minimal, flexibility in land use can be identical to that of individually owned land. If, however, the family ties are weak and hostility is common, then family land may be left in ruinate, extremely underutilized, used for grazing or, at best, planted with semi-permanent or short-

term crops (Edwards 1961:112). Clarke (1971:24) argued that the multiple-ownership of land retards agricultural development even in cases where it is cultivated:

From the perspective of land use it [family land] is inevitably wasteful and incompetent.... Misuse of land in the form of exhaustion or neglect, under-use because of lack of capital, or multiple ownership restricting development, are all practical results which have to be weighed against the strong sentiment and high values attached to the system (Clarke 1971:241).

In general, these views of the use of land under conditions of joint tenure did not apply in the study area. Contrary to the findings of Edwards (1961) and Clarke (1971), none of the 75 plots with joint ownership was more underused than individually-owned fragments. While family lands among sampled farms had a slightly higher proportion of their area devoted to food crops than other fragments, as observed by Clarke (1971:240), the proportion in ruinate was lower than for individually owned fragments. A probable reason is that family members often vie to maximize benefits from the land. While such rivalry could result in "misuse of land in the form of exhaustion", there was no evidence of this on the plots observed. There was a noteworthy contrast in land use between rented and owned land. Rented plots were commonly planted with short-term or semi-permanent crops, and there was a notable absence of permanent or even semi-permanent structures on these plots.

Summary

The physical and land-use characteristics of small farmers' land, epitomizes the plight which faces improvements in domestic-food supplies in Jamaica. With nearly 50 percent of the farms under two hectares in size and divided into an average of two fragments, the productive viability of these farm units in providing an adequate income for small-farming families comes into question. While most of these farms are owner-occupied, about 70 percent of the occupants lack sufficient legal claim to their land and, as a result, cannot qualify for vital farm credit. With these odds against them and, despite domestic-market production being a secondary production emphasis for these farmers, they are still widely acknowledged as the principal source of domestic-food production. Probably the most distressing aspect of physical resource use by these farmers, is the proportion of their land which is idle. The real extent and true cause of idle lands are difficult to ascertain, but explanations will likely differ among groups of farmers. Young farmers for instance, may be in a transitional phase of their occupation, where the quest for a better alternative to small farming is still in vogue, and in these circumstances they are likely to underutilize land. On the other hand, older farmers are fast approaching or have passed the peak of their physical ability and therefore, might be hindered to maximize the use of land resources. Whatever the reason for the existence of such large portions of unused land on already minuscule farms, it presents a major problem for improvements in domestic-food supplies.

CHAPTER 8

THE INFRASTRUCTURAL RESOURCE PROFILE OF SMALL FARMING

The role of infrastructural support in sustaining small farming was discussed in Chapter 3. By examining the types of infrastructure provided for small farmers in the region and the factors influencing their utilization, this chapter completes the analysis of the resource profile of small farming. This discussion of infrastructural variables excludes small-farm research and development, which has a national rather than parochial significance. Hence, this chapter focusses upon marketing, the use and availability of credit and farm aid, support organizations and extension services as they apply to small farming.

MARKETING

In general, the structure of agricultural marketing among sampled farmers mirrors that of the national situation. For example, both the relatively well-organized networks for the marketing of export crops and the informal, highly fragmented system associated with domestic-food crops, functioned within Clarendon.

Export Marketing

Commodity Associations were relied upon as a medium for marketing by 203 of the 241 farmers who produced export crops (Table 8.1). A distant spatial pattern in the use of export-marking facilities emerges from the geographical pattern of

export-crop production. Thus, use of Commodity Associations for export

TABLE 8.1
EXPORT MARKETING NETWORKS USED BY SAMPLED FARMERS

Type of Network	Number of Farmers N = 241	Percentage
Commodity Associations	203	84.2
Coffee Industry Board	90	37.3
Citrus Growers Association	81	33.6
Cocoa Industry Board	66	27.4
All Island Cane Farmers Association	65	26.9
Processing Factory	99	41.0
Private Organizations	52	21.6

* **Note:** Farmers utilized more than one type of facility.

marketing is largely confined to the Limestone Plateau and Mountain Regions. While use of processing factories, such as those involved in citrus fruit, was likewise concentrated among upland farmers, those utilizing the processing facilities of the Tobacco Company of Jamaica were located in lowland areas of the Alluvial Plains, as this is the most common location for tobacco cultivation.

Domestic Marketing

Almost all respondents (98.9 percent) produced surplus domestic-food crops and utilized a variety of marketing options (Table 8.2). Agricultural higglers provided the main outlet, collecting the produce or "load" at the farmgate during the middle of each week and travelling to local and urban markets to sell it on

weekends. Usually, farmers are not paid at the time their produce is collected,

TABLE 8.2
DOMESTIC MARKETING OPTIONS USED BY SAMPLED FARMERS

Marketing Option	Number of Farmers N = 260	Percentage of Surplus Producers
Agricultural Higglers	217	83.5
Sale at Country Markets	121	46.5
Sale at Urban Markets	16	6.1
Private Exporters	16	6.1
Local Cooperatives	10	3.8
Government Agencies	6	2.3
Food Processors	2	1.0

but at the beginning of each week when higglers again place orders for mid-week collection. The supply arrangement between farmers and higglers is therefore on a credit or "trust" basis, because most higglers lack ready cash to pay upfront and must, therefore, wait until the load is sold. Nevertheless, some farmers held the opinion that "trusting" was a strategy employed by higglers in order to reduce their own risks and sometimes even to cheat, because a common complaint by higglers was that they had experienced a "bad market" and, therefore, would have to abrogate parts of their payments. While the prices obtained from higglers were generally lower than those obtained by personally taking produce to market, the general consensus was that use of higglers avoided problems of transportation and "bad" market. In addition, the time spent preparing a load for market might be more profitably spent attending to farm business.

The second most popular method used by farmers to dispose of surplus crops was for them to convey their produce to country markets (Table 8.2). These markets are located in small towns and villages and open for business mainly on Saturdays, when farmers and/or their spouses gather to sell produce. This weekly trip to market also affords farmers the opportunity to purchase goods, such as tools and some groceries, which are unavailable in their local villages. In addition, agricultural produce which are either out of season or not grown in some areas can be purchased.

Some farmers (6.1 percent) bypass both higglers and country markets, in order to take their produce directly to either of the main urban markets of Kingston or Montego Bay at approximate distances of 129 and 160 kilometres from the parish respectively. This situation was especially noted in the marketing of vegetables. Although vegetable cultivation is labour intensive and relies heavily on chemical input, these crops fetch high prices in Kingston and Montego Bay, thus making it economically attractive to transport these crops over long distances. However, conveying vegetables for sale in these distant markets can be a risky undertaking, because farmers have virtually no market intelligence on which to rely. It was therefore not uncommon for farmers employing this strategy to complain about "bad market" due to glut, which resulted in low prices and spoilage of produce. Such losses are only exacerbated by the transport costs the farmer has incurred.

Private exporters, who operated in the study area, were particularly concerned with root crops, particularly yams. Farmers who utilized this option, did so intermittently, because regular collection was not provided by these exporters. Also, prices paid by them are similar to those paid by higglers, so that there was no real advantage in utilizing this option, except when there was a local production glut.

Ten farmers used a local cooperative (Christiana Potato Cooperative) as an outlet. These farmers were all located around the Spaldings community, an area which forms an extension of the Christiana potato-growing region. Some farmers indicated they sold produce to "government", although it could not be ascertained which government agencies were involved. Private food processors provide an outlet for about one percent of the farmers, with AgroGrace being the principal buyer. Vegetables and legumes were the main crops sold to these outlets.

Considerable dissatisfaction was expressed by farmers with regard to the existing system of domestic food-crop marketing. Over 45 percent of those farmers who produced surplus domestic-food crops, experienced difficulties in marketing these crops. This level of dissatisfaction can be measured by comparing farmers' actual and preferred marketing options (Table 8.3). Although higglers were the most frequently used option, this seems to be a consequence of the lack of alternative outlets. This finding corroborates that of Wigley (1988:107), who argued that

marketing surplus produce through higglers is the least preferred outlet of small farmers. The preferred surplus strategy is disposal through government regulated agencies. This preference was influenced by the functions of the AMC during its heyday of operation between 1973 and 1981. Of the 125 farmers who had, at one

TABLE 8.3
ACTUAL AND PREFERRED DOMESTIC MARKETING OPTIONS OF
SAMPLED FARMERS

Marketing Option	Actual	Percentage of Surplus Producers N = 260	Preferred	Percentage of Surplus Producers N = 260
Higglers	217	83.5	10	3.8
Sale at Country Markets	121	46.5	15	5.8
Sale at Urban Markets	16	6.1	0	0.0
Private Exporters	16	6.1	0	0.0
Local Cooperatives	10	3.8	4	1.5
Government Agencies	6	2.3	218	83.9
Food Processors	2	1.0	13	5.0

time or another, sold surplus food crops to a government agency, 119 sold to the AMC between 1973 and 1981. Such endorsement for the AMC is based on the perception that this agency provided a guaranteed market through regular purchase of produce at the farmgate and, in addition, provided prompt and complete cash payments. This is in contrast to the delayed and staggered payments provided by higglers. Prompt and complete payment is considered important to farmers, as it allows them more efficient financial decision-making. A farmer in Kellits demonstrated this point when he explained that, "when mi get pay catter-catter, mi caan only plan fi dis evening, but when mi get it all-in-one

mi caan plan fi next year". That is, when payment for produce is staggered and delayed, his financial plans are confined to a day at a time, but if payments are prompt and complete then he can plan for a much longer period. It appears that market security took precedence over prices in the marketing preference of small farmers, because even though prices paid by AMC were widely acknowledged to be the lowest of any outlet, their preference was unwavering. This fact supports the risk-minimization decision-making thesis of small farmers advocated by Innis (1980:1-8).

CREDIT AND FARM AID

Eighty-two (31.2 percent) of sampled farmers received official farm assistance in the form of credit and farm aid during their time working the land. Such

Farm Size (ha.)	Number of Farms in Category	Number of Credit Aid Recipients	Percentage of Farmers in Category Who Received Credit/Farm Aid
Less than 2.0	128	36	28.1
2.0 - 3.0	71	28	38.4
Greater than 3.0	64	18	40.9
Total	263	82	100.0

assistance was channelled through a variety of institutions including People's Cooperative Banks, special development programmes, such as the IRDP and Crop Lien, commodity associations, such as the Coffee Board and All-Island Cane

Farmers' Association, as well as directly through the Ministry of Agriculture extension services. As with the national situation, credit and aid receipt among sampled farmers, showed a strong bias in terms of farm size and, by extension, export-crop orientation (Table 8.4). Thus, nearly 60 percent of the assistance received by farmers was in connection with export-crop cultivation.

In addition to institutional factors which deny small farmers access to formal assistance, the attitude of some farmers especially to credit, acts as a further barrier. While the majority (60 percent in the case of this study) are not opposed to the idea of obtaining farm credit and other assistance, very few have taken the initiative to secure these facilities, even when cognizant that they exist (Edwards 1961; Heffernan and Pollard 1983; Spence 1985). Only about 12 percent of sampled farmers had sought assistance on their own initiative, because of the fear to have land put up as collateral for assistance, in light of the adverse social implications of the loss of land (*supra* p.163). These implications are sufficient to deter farmers from even investigating the requirements for assistance.

FARMER SUPPORT ORGANIZATION

An integral part of agricultural planning in Jamaica has been the organization of the rural sector. A variety of organizations were functioning in Clarendon in 1987, and 120 farmers indicated their membership in one or more of these organizations (Table 8.5). Despite having the highest membership, the JAS was

largely a dormant and, hence, irrelevant body. Most local Chapters were no

TABLE 8.5
MEMBERSHIP IN SUPPORT ORGANIZATIONS AMONG SAMPLED FARMERS

N = 120

Organization	Membership	Percentage of Farmers in Support Organizations
Jamaica Agricultural Society (JAS)	72	60
All-Island Cane Farmers' Association	59	49
People's Cooperative Bank	33	26
Christiana Potato Growers Association	13	11
Citrus Growers' Association	11	9
Banana Growers' Association	2	2

longer functional, owing to a lack of leadership and membership enthusiasm (Wigley 1988:59). Dissatisfaction with the JAS was widespread among small farmers, who claimed the organization has been dominated by "the big man dem", i.e. larger-scale farmers whose problems not only differ from those of small farmers, but who are also considered unsympathetic to and disinterested in the needs of small farmers.

Membership in the All-Island Cane Farmers' Association is automatic, provided sugar cane is grown for sale. In light of the fact that sugar cane was produced on 86 farms, it might seem inconsistent that only 59 farmers were members of the Cane Farmers' Association. The reason for this discrepancy is that some sugar-cane farmers marketed their crop on the quota of a relatives or friends who are members of the Association, so as to avoid the paying of dues. Attitudes

towards the Cane Farmers' Association were generally favourable, as farmers were satisfied that the organization negotiated in their interest and secured the best possible price for their crop.

Farmers obtained membership in People's Cooperative Banks by purchasing shares. However, membership is not a prerequisite for obtaining credit from the bank. Shareholders were dissatisfied with the performance of the People's Cooperative Banks, because the amount of credit obtainable is considered small and most could not remember the last time they received dividends on their shares. In fact, until the rationalization of the People's Cooperative Banks under the umbrella of the Agricultural Credit Bank in the mid 1980s (supra p.66), this institution faced extinction, because of high levels of default on credits to farmers.

Both the Christiana Potato Cooperative and the Citrus Growers' Association, received favourable evaluations from their representative members. In the case of the former, members were confident that the administration of the Cooperative had their interest at heart in securing low-cost seeds and other inputs, such as fertilizer and pesticides, and negotiating favourable prices for their crop. In the case of the Citrus Growers' Association, its organization of transportation for farmers' crop and the reasonable prices obtained for citrus, elicited favourable ratings.

EXTENSION SERVICES

Of the 263 farmers surveyed, 141 (54 percent) had contact with extension personnel during their time in farming. While farmers could not recollect the regularity and frequency of extension contact with any degree of certainty, 63 (24 percent) had no contact with extension officers in the three years prior to the survey. Most of those who had contact within that period had a single visit. These statistics reveal the paucity of the extension services, because 200 (76 percent) of the farmers in the survey had no contact with an extension officer in the three years preceding the survey; a situation reflecting the inadequate number of extension officers in Clarendon, 14, to adequately assist the estimated 22,000 farmers in the parish. The combination of rugged terrain, lack of transportation facilities and administrative duties, served to hamper the ability of extension officers to deliver technical assistance to the majority of farmers. Extension contact related mainly to training, cultivation of export crops, soil conservation and pest control (Table 8.6). Organization of "field-days" in which farmers are provided with technical advice is one of the main methods by which extension officers establish rapport with farmers. Field-days tend to focus on soil conservation techniques, given its critical role in the upland regions of Clarendon, as well as on strategies for the improved cultivation of export-tree crops, such as coffee, cacao and citrus. Pest-control training also focussed upon export crops.

The evident bias of extension services to export-related activities is paradoxical,

TABLE 8.6
EXTENSION SERVICES PROVIDED TO SAMPLED FARMERS

Service	Number of Farmers N = 141	Percentage of Contacted Farmers
Training	64	45
Export Crops	54	38
Soil Conservation	54	38
Pest Control	49	35
Farm Management	41	29
Domestic Crops	36	26
Fertilizer Use	36	26
Credit	21	15
Introduction of New Crops	8	6
Livestock	8	6

especially in light of the Jamaican government's agricultural development rhetoric relating to improved food security.

Summary

While there is general inadequacy in the provision of infrastructural support to small farming, these inadequacies are not homogeneous throughout the small-scale farming sector. Instead, intra-sectoral disparities between export and domestic-market oriented production are evident. In the case of marketing, the poorly coordinated and highly fragmented system for domestic-food crops, contrasts with the well-organized networks for export crops. This situation results in considerable marketing problems for domestic-food producers, while no such problems exist for export producers. This is, therefore, a factor which adversely

influences the potential for improving domestic-food security. In addition, in the absence of viable alternatives and despite their abhorrence of arrangements with higglers, domestic-food producers are forced, nevertheless, to rely on this arrangement as their main mode of surplus disposal. Staggered payments and sometimes downright guile on the part higglers, disables farmers from making long-term financial plans for their farms and households. Those who had experienced the guaranteed market and prompt payment system provided by the AMC between 1971-1983, clamour for the return of that arrangement, even though AMC prices to farmers were considered low. Their rationale is that a secure market and prompt payment allows them the opportunity for better planning to improve their level of living.

Similar disparities were noted with regard to the provision of official assistance to farmers. Although bias against small farming in the provision of formal assistance, particularly credit, is undeniable, the low occurrence of formal assistance among them is not always the result of institutional bias, but is often related to farmers' attitude to credit use. The only collateral that most farmers can offer in return for farm credit is their land. But the value of land to farmers is not only economical, it is also sentimental and is the basis of social standing in a community. Loss of land could therefore mean total disaster for a farm family. Besides, most of the farmers surveyed, had no valid title to their land. Even where land was purchased, their claim to their property was based on the

purchase receipt along with community recognition of their rights. Thus, even if these farmers were willing to access credit, they could not do so for lack of a legal claim to their land. Key variables determining farmers' access to credit include: their level of contact with extension officers; the length of time they have worked their land; the size of the livestock component of their operation; and the size of the farm unit. These variables are not unrelated, because the level of extension contact is often a function of the number of years in farming, which itself influences the extent of land accumulation, and hence farm size.

Organization of the rural sector is considered an integral part of agricultural development planning and a variety of institutions have been established for this purpose. However, farmers' participation in and attitude towards them has been generally cool. This dearth of enthusiasm, especially towards those concerned with domestic production, results from farmers' belief that these institutions have done little to cater to their interests and needs, but instead focus on the "the big farmer". While evaluation of export-related institutions was somewhat more favourable, farmer participation was nevertheless low because these organizations are crop specific, so that a farmer's ability to participate would be determined by the agronomic capability of the land he/she farms.

The low level of extension involvement with the activities of small farming, represents a serious indictment of the extension services. Over 45 percent of

these farmers had never been contacted by an extension officer and over 70 percent had no contact within the three years prior to the survey.

CHAPTER 9

CLASSIFICATION OF SMALL FARMING

The concept and method of agricultural typology were developed between 1964 and 1976 by the Commission on Agricultural Typology of the International Geographical Union. Though the Commission was discontinued in 1976, the idea was not abandoned and the research went on uninterrupted. The project is currently based in the Polish Academy of Sciences and is being continued through limited funding from that institution, but international organizations such as UNESCO have expressed interest in this project (Kostrowicki and Szyrmer 1991:5).

Classification of the sampled farms represents the second step in the rationalization of the myriad of factors that impact on domestic-food production and small farming in Jamaica. Previous chapters have indicated variations in small farming with respect to the type of crops grown. These variations are not solely a function of variations in the physical environment, but also reflect certain human resource and infrastructural variables. Thus, to identify distinct farming systems within the sample is a means by which detailed analysis of small farming can be facilitated.

Traditionally, agricultural planners in the Caribbean have not distinguished between different categories of small farming in policy formulation and implementation. If there is a reasonable basis for categorizing small farming and the dynamics of the development of these categories can be identified and understood, then policies and development strategies should ideally be tailored to meet the needs of different categories of farmers. With this goal in mind, this chapter establishes a typology of small farming in the study area, focussing on methodology, distribution, and the relevance of the results to the study.

CLASSIFICATION METHOD

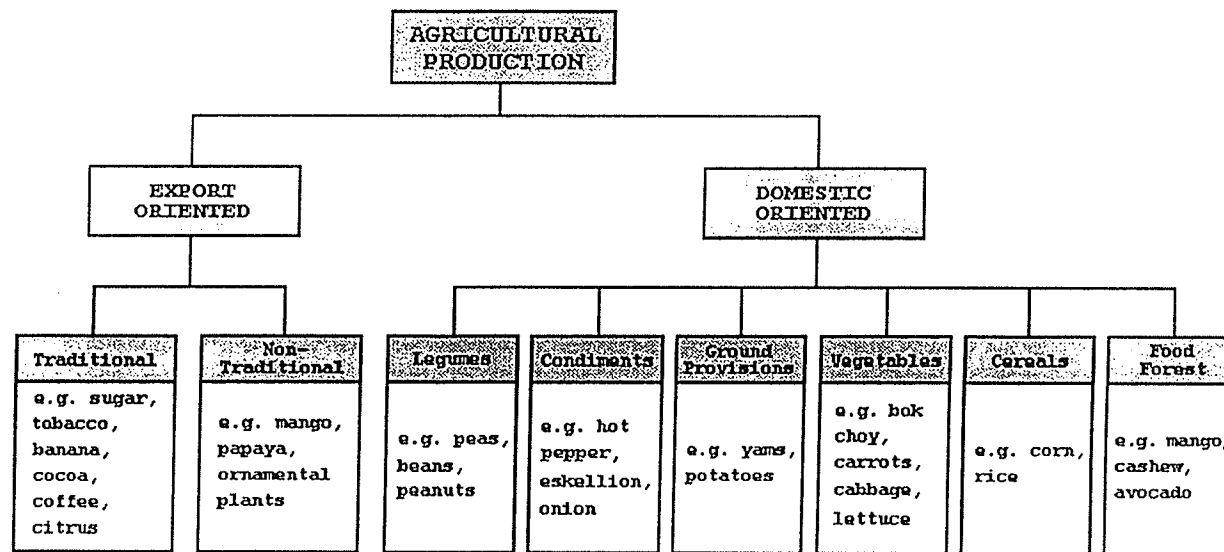
Farm size has been one of the more commonly used criterion for classifying small farming in the Caribbean, although Berleant-Schiller and Pulsipher (1986) have proposed the use of a wet-dry, high-low continuum to explain and organize variations in subsistence agriculture in Montserrat and Barbuda. Using the land-access ceiling of just over six hectares Brierley (1974), for example, found that farm size was a key variable explaining variations in categories of farming in Grenada. Likewise Goldsmith (1981) used a ceiling of ten hectares to conceptually define three distinct categories of small farmers in Jamaica. While acknowledging farm size to be an important variable differentiating categories of farming, the classification scheme employed in this study uses cash-crop emphasis of farmers as its basis. This decision is because the area ceiling used in defining small farms in this study (*supra* p.25) was deemed to be sufficiently low so that

significant differences between categories based on size were considered unlikely. Crop emphasis is not, however, to be confused with crop specialization. Crop specialization is a situation in which a specific crop or combination of crops is the basis of the farming activity over an extended period, i.e. a fairly static farming activity. Crop emphasis, on the other hand, suggests greater transience in the dominant cropping activity. It can be argued that crop specialization is non-existent among Caribbean small farmers, given the absence of long-term commitment to specific crops, as well as the multitude of crops grown under conditions of fairly equitable allocation of resources (Berleant-Schiller and Pulsipher 1986, Hills and Iton, 1983). Crop emphasis is more discernible among small farmers, because the most important crop(s) may change annually or even seasonally in accordance with market opportunities and price fluctuations.

This scheme adheres to the basic categorization of agricultural crop production by the main economic planning institution in Jamaica, the Planning Institute of Jamaica (Figure 9.1).

On each farm, the crop emphasis was determined by the farmer's ranking of his/her perception of their most important income-generating crops for the three calendar years prior to the survey (see question 35). Previous small-farm surveys undertaken in Jamaica, such as that of Edwards (1961), Spence (1985) and Wigley (1988) have revealed the livestock component to be supplementary to

FIGURE 9.1
JAMAICAN GOVERNMENT CLASSIFICATION OF AGRICULTURAL PRODUCTION



Source: Compiled from Economic and Social Survey of Jamaica, 1986

other agronomic activities, and as such, was not considered to be a specific emphasis. However, as there were two cases where livestock, particularly poultry, played a major income-generating role on small farms, livestock were considered a valid emphasis in the initial stage of the classification. Based on the results of the survey, farming activities were grouped initially into 14 categories, often limited to specific crops. These categories included: vegetables; sugar cane; citrus; ground provisions; cacao; coffee; pimento; tobacco; legumes; condiments and spices; coconuts; food-forest produce; rice and livestock. Based on agro-economic as well as physical similarities, these categories were subsequently collapsed into six less restrictive categories, namely:

Traditional Export

- 1) Export field-crops - sugar cane and tobacco;
- 2) Export orchard crops - citrus, mango, papaya;
- 3) Export non-orchard tree crops - cacao, coffee, banana, coconut, pimento (allspice);

Domestic Food Crops

- 4) Vegetables and legumes - salad vegetables (lettuce, cabbage, bok choy, tomato, carrots), peanut, peas and beans; and
- 5) Domestic provisions (excluding vegetables) - ground provisions, e.g. yams, potatoes, cereals, condiments, domestic spices, food-forest crops.

Although livestock are considered to be a valid income-generating activity, they were not treated as a discrete group, because of their low occurrence (two farms)

does not permit statistical inferencing. As many aspects of the agronomic focus of the two livestock farmers are aligned with export non-orchard farming, they are incorporated into that category.

The decision to group crops into discrete categories is based on similarities in various aspects of their production. Traditional export field-crop cultivation is generally labour intensive, but labour demands are seasonal. From an agronomic standpoint, these crops thrive best in pure stands. Traditional export-orchard crops, such as oranges, grapefruit, tangerine and ugli fruit, are similar not only because they are citrus crops, but also because they share similar agronomic requirements, such as pest control and maintenance, and marketing channels. Mango and papaya are not traditional in the same sense as citrus, because their export potential has been realized only since the early 1980s. As such they are categorized as non-traditional exports by the Planning Institute of Jamaica. That group, however, also includes ornamental crops, winter vegetables and a wide range of other crops. The decision to incorporate mango and papaya into this group stems from their agronomic similarities to *bona fide* traditional export orchard crops. Traditional export orchard crops are usually cultivated in pure stands, because their high-density foliage prevents interplanting with other species. Traditional export non-orchard crops are often planted with each other. Banana, for example, is often interplanted with coffee and cacao to provide shading for these slower growing crops, especially in the early stages of growth.

In contrast to orchard crops, these crops require little tending once they reach maturity. For example, pimento trees are rarely pruned; coffee trees, although sprayed annually to prevent destruction by coffee-berry borer, require pruning on an average of every two or three years; and once established cacao requires even less tending, except when outbreaks of Witches' Broom or Black Pod disease occur (JAS, 1961:443). Demand for labour is comparatively small, owing to the low maintenance requirements of those crops.

Vegetables and legumes are grouped into a single category, because of their similarity in both chemical inputs (fertilizers and pesticides) and labour demands (high and continual). Domestic provisions are usually interplanted with each other, often on a complementary basis, and require similar agronomic methods. These crops utilize the same marketing channels, namely higglers and local markets. As with vegetable and legume cultivation, they require large labour inputs on a fairly regular basis.

DISTRIBUTION OF FARMERS BY CATEGORY OF FARMING

The sample distribution according to the five discrete farming groups is shown in Table 9.1. This classification shows that 64.6 percent of the farmers surveyed were involved in export-oriented crops as their main income-generating activity. This fact is significant and relevant to this study, because it unequivocally demonstrates the importance of export production over that of domestic-market

emphasis - a point underlying a chronic problem in Jamaica's agriculture.

TABLE 9.1
DISTRIBUTION OF FARMERS BY CATEGORY OF FARMING

Category of Farming	Number of Farmers	Percentage
Traditional Export		
Traditional Export Field Crops	46	17.5
Traditional Export Orchard Crops	48	18.3
Traditional Export Non-Orchard Crops	76	28.8
Sub-Total	170	64.6
Domestic Food Crops		
Vegetables and Legumes	27	10.3
Domestic Provisions	66	25.1
Sub-Total	93	35.4
Total	263	100.0

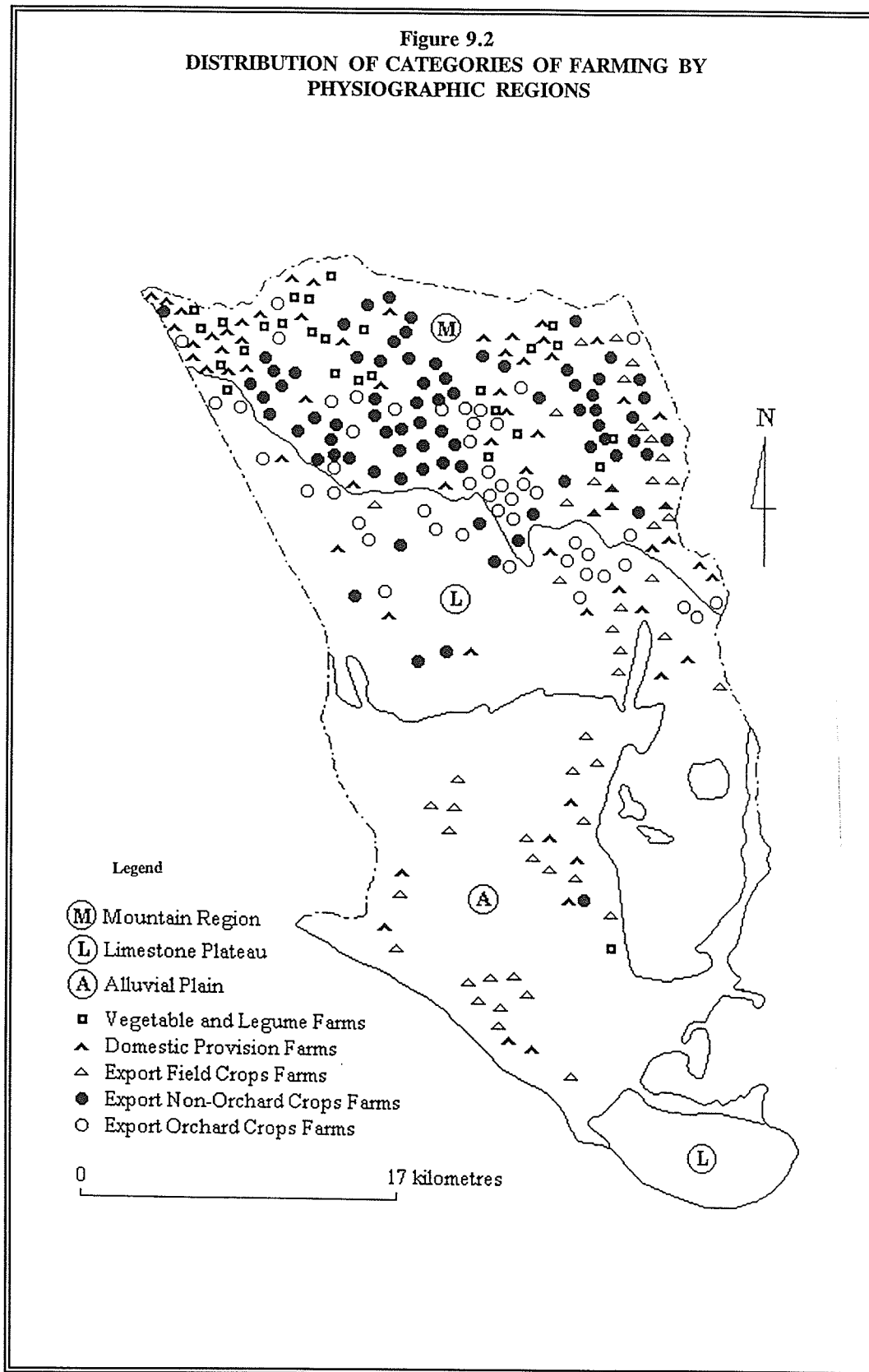
TABLE 9.2
PERCENTAGE DISTRIBUTION OF CATEGORIES OF FARMING BY
PHYSIOGRAPHIC REGIONS

Category of Farming	Physiographic Region		
	Mountain	Limestone Plateau	Alluvial Plain
	N = 183	N = 47	N = 33
Percentage of Total Sample	69.6	17.9	12.5
Traditional Export Non-Orchard	37.6	12.8	3.0
Domestic Provisions	26.2	21.3	24.3
Traditional Export Orchard	14.8	44.7	0.0
Traditional Export Non-Orchard	7.7	19.1	69.7
Vegetable and Legumes	13.7	2.1	3.0
Total	100.0	100.0	100.0

Spatial Distribution of Types of Farming

The disproportionate distribution of farms shown in Figure 9.2 reflects the historical development of Jamaica's small-farming sector, whereby smaller farms have generally been associated with hilly interior locations (supra p.116), and is quantified in Table 9.2. The domination of the Alluvial Plains by traditional export field-crop farms is logical, because these farms are primarily involved with the production of sugar cane and tobacco, both crops requiring gentle slopes and deep well-drained soils. Similarly, the rolling topography and relatively high rainfall of the Limestone Plateau is well suited to citrus production and accounts for this region being characterized by traditional export-orchard farms. The Mountain Region with its steep slopes and high rainfall is suitable for the interplanting of a variety of tree crops, such as coffee, cacao and pimento, i.e. traditional export non-orchard farms. The environmental synchronism of this activity stems from the fact that differential root depth and foliage layers associated with the interplanting of tree crops, acts as an effective barrier to soil erosion in these areas of high rainfall intensity and steep slopes. In addition, the layering of plant foliage, in association with differential sunlight demands, means that slopes of varying aspect can be utilized (Innis 1980:8). Among categories of farming, regional variation is least among farmers with a domestic-provision emphasis. This fact not only attests to the ubiquity of domestic-food crops, but also reflects an innate desire by small farmers to produce some food for home consumption, regardless of crop emphasis.

Figure 9.2
 DISTRIBUTION OF CATEGORIES OF FARMING BY
 PHYSIOGRAPHIC REGIONS



Preliminary analysis of the categories of farming shows a significant relationship between the orientation of small-farmers' production and their age. Crosstabulation of the categories of farming which are summarized according to orientation of production (Table 9.3), resulted in a χ^2 value of 10.05 with two

TABLE 9.3 ORIENTATION OF PRODUCTION BY AGE OF SAMPLED FARMERS					
Category of Farming	Mean Age	Age Category			Total
		< 40	40-55	> 55	
Domestic provision	48.4	23	41	29	93
Export crops	53.2	34	50	86	170
Total		57	91	115	263
Chi-Square Results					
Observed Values (O)	Expected Value (E)	(O-E)	(O-E) ²	(O-E) ² /E	
23	20	3	9	0.45	
34	37	-3	9	0.24	
41	32	9	81	2.53	
50	59	-9	81	1.37	
29	41	-12	144	3.51	
86	74	12	144	1.95	
$\Sigma = 263$	$\Sigma = 263$	$\Sigma = 0$	$\Sigma = 463$	$\Sigma = 10.5$	
$\chi^2 = 10.05$	df = 2	significance = 0.99			

degrees of freedom at the 0.99 probability level. This χ^2 result indicates that younger farmers are primarily involved in the production of crops for the domestic market while older ones are more export-oriented.

Although this chi-square result is based on cross-sectional data, the usefulness of this classification scheme would be enhanced by the establishment of longitudinal relationships among the categories of farming. It is in this regard that this study proposes an age-influenced progression in small farming. The domestic categories of farming (i.e. vegetable and legume and domestic provision) represent the initial, while the export groups represent the advanced stage of the progression.

Thus, although discussion of the categories are sequenced according to their mean age, the most significant age difference is between domestic and export farming. In this regard, the categories which comprise each of these two groups are regarded as parallel stages of the continuum. Differences in crop emphasis among the categories comprising these two broad groups are therefore influenced by spatial factors which are related to the type of farming options available to farmers, as well as social factors within these groups.

Summary

As with all classification schemes, the categorization of small farming proposed here is by no means definitive, and should be regarded more as a guide for the rationalization of the multitude of factors impacting on these systems. That most categories of farming occur among the three different physiographic regions is evidence that variations in the type of farming is not entirely a function of variation in the physical geography. Thus, in the following five chapters, examination is made of the relationship between human, agrophysical and infrastructural profiles of farmers, for the five major categories. The objective is to establish comparisons and contrasts between these categories, so as to improve understanding of domestic-food production and the dynamics of small farming in Jamaica. Because human resources influence the levels of interaction between farmers and their land, and farm size and tenure sometimes determine the degree of access to some aspects of agricultural infrastructure, the sequence

of discussion progresses from examination of the human resource, and ends with farm infrastructure. In addition, a case study of a typical farmer for each category is presented so as to provide additional insight by focusing on individuals. The overall objective of these chapters is to highlight unique characteristics of individual categories of farming, and what if any relationship exists between them.

CHAPTER 10

VEGETABLE AND LEGUME FARMING

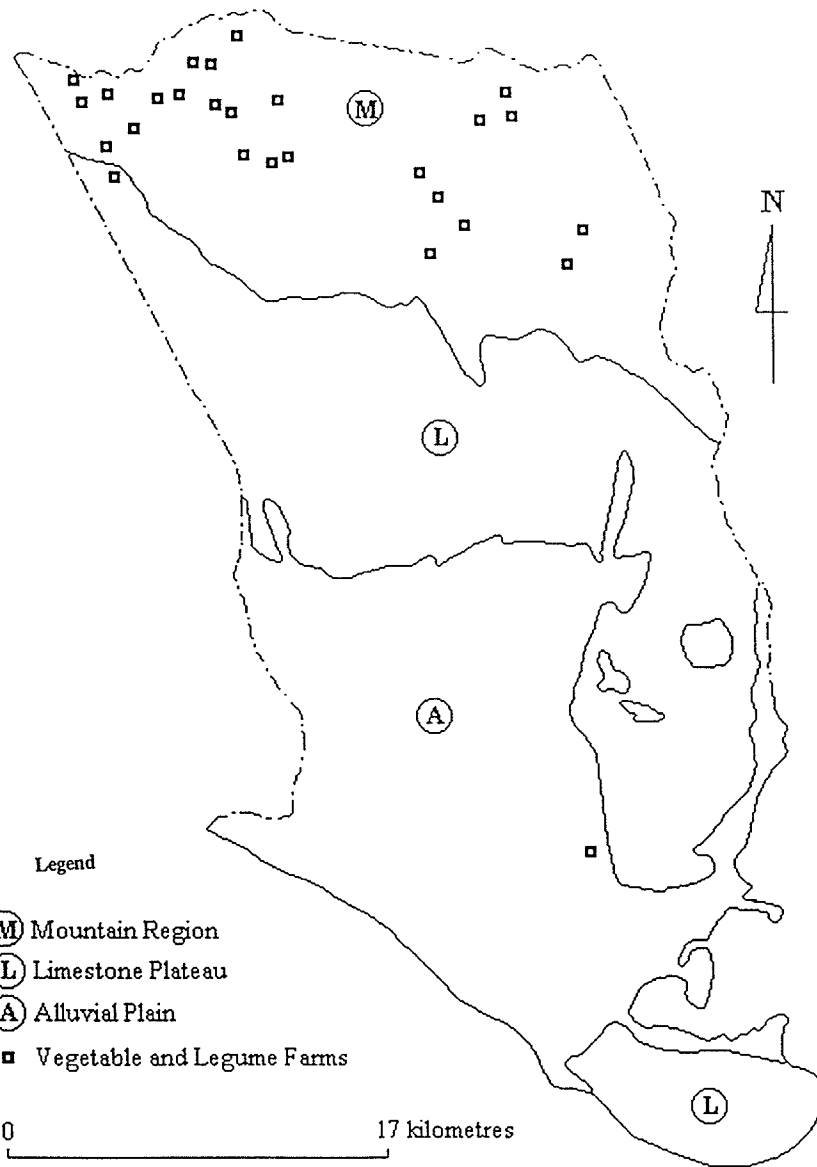
Vegetable and legume farming represents the first of the parallel domestic categories which are initial to the farming progression. Discussion of this group followed a similar sequence to that in Chapter 6, and the thoroughness with which they are treated indicate their importance in understanding subsequent chapters.

Although this category is the smallest, numbering 27 farmers or 10.2 percent of the sample, it is by no means the least important, since it sets the stage for development of a hypothesis on the evolution of small farming. All but two farmers in this group was located in the Mountain Region (Figure 10.1); a locational bias which conforms to the historical pattern discussed in Chapter 7. Intra-regionally, these farms are located on loam soils, with the majority being found on the narrow band of loam which runs easterly across the Mountain Region. The medium-texture and well-drained character of this soil is suitable for vegetable cultivation.

HUMAN RESOURCE CHARACTERISTICS

This discussion is concerned with the personal characteristics of the farmers and their households, as well as their organization and use of farm labour.

FIGURE 10.1
VEGETABLE AND LEGUME FARMS: DISTRIBUTION BY
PHYSIOGRAPHIC REGIONS



Characteristics of Farmers

These farmers are on average almost five years younger than the sample, but this should not disguise the fact that one-third of them were older than 55 years (Table 10.1).

Age Category	Number	Percentage
< 40 years	9	33.3
40 - 55 years	9	33.3
> 55 years	9	33.3
Total	27	100.0
Mean Age = 47.1 years		
Standard Deviation = ±14.5 years		

In light of the age distribution of Jamaican small farmers (supra p.138) this equal distribution among the age categories is unusual.

Only two (7.4 percent) farmers in this category were women; a proportion substantially lower than the sample norm of 16.0 percent. This proportion is likely explained by social norms which govern women acceding to the headship of households and major decision-making roles in farm operations. There are essentially two sets of circumstances under which women assume these responsibilities. The first results from the death of a spouse or the dissolution of a marital union, and is more common among older groups of farmers. The

second stems from the temporary absence of spouses, especially for overseas farm work, and is more common among younger farmers. However, because the survey period coincided with the North American winter and, thus, the low season for migrant farm workers, males who might normally be away were at home, relegating their spouses to their normal role of secondary decision makers.

Like the overall sample, most vegetable and legume farmers did not attain above primary level education (Table 10.2). Likewise, the need to supplement household incomes made it necessary for 67 percent of them to work off-farm

Level of Education	Number	Percentage
Primary	20	74.1
Secondary	4	14.8
No Formal Education	2	7.4
Vocational	1	3.7
Total	27	100.0

seasonally, primarily as casual labourers (Table 10.3). Since off-farm employment was usually undertaken during slow periods on the farm, it did not interfere with cultivation activities. This category of farmers is distinct from the sample in that 10 (37 percent) had worked overseas, versus the norm of 22.8 percent. Eight males had obtained employment through the overseas farm-

workers' programme, while the other two were older farmers who had worked

TABLE 10.3
VEGETABLE AND LEGUME FARMERS: DISTRIBUTION OF PART-TIME
JOBS BY CATEGORY

Type of Jobs	Number	Percentage
Casual Labour	11	61.1
Tradesman	5	27.8
Skilled Labour	2	11.1
Total	18	100.0

in Panama or in England. This higher than normal proportion of overseas employment reflects the requirements of the farm-workers' programme, whose principal criteria are youth and good health. Although such farm work is regarded as low-skilled casual labour, these individuals acquired a higher social status than locally employed unskilled labourers, owing to the higher wages they had earned overseas. In addition, overseas employment reflects a degree of initiative on the part of these individuals, the financial proceeds from which, provided the means towards more financially rewarding farming. For example, a 38-year old farmer who had "spent eight seasons" in the USA had recently purchased a truck with which he planned to transport not only his crops, but those purchased from other farmers, to hotels in Montego Bay and Ocho Rios. Such an enterprise would have been most improbable without the proceeds gained from overseas employment.

With regard to marital status, the dominant category is common-law associations (Table 10.4); a fact not unexpected given their younger than average age.

Marital Status	Number	Percentage
Common-law	11	40.7
Married	9	33.3
Single	6	22.2
Widowed	1	3.8
Total	27	100.0

Consequently, when combined with those who are single, this group reveals a lower level of family unity, which has implications for household stability and, the stability of farm enterprises.

Characteristics of Households

Households were generally large, except in cases where farmers were single and therefore, not directly responsible for a household, even though they often had children residing in other households. The mean household size of 5.4 persons was 14 percent higher than the sample average. This size is attributed to children still residing within the household of comparatively younger farmers, and the phenomenon of the extended family, whereby grandchildren are reared in the households of older farmers (Table 10.5). The nature of extended families is

such that, there is need for caution in the interpretation of its implications for

TABLE 10.5
VEGETABLE AND LEGUME FARMERS: HOUSEHOLD SIZE BY
AGE CATEGORY

Age Category	Number	Mean
< 40 years	9	4.1
40 - 55 years	9	5.9
> 55 years	9	6.1
Total	27	5.4

TABLE 10.6
VEGETABLE AND LEGUME FARMERS: AGE-SEX COMPOSITION
OF HOUSEHOLDS

Age-Sex Category	Number	Percentage
Fit Males > 15 years	48	32.4
Fit Females > 15 years	37	28.0
Females < 15 years	35	23.6
Males < 15 years	25	16.9
Unfit Adults	3	2.1
Total	148	100.0

potential human pressure on physical resources (supra p.142). The dependency ratio, was 1:1.3, 13.3 percent higher than the sample mean (Table 10.6), underscoring the need for these farmers to be serious about cultivating their land

effectively, so that sufficient income is generated in order to attain or maintain their basic needs of food, clothing and shelter.

Farm Labour Input

Discussion of farm labour input focusses upon that provided by the household heads, aggregate input of households, use of wage labour and the involvement of informal labour arrangements. Calculations are based on both busy and slow periods of the cultivation cycle.

Labour Input of Household Head

Amongst the sample, this category of farmers are noteworthy for their level of labour input. In spite of their seasonal off-farm employment, these farmers worked on their farm an average of 30.9 hours per five-day week, or 2.3 hours more than the norm. Given that vegetable production is more intensive than other categories of crop production, this level of labour input reflects the demand of their enterprise. When the labour input is prorated to the land, then 24.3 hours per hectare of cultivated land are involved among this group, or 6.7 hours more than the norm.

Household Labour Input

As discussed in Chapter 6, potential household labour supply is indicated by the proportion of household population accounted for by fit adults (supra p.147). Among vegetable and legume farmers, fit adults accounted for 85 (57.4 percent)

of the aggregate 148 persons found in these households - a proportion comparable to the norm. Their contribution to household labour, along with that from other members is summarized in Table 10.7. Of significance to these discussions, is

	Mean Labour Input Per 5-day Week (hrs.)	Mean Labour Input per cultivated ha. Per 5-day Week (hrs.)
Per household	51.3	39.5
Per household head	30.9	24.3
Per fit adult	16.3	12.5

the fact that the household head alone, contributes 60.2 percent of weekly labour input, (3.1 percent more than the sample). There are three factors which account for this phenomenon. The first relates to the preponderance of young dependents (Table 10.6) who make minimal contribution to household labour. Secondly, the comparatively young mean age of this group suggests that the domestic and maternal labour demands of female spouses would be at their peak in this group, thereby drastically reducing their contribution to farm labour. Thirdly, young adults are often discouraged by parents from undertaking any farm work. This last factor accounts for the low input per fit adult, in spite of their accounting for 57.4 percent of total household population.

Similar to the sample, household labour among this group is divided according to gender and age. The contribution of adult females includes transplanting seedlings from seed-beds, weeding, fertilizing and cooking for work groups. Women are considered more capable than men in transplanting vegetables, such as tomatoes and peppers, because they have "soft hands", so are less likely to bruise or break the delicate roots and stems of seedlings. Harvesting of delicate crops, such as tomatoes is predominantly "women's work", and it is primarily their responsibility to market all crops. Adult males assume responsibility for the more strenuous tasks, such as the preparing of seedbeds and fields, budding and moulding, spraying and fertilizing of crops. Younger household members who are greater 15 years, participated in light tasks, such as carrying water for irrigating the crops during dry spells, preparing the load for market and tending livestock.

Wage Labour Input

In light of this household structure, reliance on hired help was a secondary consideration. Data on wage labour input per unit area of land were desirable in order to make a complete assessment of farm labour dynamics, but this was unobtainable because of fluctuations in wage-labour use. Both day work and task labourers were employed, and while approximate input could be calculated for day work labour, farmers had little quantitative recollection in relation to task work. Hired help was used primarily on a seasonal basis (Table 10.8), although

the incidence of intermittent use was more than twice the norm. Wage labour

TABLE 10.8
VEGETABLE AND LEGUME FARMERS: USAGE OF WAGE LABOUR

	Number	Percentage
Used of Hired Labour	21	77.7
Seasonal	12	57.2
Intermittent	9	42.8
Mean Hired Labour = 2.3 persons		

was utilized mainly for clearing land and forking fields. In no case was wage labour used for normal farm maintenance or reaping of crops. These activities seemed to be within the capabilities of the households.

Informal Labour Arrangements

This group utilized a variety of informal labour arrangements to undertake farm work (Table 10.9). Overall, only a marginal difference (3.8 percent) in the use

TABLE 10.9
VEGETABLE AND LEGUME FARMERS: INFORMAL LABOUR USAGE

Type of Arrangement	Number	Percentage of Informal Arrangements
Occurrence of Informal Labour Use	15	55.6
Day for Day	14	93.3
Morning Sport	2	13.3
Partner	2	13.3

of informal labour occurred between this group and the sample. However, those under 40 years, were more inclined to, and more frequently used informal labour than older ones, because they are better able to reciprocate labour as required by these arrangements. In view of the relatively small size of farms in this category, the combined use of household, wage and informal labour input appears high, reflecting the fact that vegetable and legume cultivation is the most intensive type of small-farm production.

AGROPHYSICAL CHARACTERISTICS AND AGRONOMIC METHODS

Attention in this section centres upon farm size, farm fragmentation, land tenure and use, and cultivation practices of farmers in this category.

Farm Size

Although the pattern of farm-size distribution (Table 10.10) among these farmers resembles the sample, the mean size of holding was 21.7 percent smaller. This

Size Category (ha.)	Number	Percentage
< 2.0	15	55.5
2.0 - 3.0	10	37.0
> 3.0	2	7.5
Total	27	100.0
Mean Size = 1.86 ha.		

smaller farm size is associated with their location on an age, land-accumulation continuum. Being younger, they have not attained the level of capital accumulation, particularly land, of older categories of farmers, although some older members might be in a state of stagnation, with regard to land accumulation. At this age, land-accumulation relationship is borne out by cross-tabulation (Table 10.11), which resulted in a χ^2 value of 6.4 with four degrees of

Age Category (yrs.)	Farm-Size Category (ha.)			Total
	< 2.0	2.0 - 3.0	> 3.0	
< 40	5 (55.3)	3 (33.3)	1 (11.1)	9 (100.0)
40 - 55	7 (77.8)	1 (11.1)	1 (11.1)	9 (100.0)
> 55	3 (33.3)	6 (66.7)	0 (00.0)	9 (100.0)
(%)				

freedom at the 0.83 probability level. This value indicates that the smallest farms are more common among younger than older farmers.

Farm Fragmentation

On average, each farm consisted of 1.7 parcels, with a mean size of 1.07 hectares. No farm had more than three fragments - a level attained by two individuals. Again, the age and land-accumulation relationship among small farmers explains this distribution, because as a farmer grows older, the tendency

is for him/her to occupy additional parcels of land. In view of their younger than average age, these farmers have not complete their accumulation of fragments in the majority of cases.

The pattern of fragment size and distance relationship on these farms differed from that of the overall sample in that the F1s were largest (Table 10.12). This

Ranked Fragment Distance	Number	Mean Size (ha.)	Mean Distance (km).	Mean Period of Occupancy (yrs.)
F1	27	1.15	0.00	13.8
F2	16	0.97	0.97	13.1
F3	3	1.09	1.09	7.3
Mean = 1.7 plots.				

pattern exists because many farmers resided on family-owned fragments which were marginally larger than other tenurial categories. At 0.48 kilometres, the mean distance between F1 and other fragments was 2.02 kilometres shorter than the sample norm. This is because as farmers grow older and their farming enterprises become more established, further accumulation of land tends to occur at increasing distance from F1. Younger members of this group are at the earliest stage of this land-accumulation process.

The relevance of the length of occupation of a fragment lies in its potential for receipt of farm assistance and other infrastructural benefits, particularly if the fragment is owned. On average, these farmers occupied their fragments for 2.4 years less than the total sample. This difference is unexpectedly small and relates to the fact that one-third of the farmers in this group were older than 55 years, and therefore occupied their plots for a longer time than the mean age of the category would indicate.

Land Tenure and Use

As with farm size and fragmentation, the tenorial distribution among vegetable and legume farmers supports the age-related, land accumulation thesis (Table 10.13).

The occurrence of individually-owned land was 5.7 percent lower than normal, suggesting that there is an age-related land accumulation process among these farmers. Given that at this stage, younger farmers in this category still cherish the hope of "moving on" to higher status, non-farm jobs, it is possible that even when sufficient capital existed, they might be reluctant to invest in land.

This point was underlined in comments made by a 34-year old farmer, who regarded his vegetable operation as a pathway to his ambition of becoming a shopkeeper. He conjectured that "in the next four years" he should have accumulated enough money to set up and stock a shop, which he regarded as

providing him with a higher status and a more reliable source of income. This attitude might be a factor in the delay of maximum land accumulation to a time

Tenure	FRAGMENTS			
	F1	F2	F3	Total
No. of fragments:				
Owned	17.0	8.0	0.0	25.0 (54.3)
Family	7.0	1.0	1.0	11.0 (23.9)
Rented	2.0	7.0	2.0	9.0 (19.6)
Caretake	1.0	0.0	0.0	1.0 (2.2)
Total	27.0	16.0	3.0	46.0 (100.0)
Total area (ha.):				
Owned	21.0	7.3	0.0	28.3 (56.5)
Family	8.7	2.0	1.2	11.9 (23.8)
Rented	0.8	2.5	2.0	9.3 (18.5)
Caretake	0.6	0.0	0.0	0.6 (1.2)
Total	31.1	15.8	3.2	50.1 (100.0)
Land Use				
Area (ha.) in:				
Export crops	8.7	0.3	0.1	9.1 (18.2)
Domestic crops	10.5	6.6	0.6	17.8 (35.5)
Pasture	4.5	4.8	0.8	10.1 (20.2)
Ruinat	7.7	4.1	1.8	13.1 (26.1)
Total	31.1	15.8	3.2	50.1 (100.0)
Note: values in parentheses denote percentages				

in a farmer's life cycle when he/she has passed the peak of his/her physical abilities. The categories of land use discussed are identical to those identified in Chapter 6 and, thus include; export-crop production, domestic-crop production, pasture and ruinate (Table 10.13).

On average, vegetable and legume farmers devoted 10.0 percent more of their land to domestic-food crops than for the sample. Conversely, the proportion of land allocated to export crops was 16.3 percent below the norm; a fact which denotes their emphasis on domestic production. The nature of land allocation between these two land-use categories is related to the stage these farmers are at along the age-defined progression. Emphasis on domestic crops, particularly vegetables and legumes, over export crops, underscores the fact that at this stage some farmers still hope to "move on" to more lucrative non-farm endeavours, and may therefore be reluctant to make long-term investments as required by export crops. Moreover, the initial investment required to establish domestic crops is usually lower than for export crops, making the production of domestic crops more attractive to farmers who are in the initial stage of their career.

The proportion of total farmland devoted to pasture was 4.0 percent above the norm, reflecting a higher than average occurrence (25.7 percent) of grazing animals, such as cattle and goats. The average number of grazing animals per farmer was 4.4. Although the proportion of ruinate was merely 2.3 percent higher than the sample norm, this level was high in relation to their small land resource.

Agronomic Methods

A wide range of crops are cultivated by all small farmers (supra p.169), but all are not of equal importance to the farm operation. It follows, therefore, that in

making agronomic contrasts between categories, discussion must focus on those crops which are the basis of categorization, and the crops in which farmers devote resources. Aspects of agronomic practices to be reviewed, include crop distribution, cultivation methods and cultivation cycles.

Crop Distribution

While lettuce and cabbage dominate the vegetable category, red pea is the principal legume crop (Table 10.14). Crops listed in Table 10.14 are those which were normally cultivated during the annual cropping cycle of these farms.

Cultivation Practices

With respect to field preparation, vegetable and legume farmers employ the same basic tools as other categories. These tools include the garden fork, machete, hoe and occasional spade. There are three phases in land preparation, namely:

- i) clearing of land;
- ii) preparation of nurseries (where required); and
- iii) forking and bed preparation of area to be cultivated.

Because most of the original forest has long been removed, existing shrubs and grass are easily "siled down", i.e. cut low and burned. In order to ensure an even distribution of ash, the cleared vegetation is spread evenly over the area to be planted. Farmers explained that this process is necessary because their vegetable and legume crops are particularly susceptible to beetles and "bowga" - a root-eating worm which thrives in the organic soil layer. Via the distribution

of debris, a more equitable distribution of heat and ash is generated from the burn and in turn, helps control these pests. After the burn is completed, the area to be planted with vegetables is forked and furrowed. An intricate system of drains ensures that plant roots do not become waterlogged. Vegetables such as lettuce, cabbage and pumpkin are sown directly into the prepared fields and thinned out during the early stages of growth. Tomato is propagated in a nursery (bed)

TABLE 10.14
VEGETABLE AND LEGUME FARMERS: DISTRIBUTION OF PRIMARY CROPS

Crops	Occurrence on Farms	Percentage of All Farms
VEGETABLES	26	96.3
Lettuce	14	48.1
Cabbage	9	33.3
Tomato	2	7.4
Pumpkin	1	3.7
Calaloo	1	3.7
LEGUMES	24	88.8
Red Pea	17	62.9
Cow Pea	3	11.1
Congo Pea	2	7.4
Peanut	2	7.4

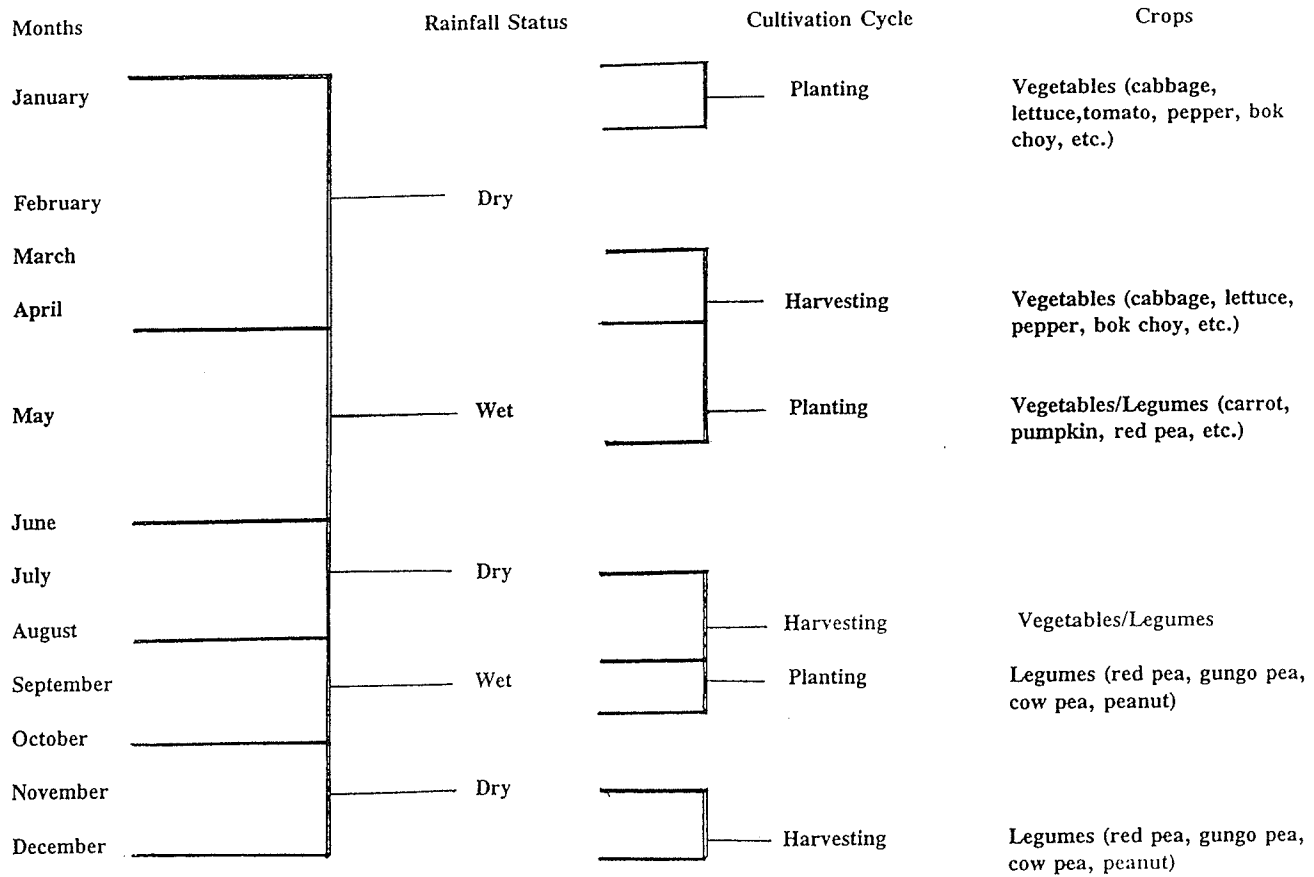
before being transplanted. Such beds are usually situated adjacent to the prepared fields and are fenced so as to protect them from being damaged. Legumes are

sowed directly in the ash-covered soil - no forking or furrowing of land is necessary.

The cropping cycle followed by these farmers is closely related to the rainfall regime of the region (Figure 10.2). Thus, the planting of vegetables and legumes usually coincides with periods of high rainfall (May and September), because adequate moisture is necessary for their germination and the early stages of development. Planting is also undertaken in January, as light frontal rainfall associated with inflows of cooler air (northers) from North America, provides adequate moisture for germination (Jamaica Ministry of Agriculture, 1990:3). Harvesting coincides with drier spells, i.e. March, July and December, because damp soils would result in rotting of mature crops, but also because insect pests are at their lowest level during dry periods.

Vegetables and legumes are referred to by farmers as "ketch crops", which means they are short-term, cash-generating crops taking about three months to mature. Although the type of vegetable may change seasonally, rotation with other categories of crops, such as ground provisions is rare, because this would necessitate the destruction of the vegetable beds, whose layout has required a substantial investment of time and energy. Thus, these farmers wish to maximize their utility.

FIGURE 10.2
VEGETABLE AND LEGUME FARMERS: RELATIONSHIP BETWEEN RAINFALL PATTERN
AND CULTIVATION CYCLE



Legumes are frequently rotated or even interplanted with other crops, such as corn and ground provisions, because they "put back richness that other crops take out".

Use of Agrochemicals and Manure

Agrochemicals in the form of inorganic (chemical) fertilizers and pesticides were widely used by these farmers. Use of chemical fertilizers is marginally (3.9 percent) greater than the sample norm. However, in terms of frequency and quantity of fertilizer application, noteworthy differences were evident. Fields were fertilized on average three times a year, applying about 228.2 kilograms per hectare per year, compared to 115.2 kilograms for the sample. As previously indicated (supra p.34) there was a general ignorance about the application of fertilizers. For instance 12-8-14, (an N-P-K ratio most suitable for root crops whose roots are less susceptible to burning by this compound) was used widely on vegetables and legumes, because it was cheaper and more readily available than the more appropriate sulphate of ammonia. Only 10 of the 26 farmers, who applied chemical fertilizers were knowledgeable enough to be selective in the type and amount of their application. Chemical fertilizer usage was supplemented by applications of cattle and goat manure on 10 (37.0 percent) of these farms; a proportion similar to the overall sample. That use of manure was 12.5 percent lower than the norm despite this category of farmers possessing a higher occurrence of livestock, was unexpected. One explanation was provided by a

farmer who declared that manure is a suitable habitat for breeding worms and "bowga", which damage vegetables and legumes. Thus, manure was used reluctantly and sparingly.

Pesticides were applied by 20 (74.0 percent) farmers; a proportion 24.7 percent higher than average. In general, crops were sprayed twice per cropping period or about six times per year. This contrast with others in the total sample who sprayed twice per year. On average, vegetable and legume farmers use 14.7 litres of pesticide per hectare, or 27.3 litres per year, as compared with 7.8 litres per hectare or 16.2 litres for the total sample. This usage reflects not only the level of dependence by vegetable production upon this input, but also a level of knowledge of their application on crops prone to pest and fungal damage. Farmers were generally selective in the application of pesticides, and dieldrin, a crystalline insecticide produced by the oxidation of aldrin, was commonly and appropriately used on vegetables and legumes.

INFRASTRUCTURAL CHARACTERISTICS

This section provides an overview of the infrastructural factors which impact on vegetable and legume farming. To this end, consideration is given to marketing, credit availability and farmer-support organizations.

Marketing

Vegetable and legume farmers rely primarily on domestic-market options, hence they sell most of their crops to higgler, although they will sometimes take their produce to local and urban markets (Table 10.15). Although farmer-higgler

Marketing Option	Number Using Option	Percentage
Higglers	23	85.2
Local Markets	15	55.6
Urban Markets	3	11.1
Private Exporters	1	3.7
Others	2	7.4

arrangements described in Chapter 8 (supra p.185), were used by some vegetable and legume farmers, many were involved in supply contracts with higgler from the urban centres of Kingston and Montego Bay. Even though these "out of area" higgler bought produce at lower prices than local higgler, farmers were more inclined to utilize their services, because they bought larger volumes. The market option designated as "others" involved two brothers who farmed separately, but who operated a joint venture supplying produce to hotels in Montego Bay. They were considered to be different from higgler, because they produced the bulk of the produce they supplied.

Farm Assistance

Nine farmers (33.3 percent) had received farm assistance; a level 20 percent higher than the norm. The reason for this level of assistance is unclear, but it may result from extension officers being more sympathetic to the needs of these younger farmers, in their arrangement of farm assistance.

Support Organization

As a group these farmers were not as involved with farmer-support organizations as were those in the other categories. Only six, or 22.4 percent had membership in these organizations, in comparison to 45.6 percent for the sample. Such a level of membership is once again related to their age, because farmers rarely join support organizations until they reach a stage of the farming progression where non-farm occupational options have diminished. In this regard, the six who participated in farm organizations were all over 50 years.

Provision of extension services is considered critical to the development of small farming (supra p.69). Earlier conjecture, that extension officers might be biased towards vegetable and legume farmers in terms of arranging farm credit, was not evident in the number or frequency of visits made to these farmers. Incidence of visits by extension officers was 9.2 percent lower than the norm, and the average number of visits per farmer in the three-year period prior to the survey, was nearly one-half of that for the sample. The explanation for this apparent

contradiction relates to the fact that of the nine recipients of assistance, six had taken the initiative to solicit such assistance without waiting to be approached by extension personnel.

CASE STUDY

By presenting a case study which involves a representative farmer in each category, a greater appreciation of the farming category can be gained. In order to preserve the confidentiality of the survey, both the names of the individual and community are fictitious.

Personal History

Linval, a 36-year old farmer has lived all his life in the community of Riverside, the main vegetable-growing region of the study area. Consequently, he has had little outside opportunity for social and economic advancement and depended solely on farming for his livelihood. His educational background consisted of six years of primary schooling, but this period was discontinuous because his parents could not always find the means by which to send him to school. He left school in the 4th grade, being able to "sign mi name good" and haltingly read passages in *The Bible*. Linval had no real desire to achieve a higher level of education, because he did not "have a good head for books". Instead, he aspired to be a mason like his uncle. In this regard, Linval spent 14 months in apprenticeship with his uncle, but abandoned this goal because his uncle was "robbing" him, in

that he was not paid a fair wage. An alternative goal was to "get a card", which would allow him to do seasonal farm work in the United States or Canada. This goal has so far eluded him because of the "curry favour of politicians and local activists". Unlike most farmers his age, Linval works only on his land, because he does not want to work for "local people", a policy he perceives as enhancing his social station in the local community. He may sometimes "help out his brethren" on their farms, but never for wages. However, if regular off-farm employment was available, he would consider accepting it, provided he would not be working for local people.

Linval occupies a two-room wooden house with his 25-year old common-law wife of nine years and their three children, ranging in age from three to 10 years. His responsibilities as a father probably extend beyond his immediate household, as he confided that his "name has been called outside twice", meaning that on two occasions he had been named as the putative father of children outside his household. Although he has not formally accepted responsibility for these "outside" children, he likely provides some minimal support for their education, because he wants to see them excel.

Farming Activities

For Linval, a typical day begins between 5:30 a.m. and 6:00 a.m. After breakfast he rides his donkey for 1.6 kilometres in order "to look after the cow"

tethered on private property. Although not having the permission of the owner to keep the cow on this land, the owner was considered unlikely to take any action against Linval should the animal was discovered, because the "owner-man cool", meaning that the owner is easy going. Nevertheless, Linval feels compelled to remove the animal "early", because he does not want to appear "too bare-faced". As there is limited pasture on his property, the cow is tethered during daytime on grassy roadside verges where shade is possible. After moving the cow he goes to the "grung", i.e. the cultivated portion of his land, arriving there between 6:45 a.m. and 7:00 a.m., where he works until lunch-time, which is around 12 noon. As his "grung" is situated on the houseplot, he normally eats at home. However, if he is extremely busy, and especially if "other men" are working with him, then either his spouse or 10-year old daughter will deliver his lunch to him in the field. The lunch break can be quite lengthy owing to the heat of the mid-day sun, and because Linval claims to sometimes "gets niggeritis", a state of drowsiness following a mid-day meal. A snooze before returning to work at about 2:30 p.m. is therefore normal. His workday ends between 3:30 p.m. and 4:00 p.m. when he returns home to do light chores, such as sharpening his tools or mending the "crill" (hamper) and halter for his donkey, after returning his cow to the "night pasture". These chores are followed by dinner, after which he "freshens up" prior to going to "chill out" (relax) with friends. All told, Linval spends between six to seven hours per day, or 30 to 35 hours per 5-day week working on his land.

Linval's spouse makes a minimal contribution to the labour input on the land. At the time of the survey she was in an advanced state of pregnancy, so that much of her day was spent attending to household chores and to the children.

In addition to his personal labour input, Linval hires wage labour for the preparation of vegetable plots and yam mounds. About four persons were usually hired per day, for four days, at a daily wage rate of J\$160. Thus, wage labour contributed 24 man-hours per day at a cost of J\$640.

Agrophysical Resource

Linval's holding consists of a single plot, 0.81 hectare in size. He purchased it two years prior to the survey from a cousin who "turned worthless and needed money to drink". As a result, Linval paid little for the plot, as "money to drink" connotes a relatively small quantity of money. Nevertheless, the fact that he was able to purchase land at the age of 34 years is an achievement of which Linval was proud, because he relates this accomplishment to the hard work he "put" into the small vegetable beds cultivated on his "father's piece of land", i.e. the family land (which accounts for his inclusion in the register), as well as to the sacrifices he made to save enough money so as to have his own land.

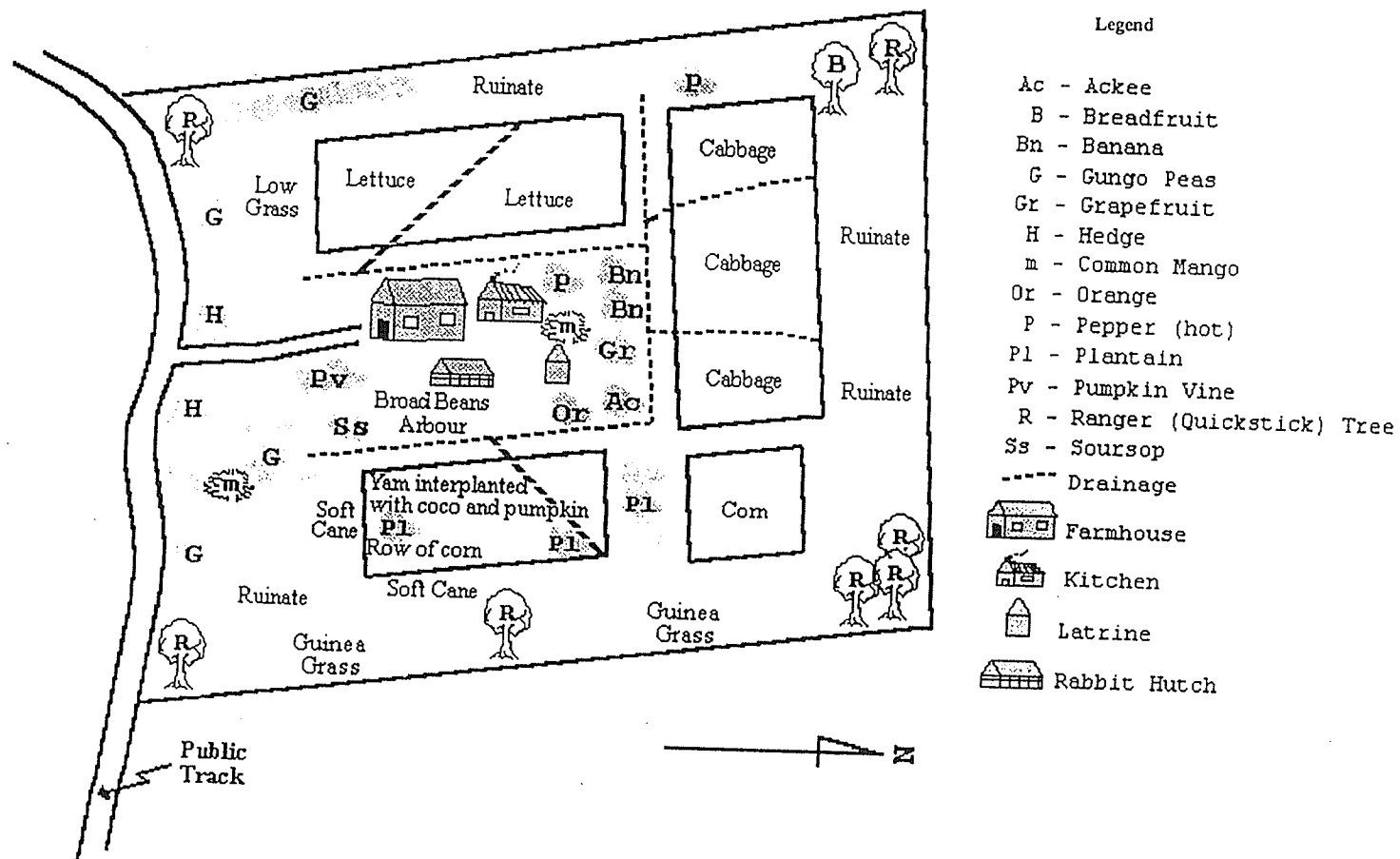
Land Use

Although vegetables and to a lesser extent legumes are the mainstay of Linval's

farm operation, a wide variety of other tended (cultivated) and untended (resulting from accidental propagation) plants are grown on his land. His livestock, which are of significant importance in the farm economy, consisted of one cow, two goats, a donkey, seven fowls, and three rabbits which belonged to his son. He explained that within six months following the interview, he intended "putting out" his cow, i.e. secure the services of a bull for her impregnation. After calving, the cow would become an important source of milk for his family. If the calf is a heifer, it would likely be kept to "build up" his herd. On the other hand, if it is a bull it would likely be sold in times of financial hardship. His goats also represent a part of his hardship-income pool. His donkey is used as a draught animal which he sometimes hires to other farmers. Fowls are kept for eggs and along with the rabbits, represents his meat pool. The goats and donkey were kept on the houseplot because their demand for pasture is less than that of the cow. At the forefront of his rationale for spatially organizing crops on his farm (Figure 10.3) was the concern over praedial larceny. Most of his vegetable and legume crops are equally susceptible to praedial larceny, however, the loss of some crops would be more devastating to his farm income than others. For this reason, he locates his vegetable patches close to or within visual sight from his home, whereas crops of less intrinsic value, such as corn and congo pea, are situated in more peripheral locations.

FIGURE 10.3
VEGETABLE AND LEGUME FARMER: FIELD SKETCH

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This rationale typifies the risk-minimization strategies employed by small-scale agricultural producers. In addition to this locational strategy to minimize crop lost from praedial larceny, he also employs other strategies by which to "hide" his crops from potential thieves. The local aphorism that "what a man cannot see he cannot steal", provides the logic for planting hedges, tall grass and gungo pea along his property boundary, adjacent to the track. These plants serve the dual functions of providing privacy for his home and a visual barrier around his valued vegetables. There are some food trees, for example mango and ackee, the result of accidental propagation and are located close to the farmhouse, but not regarded as high-risk crops. These trees are considered to be beneficial to the farmyard, because in addition to providing shade they are also used as anchorage for clotheslines, swings and benches.

The ranger trees at the corners of his property are multi-purpose. They might have been originally planted as surveyor's pegs marking the boundaries of his property, but they are also a useful source of fodder for his goats and cow. In this regard, younger more succulent branches are constantly harvested for that purpose. Guinea grass is also a source of fodder, but is also used to cover seedbeds as a moisture conservation measure.

On this farm there was no difference between actual and preferred land use. If Linval could have access to all the assistance he needed to improve or develop his

farm without dictates from the provider(s) of such facilities, he still would emphasize cabbage and lettuce in his cash-crop production. These crops he explained, are always in demand, unlike other domestic crops which he considers prone to fluctuations. He explained further, that while the soil on his land is suitable for sugar-cane cultivation, he has been deterred by the smallness of his holding and the wage-labour dependency of sugar cane.

Quantitatively, the proportional allocation of land to different categories of crop utilization, reflects Linval's crop emphasis. Domestic-food crops, which are mainly vegetables, occupied 0.41 hectares (50 percent) of his farm, while pasture and rinate each accounted for 0.20 hectare (25 percent). Export crops are noticeably absent from this farm - a fact Linval explained was due to his uncertainty about how much longer he would remain in active farming. Such an explanation underlines the uncertainty of his commitment to farming - an attitude which was all too typical of the younger farmers in this group. However, the reality of his situation is that the likelihood of permanent non-farm employment is restrictive, given his limited skills.

Infrastructural Resource

Linval used three market options in order to dispose of his vegetables and legumes. While sale to local higglers was by far his most commonly used option, he and his spouse sometimes took produce to local markets in Kellits, Chapelton

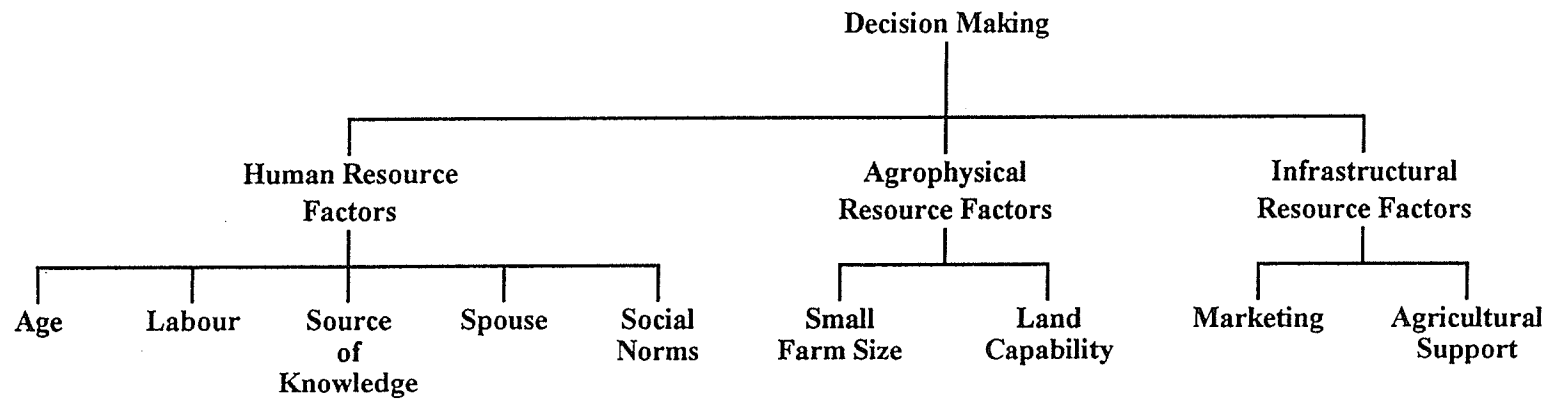
and Maypen (Figure 4.3). When sale of his crops are not "moving fast enough", he along with some of his "brethren", sometimes hire a truck at a cost of J\$500 per participant, to transport produce to market in Montego Bay. Linval considered this method to be the potentially most lucrative, as prices fetched are higher than elsewhere. A main drawback to this option however, was the lack of any market intelligence. Hence, on some occasions he had taken his produce to Montego Bay only to "meet bad market". On such occasions, he was forced to sell produce far below its normal price and to remain in Montego Bay for a longer period than anticipated, incurring loss due to spoilage, while still being committed to pay the transport cost. Between 1973-1980, Linval sold his produce to the now defunct Agricultural Marketing Corporation (AMC). He still bemoans the loss of that option, because although AMC prices were not high, the regularity of sale allowed him to sell a larger quantity of produce, collect his payment in bulk and, therefore, foster better planning and decision-making in his enterprise, albeit on family land. Furthermore, problems of market glut, lack of transportation and poor roads, were largely eliminated by the AMC option.

Although Linval had met once with an extension officer for advice on the use of pesticides, he never obtained official credit for his farm, but was interested in doing so. In spite of this interest, Linval had never applied for credit, because he only recently acquired his own land - a prerequisite for credit. Further, he was apprehensive about using land as collateral for credit, fearing that if he was unable to repay, "government will take the land".

Factors Influencing Decision-Making

Linval's decision-making in relation to vegetable and legume cultivation is influenced by the interaction between a range of human, physical and infrastructural resource factors (Figure 10.4). Human resource factors include age, labour situation, his source of farming knowledge, the influence of his spouse and the social norms to which he is expected to conform. These factors are not independent of each other. Age for example, influences his labour situation and the extent to which he conforms to social norms. Likewise, the level of agricultural support to which he is exposed, for example, in his contact with extension officers, may influence the extent of his farming knowledge as was evident in his use of pesticides. In terms of this human resource, Linval's age is a key factor in determining his crop emphasis within the ambit of his land capability. His decision to cultivate short-term crops, namely, vegetables and legumes, is influenced by his awareness that at his relatively young age, non-farming options are still perceived as being available to him. Planting long-term crops such as sugar cane, would require a longer-term focus of his farming career and, therefore, restrict his ability to take advantage of non-farming occupation if and when they should become available. Linval keeps a MacDonald's Almanac, which although two years out of date, he still found useful in instructing him on "good planting days". The influence of farm size on his decision-making results from the fact that if he had more land, Linval would "try to raise few more cows". He explained that raising more cows would

FIGURE 10.4
CASE STUDY: SCHEMA OF DECISION-MAKING



expand his hardship-income base, thus leading to greater overall income security and improved social status. Given Linval's desire to keep his non-farming options open, his desire to raise more cows might make him seem to be something of an enigma. This apparent paradox is in reality, a reflection of the degree of instability and uncertainty which occurs at this stage of the farming progression.

Summary

Overall, vegetable and legume farmers are more deficient in land resource than any other category. Not only are farms small and underutilized, but the dependency ratio of these households exceeds the norm, revealing a potential for extreme population pressure on land resources.

Although the youngest of the categories, one-third of them were over 55 years old and therefore devoid of alternative career options by virtue of their age. They represent potential stability but also associated stagnation in this group, because at that age they are unlikely to change the focus of their activities to accommodate development initiatives. The potential dynamism of vegetable and legume farming rests with the younger members of the group, particularly those under 50 years. Herein lies the greatest potential for instability, because these comparatively young farmers will unhesitatingly accept non-farming occupation options, should the opportunity arise, because low farm incomes provide little

opportunity for social and economic advancement. By the same token, however, they are likely to be more receptive to strategies designed to improve small farming and domestic-food security. Evidently, therefore, the profile which has emerged of these farmers is best understood within the context of their general placement on an age-defined farming progression, in conjunction with the land-use capability of their holdings. This is a stage of the continuum which is characterized by the paradox of greatest potential human resource, being coupled with the lowest level of agrophysical resource availability in small farming. It is also a stage where the potential for instability is at its greatest, as comparatively younger farmers seek alternatives to their default occupation. As this applies to domestic-food security, it is ironic that the best hope for improved food production occurs at the most restricted stage of the progression.

CHAPTER 11

DOMESTIC-PROVISION FARMING

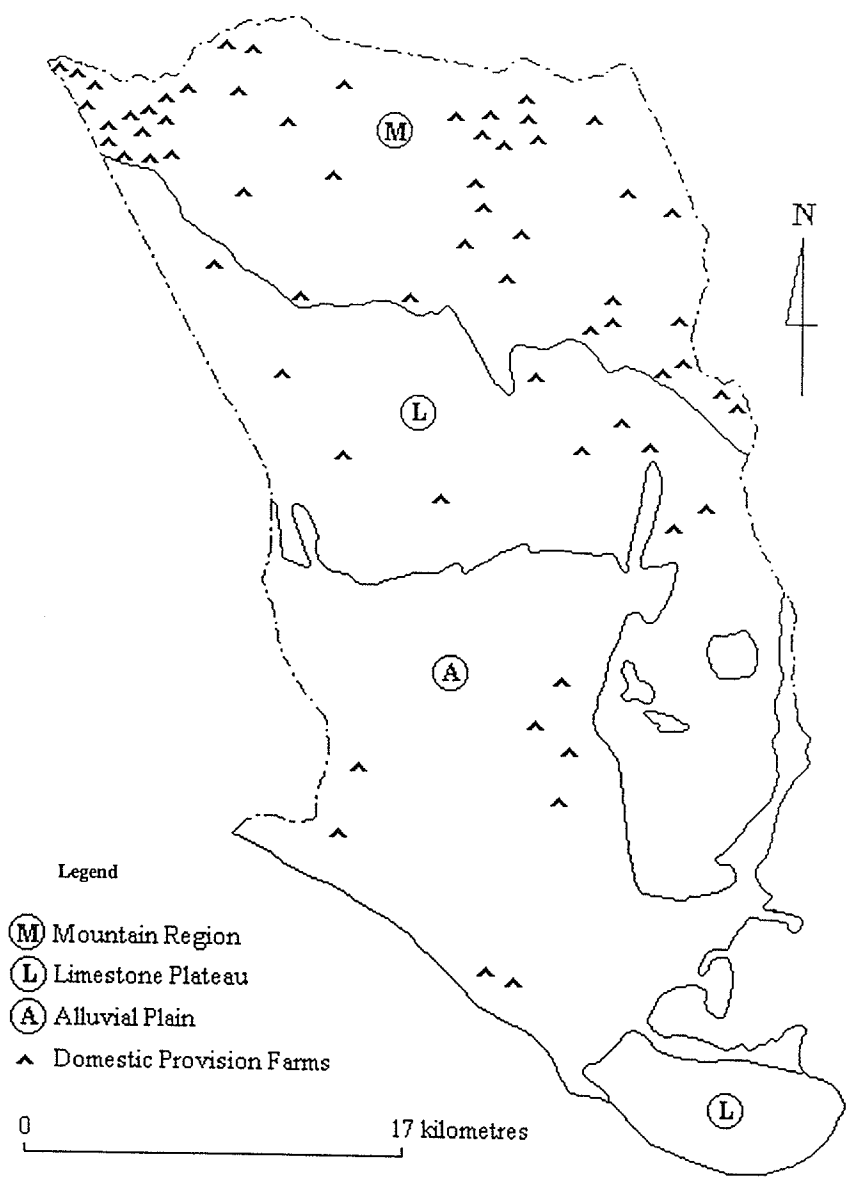
Domestic-provision farming shares a joint position with vegetable and legume at the initial stage of the small-farming progression. As such, the farmers in this group share much in common with the previous category, but have also developed their own unique characteristics which distinguishes them from any other group.

This group is the second largest in the typology, numbering 66 farms and accounting for 25.1 percent of the sample. Like most other categories, these farms are primarily located in the Mountain Region, but they were nevertheless the most widespread (Figure 11.1). Their ubiquity stems from the wide range of crops which characterize this system of farming and therefore, the variety of physiography which they can utilize.

HUMAN RESOURCE CHARACTERISTICS

The human resource variables discussed in this section, follow the sequence established in Chapter 10.

FIGURE 11.1
DOMESTIC PROVISION FARMS: DISTRIBUTION BY PHYSIOGRAPHIC REGIONS



Characteristics of Farmers

At an average age of 49.6 years, these farmers were only 2.5 years older than vegetable and legume farmers, and 2.2 years younger than the norm. Likewise, the standard deviation (σ) of ± 13 years was similar to the previous group and denotes a large intra-group age variation (Table 11.1). Nearly 79 percent of these farmers were over 40 years and their modal age category was between 40 and 55

Age Category	Number	Percentage
< 40 years	14	21.2
40 - 55 years	32	48.5
> 55 years	20	30.3
Total	66	100.0

Mean Age = 49.6 years
Standard Deviation = ± 13.0 years

years. Eleven (16.7 percent) farmers were women, with ages ranging from 27 to 72 years; a proportion similar to the norm of 16.0 percent. Seven of them were younger women who had assumed responsibility for the farm, owing to the temporary absence of the man of the house. Of the remainder, two were single and three were widowed or separated. On average, female farmers were 3.7 years younger than their male counterparts.

The level of educational attainment resembled the sample norm (Table 11.2), in that over 80 percent of these farmers had not achieved above the primary level

of education. One farmer was a teacher who had completed a one-year certificate

TABLE 11.2
DOMESTIC PROVISION FARMERS: EDUCATIONAL ATTAINMENT

Level of Education	Number	Percentage
Primary	53	80.3
Secondary	6	9.1
Vocational	5	7.6
University	1	1.5
No Formal Education	1	1.5
Total	66	100.0

course at the University of the West Indies. However, his farming techniques did not differ from that of others, because he informally relied on a fellow farmer with primary level education for both assistance and advice in his farming endeavours.

Like other categories, low and discontinuous farm incomes have resulted in a high propensity for part-time jobs within this group. Thus, 44 (66 percent) worked off-farm seasonally or intermittently, mainly as casual labourers (Table 11.3).

A revealing characteristic of this group is the fact that 18 (27.3 percent) had worked overseas (versus the norm of 22.8 percent), of whom 11 were currently

involved in the overseas farm workers' programme. As for the others, two were

Type of Jobs	Number	Percentage
Casual Labour	24	54.6
Tradesman	10	22.7
Shopkeeper	4	9.1
Skilled Labour	3	6.8
Low Income Professional	2	4.5
Fisherman	1	2.3
Total	44	100.0

male pensioners who returned from Britain after migrating there in the 1950s and four had worked as labourers either at the United States Naval Base at Guantanamo Bay in Cuba, in the Cayman Islands or in the Bahamas. Overseas employment as it relates to motivation in farming was most evident in the case of the two pensioners. Both were over 70 years old, but continued to invest portions of their pension into their holdings. In addition, one of them operated a shop to "pass time". Those in the farm workers' programme seemed less motivated and although monies were occasionally invested in their holdings, particularly in buying livestock, their concern was more with material indicators of well-being, such as housing and transportation.

Marital status within this category typifies the norm (Table 11.4). Age is the key variable explaining the distribution of marital status, because all single farmers were less than 48 years of age. On the other hand, those who were widowed were over 55 years of age. That married and common-law unions accounted for

TABLE 11.4
DOMESTIC PROVISION FARMERS: MARITAL STATUS

Marital Status	Number	Percentage
Married	29	43.9
Single	16	24.2
Common Law	10	15.2
Widowed	6	9.1
Divorced/Separated	5	7.6
Total	66	100.0

59.7 percent of marital distribution, augur well for the onset of a degree of stability in family units and, therefore, the farming practices of these farmers. As this relates to domestic-food security in Jamaica, the effects are positive if the current domestic-market oriented production is maintained. However, if the internal dynamics of the category are such that, stability occurs in conjunction with a shift to an export-oriented production, then the domestic-food situation is exacerbated.

Characteristics of Households

At 4.9 persons, the average household size was comparable to the norm. Like

vegetable and legume farmers, the fact that a large proportion (58.2 percent) of this household population were children 15 years and under, along with the dependency ratio being 6.6 percent higher than the norm, points to the potential

TABLE 11.5
DOMESTIC PROVISION FARMERS: AGE-SEX COMPOSITION OF HOUSEHOLDS

Age-Sex Category	Number	Percentage
Fit Males > 15 years	100	30.8
Fit Females > 15 years	89	27.4
Females < 15 years	69	21.2
Males < 15 years	57	17.5
Unfit Adults	10	3.1
Total	325	100.0
Dependency Ratio = 1:1.4		

for human pressure on this portion of the progression. The dependent population of these households, not only represent a potential drain on farming resources, but it also implies a small pool of household labour, because young residents who are of school age cannot be considered as a reliable source of household labour.

Farm Labour Input

Labour Input of Household Head

Except for 13 (19.6 percent) farmers who worked regularly off-farm and are essentially part-time farmers, domestic provision farmers worked their land for

an average of 29.3 hours per five-day week, i.e. about 1.6 hours less than vegetable and legume farmers. Although the labour input of part-time farmers was irregular, these farmers spent much of their "days off" and sometimes evening, attending to farm chores. In this regard, their labour input per week averaged 10.8 hours.

The farm labour input of this group, reinforces the earlier suggestion that part-time jobs do not compete significantly for farm labour, because at 20.9 hours per five-day week, mean labour input per hectare of cultivated land was 2.9 hours longer than normal. Thus, in spite of the potential instabilities which may exist in this group, farmers have a seriousness of purpose to succeed at their endeavour and improve their level of living.

Household Labour Input

The relevance of the fitness status and age distribution of households to labour supply was discussed in the previous chapters. Fit adults accounted for 189 (58.2 percent) of the total of 325 persons living in these households - a proportion similar to the sample (Table 11.5). Table 11.6 shows their contribution to household labour. Like the sample, the bulk (60.5 percent) of household labour is supplied by the head of household; a pattern previously evident among vegetable and legume farmers.

TABLE 11.6
DOMESTIC PROVISION FARMERS: HOUSEHOLD LABOUR INPUT

	Mean Labour Input Per 5-day Week (hrs.)	Mean Labour Input per cultivated ha. Per 5-day Week (hrs.)
Per household	48.4	34.6
Per household head	29.3	20.9
Per fit adult	16.9	12.1

Similarly, the division of labour by gender reflects the previous category, with less strenuous tasks being undertaken by women and, to a lesser extent, by children. Specifically, women were responsible for the "dropping of corn grains" (planting corn), preparing sweet potato "slips" for planting, sowing and tending to most condiments and spices, weeding fields, and when necessary, preparing meals for wage labourers. Men, on the other hand, performed more strenuous tasks, such as preparing fields, cutting yam sticks and reaping most root crops. Some of these activities are not gender specific, but others were considered taboo for women to perform. For instance, an older man explained that, while he did not mind his spouse assisting him in the planting of potato and dasheen, he would not allow her to plant yams, because "they will turn out puny-puny and people will laugh at mi". This attitude is a result of the belief held by some farmers that the size of a yam is indicative of a farmer's virility. In this regard, no male farmer wants to produce small-sized yams. Such beliefs are not restricted to men, because female farmers routinely hired males to plant their yams.

Wage Labour Input

With regard to wage labour, these farmers reflect the norm in that 87.9 percent of them employed an average of 3.5 persons for about three weeks during each cropping cycle (Table 11.7). Although farmers did not provide specific infor-

Wage Labour	Number	Percentage
Use of Hired Labour	58	87.9
Seasonal	42	72.4
Intermittent	11	19.0
Regular	5	8.6
Mean Hired Labour = 3.5		

mation on their total labour costs, there was a general consensus among them that it was their most outstanding expenditure. Without specific data on incomes, the impact of labour expenditure on farmers' households cannot be ascertained. However, its significance is such that farmers are sometimes forced to "trust" labour until their crops are sold.

Informal Labour Input

Informal labour arrangements were used by 32 (48.5 percent) farmers in this group; a proportion comparable the norm, but over seven percent lower than the preceding category of domestic-food producers. In light of the relationship between farmers' age and their use of informal labour (supra p.222), a somewhat

higher reliance was expected for this group. This deviation from the expected is attributed to two factors. The first is the lower proportion of young farmers in this group compared with vegetable and legume farming, and the second relates to the arduous nature of domestic provision farming, especially with respect to yam cultivation which requires that mounds are created to a height of 60 centimetres and may have a diameter of 1.0 metre. Given the predominance of clay soils (Figure 4.5) and the basic tools employed, i.e. garden forks and hoes, the construction of hundreds of mounds is a formidable task. Labourers are reluctant to undertake this task informally, unless close friends or relatives are involved.

AGROPHYSICAL CHARACTERISTICS AND AGRONOMIC METHODS

Farm Size

Having a mean size of 1.9 hectares, the holdings of domestic provision farmers were on average 0.4 hectare (13.0 percent) smaller than the norm. Although this difference seems small, it can represent an important quantity of land on small farms and might be the basis for variations in land-use decision-making between one farmer and the next. In this regard, it was not uncommon for fragments as small as 0.1 hectare to be accessed in order to expand a farm.

The modal farm-size category was less than 2.0 hectares, accounting for 60.6 percent of the farms (Table 11.8). Unlike the previous group, the relationship

between farm size and age was not evident, because crosstabulation of these two

Size Category (ha.)	Number	Percentage
< 2.0	40	60.6
2.0 - 3.0	14	21.2
> 3.0	12	18.2
Total	66	100.0
Mean Size = 1.9 ha.		

variables resulted in a χ^2 value of 1.6, which has a significance of only 0.25.

Farm Fragmentation

A total of 142 fragments with an aggregate area of 122.6 hectares was recorded for this group. Thus, each farm consisted of 2.1 fragments, with a mean size of 0.86 hectare. While this level of fragmentation differed only marginally from the norm (Table 11.9), the mean size of these fragments was about 18 percent smaller. Similar to vegetable and legume farming, the number and size of fragments comprising these farms is explained by the age and land-accumulation relationships discussed earlier. Although occupying a parallel stage of the continuum with the previous group, individual ownership of land through purchase and inheritance has become more entrenched in this group because of their higher average age.

Fragment size and distance relationship within this group conformed to the norm, in that the size of fragments generally increased with distance from the houseplot.

TABLE 11.9
DOMESTIC PROVISION FARMERS: PLOT SIZE, DISTANCE AND PERIOD OF OCCUPANCY RELATIONSHIP

Ranked Fragment Distance	Number	Mean Size (ha.)	Mean Distance (km.)	Mean Period of Occupancy (yrs.)
F1 (house plot)	66	0.81	0.0	18.0
F2	47	1.00	1.8	19.0
F3	25	0.92	2.5	13.0
F4	4	-	-	-

Mean = 2.1 fragments

Note: F4 sample too small for analysis

These fragments were occupied for an average of 17.8 years, or 2.1 years longer than normal. This length of occupation of fragments seems anomalous, given that these farmers are younger than the norm. Its explanation relates to the fact that mean age of farmers in the older than 55 years age category was higher than that of the sample. Thus, as a sub-group, they occupied their fragments for a longer period, thereby weighing the group mean in a positive direction.

Land Tenure and Use

The distribution of fragments by tenure was similar to the norm (Table 11.10). Nearly 79 percent of total farmland in this category was either individually or jointly owned as family land. This proportion is evidence that these farmers have

attained greater stability than vegetable and legume farmers and as such, land is

TABLE 11.10
DOMESTIC PROVISION FARMERS: LAND TENURE AND USE
FRAGMENTS

Tenure	F1	F2	F3	F4	Total
No. of fragments					
Owned	44.0	34.0	11.0	0.0	89.0 (62.7)
Family	13.0	2.0	3.0	2.0	20.0 (14.4)
Rented	9.0	9.0	11.0	2.0	31.0 (21.8)
Leased	0.0	1.0	0.0	0.0	1.0 (0.7)
Caretake	0.0	1.0	0.0	0.0	1.0 (0.7)
Total	66.0	47.0	25.0	4.0	142.0 (100.0)
Area (ha.)					
Owned	39.2	34.4	7.9	0.0	81.5 (66.5)
Family	9.4	1.4	3.6	1.0	15.4 (12.6)
Rented	3.8	8.1	10.4	1.4	23.7 (19.3)
Leased	0.0	1.0	0.0	0.0	1.0 (0.8)
Caretake	0.0	1.0	0.0	0.0	1.0 (0.8)
Total	52.4	45.9	21.9	2.4	122.6 (100.0)
Land Use					
Area (ha.) in:					
Export crops	21.7	14.7	9.3	1.2	46.9 (38.3)
Domestic crops	17.1	15.5	2.3	0.4	35.3 (28.8)
Pasture	2.9	3.7	3.4	0.0	10.0 (8.1)
Ruinat	10.7	12.0	6.9	0.8	30.4 (24.8)
Total	52.4	45.9	21.9	2.4	122.6 (100.0)

Note: values in parentheses denote percentages

is more likely to be further accumulated than divested.

It is paradoxical that even though these farmers are classified as domestic producers, they allocate 9.5 percent more of their farmland to export than domestic uses (Table 11.10). Two factors might explain this inconsistency. The first relates to possible overestimation of the area in export crops, given the difficulties associated with calculating such values in systems of intercropping

(supra p.166). The second and more plausible explanation is that farmers actually devote a larger portion of their holdings to an arable use which does not necessarily coincide with their main income-generating activity, i.e. the basis of the classification. The rationale for such a strategy is linked to spatial differences in land-use capability on farmers' holdings. The export crops which are cultivated are primarily tree crops, such as coffee, cacao, and pimento, which can be cultivated on more marginal lands than can domestic provisions, but may generate less income at this stage of the farm development, owing to the immaturity of some plants. Also, in accordance with the onset of stability and an increased commitment to farming, some older farmers, particularly those over 55 years, have invested in tree crops as their old-age pension package. These crops have not yet attained the peak of their income-generation capacity, but in time they will exceed domestic provisions in their importance to farm income. This reasoning is supported by the explanation of one farmer, who claimed that although his land is most suited to root crops, such as yam and sweet potato, export tree-crops, such as coffee, pimento and cacao, can also be grown. Currently he emphasizes domestic provisions because he has the strength to make a living from them. Nevertheless, he has planted coffee and pimento on steeper, more marginal areas, because "dem do'nt take much from the soil, dem stop bruk-way (soil erosion) and I can live off dem when mi too old fi jook fork (plant root crops)".

The proportion of farmland in pasture was 5.6 percent lower than the norm, and is attributed to the lower occurrence of grazing animals. With an average of 2.05 grazing stock per farm, there was 28.6 percent less animals than in the sample. That the proportion of farmland in ruinate was 24.8 percent, suggests a lower efficiency in land use than vegetable and legume farmers. This proportion is, nevertheless, similar to the norm and, likewise, raises questions about the effectiveness of land use.

Agronomic Practices

As yams are the dominant cash-crop they are the focus of the discussions relating to agronomic practices. A brief discussion of rice farming is also included, because even though this crop was cultivated on only three farms, the uniqueness of related agronomic techniques warrants discussion. On the other hand, more frequently occurring food forests are excluded, because many of the plants are due to spontaneous growth, and being perennials they require little tending.

Crop Distribution

Table 11.11 shows the range of crops cultivated by domestic provision farmers. Ground provisions are the mainstay of the category and yams are the most significant crop, not only in relation to their occurrence, but also with respect to their income-earning ability for the group.

TABLE 11.11
DOMESTIC PROVISION FARMERS: CROP DISTRIBUTION

Crops	Occurrence on Farms	Percentage of All Farms
Ground Provisions		
Yams	60	90.9
Sweet Potato	50	75.8
Dasheen	36	54.5
Coco (coco yam)	18	27.3
Cassava	15	22.7
Irish potato	14	21.2
Badoo	14	21.2
Cereals		
Corn	33	50.0
Rice	3	4.5
Condiments/Spices		
Ginger	15	22.7
Hot Pepper	10	15.2
Thyme	7	10.6
Annatto	6	9.1
Eskellion	4	6.1
Food Forest		
Banana	48	72.7
Breadfruit	45	68.2
Ackee	31	46.9
Avocado	22	33.3
Plantain	21	31.8
Mango	18	27.3
Jackfruit	11	16.7
Soursop	9	13.6
Coconuts	9	13.9
Roseapple	7	10.6
Starapple	7	10.6
Cashew	5	7.6
Sweetsop	5	7.6
Naseberry (Sapodilla)	4	6.1
June Plum	4	6.1
Guinep	2	3.0
Guava	2	3.0

Cultivation Practices

The tools employed by these farmers are similar to those used by most other

categories. Land preparation for the cultivation of ground provision commences about one month prior to the start of the May rainy season. Normally, the entire area to be cultivated is "forked" in order to break up the soil aggregates of the predominantly clay soils. This is followed by the construction of yam mounds (yam hills). Making yam hills is the most significant aspect of the land preparation activities, not only because of the cost involved (infra p.276), but also because the specificity of their dimension, particularly with respect to depth and height, must be adhered to, and all stones and root fragments removed. If the hills are too shallow, direct sunlight will reach the tubers causing them to photosynthesize, and leading to an accumulation of "sugar" (glucose). When this happens, the texture of the tuber is coarse and unpalatable and is described by farmers as being "chow-chow". If root and stones are left in the mound, they will be engulfed by the expanding tuber causing decay from within. Mounds are aligned in rows separated by a network of furrows and trenches to allow adequate drainage. At the start of the rains, the propagative portions of the tuber (yam head) are transferred from "the ole grung", i.e. a previously cultivated field, where they had been left to "swell" and sprout. Yam heads are divided or "junked", and planted in the new mounds. Other ground provisions, such as sweet potato and dasheen, are interplanted with yams because their leaves provide shade for the yam mounds. The sprouting vines are later tended around wooden stakes. Next to the cost of hiring labour to construct yam hills, the purchase of these stakes is the most costly aspect of yam farming, as the stakes are priced

according to quality of the wood. Although the most expensive, bamboo is most sought after, because it is usually re-usable for two or more cropping cycles.

Ground provision cultivation is entirely rainfed, so that the cultivation cycle is determined by the annual pattern of rainfall (Figure 11.2). Although farmers rarely cultivate the same site in consecutive years, true bush fallowing does not exist, because the usual three years "rest" period between cultivation of a site, does not allow for natural regeneration of soil nutrients.

Rice cultivation is very different from the practices used in cultivating ground provisions. The three rice farms were situated on the lower flood plains of the Rio Minho River (Figure 4.3) in southern Clarendon. Paddies are prepared prior to the commencement of the September-October rainy season. Land preparation involves the establishment of nurseries and construction of mud and straw embankments around the area to be planted. At the start of the rains in late August or early September makeshift floodgates built into the embankments are opened to allow flood-water from the river onto the paddies. The purpose of flooding is two fold, in that it provides abundant moisture for the transplanted rice or "biya", as well as eliminates the need for chemical fertilizers, because of the nutrient-rich alluvium which is deposited on the paddy. Water levels in the paddy are constantly monitored and controlled by means of the floodgates. Rice

**FIGURE 11.2
DOMESTIC PROVISION FARMERS: RELATIONSHIP BETWEEN RAINFALL
PATTERN AND CULTIVATION CYCLE**

Months	Rainfall Status	Cultivation Cycle	Crops
January	Dry	Harvesting/Land Preparation	Ground Provisions
February			
March			
April	Wet	Planting	Ground Provisions
May			
June	Dry	Weeding/Tending	Corn
July		Planting	
August		Weeding/Tending	
September	Wet	Weeding/Tending	Corn
October			
November	Dry	Harvesting	Corn, Ground Provisions
December			

was cultivated primarily for household consumption, but surplus was sold during festive seasons, such as at Christmas. As rice has a long storage life, it was stored in wattle and daub sheds called "bakaar" for use throughout the year.

Use of Agrochemicals and Manure

Pesticide use was virtually absent from this type of farming. However, chemical fertilizers were used by all but eight farmers. The most commonly used brand was called Allpurpose, with an N-P-K ratio of 12-8-14. Five farmers, all over 55 years, practiced selective fertilizing of their crops. Crops which were intended for household consumption were not fertilized, because "fertilizer is not good for the body". In addition, farmers believe that fertilizer "forces" crops to mature, thereby reducing their storage life. Like vegetable and legume farmers, this category rarely used farmyard manure, because of related problems of insect pests.

INFRASTRUCTURAL CHARACTERISTICS

Marketing

Domestic-provision farmers utilized a variety of options in the marketing of their crops but like the sample, higglers and personal appearances at local markets were the most frequently utilized (Table 11.12). Although the prices obtained from higglers were lower than when farmers took their produce to market, they sold to higglers because this option was less risky and less costly.

TABLE 11.12
DOMESTIC PROVISION FARMERS: MARKET OPTIONS FOR DOMESTIC CROPS

Marketing Option	Number	Percentage	Mean Price of Yam J\$ per kg
Higglers	58	87.9	4.00
Local Markets	25	37.9	7.00
Private Exporters	8	12.1	15.00
Local Cooperative	5	7.6	na
Urban Markets	2	3.0	11.00
Others	2	3.0	5.00
na = not applicable			

Private exporters, as a means of surplus disposal, were rarely used, because collections are irregular, the quantity bought is small and the quality specifications are high. For instance, farmers complained that private exporters refused to buy yams that "have foot", i.e. yams which are not straight, so as to facilitate packaging. Farmers considered this to be unreasonable, because they "cannot tell nature how to shape a yam". However, two farmers who were "trying out" mini-sett technology (supra p.133), reported they were producing straighter, but smaller yams, which is a type favoured by exporters. Herein lies a potential conflict between economic rationality and a cultural nuance, because in a culture where the size of a yam implies physical qualities of the farmer (supra p.257), the successful transfer of mini-sett technology is jeopardized. However, experimentation with mini-sett by some farmers in the sample, and the increasing acceptance of this technology by farmers elsewhere in Jamaica

(Meikle, 1993:20), suggests that economic rationality is likely to prevail.

The local cooperative option is specifically concerned with the marketing of Irish potatoes through The Christiana Potato Growers' Cooperative. There was an overwhelming preference among these farmers for government-organized marketing strategies for domestic crops. Many bemoaned the loss of the AMC as a marketing option for domestic crops because that agency allowed farmers a regular and guaranteed source of income.

Farm Assistance

Provision of agricultural assistance to this group was lower than for any other. Only 13 (19.7 percent) had ever received help from official sources, nine of whom received farm loans from the People's Cooperative Bank. The remaining four received support in the form of fertilizers and seedlings from the Citrus Growers and All-Island Cane Farmers' Associations. Loans were used primarily to increase production of domestic provisions, particularly yellow yam and sweet potato. This low incidence of farm assistance is likely the result of an aversion to farm loans, associated with their production emphasis. Generally, these farmers perceive domestic-provision farming as being "too uncertain" to risk taking farm loans. This uncertainty stems from inadequate facilities for, and lack of coordination in, the marketing of domestic crops. In this regard, non-recipients of loans felt that they would be more inclined to use such facilities for

the production of export crops as those represent "sure money".

Support Organizations

The proportion of farmers in this category who had membership in support organizations, compared favourably with the sample norm, in that 43.9 percent belonged to one or more organizations (Table 11.13). This proportion was nearly

Organization	Number	Percentage
N = 29		
Jamaica Agricultural Society	15	51.7
People's Cooperative Bank	9	31.0
All Island Cane Farmers' Association	8	27.6
Citrus Growers' Association	1	3.4
Christiana Potato Growers' Cooperative	7	24.1
Note: Membership in organization is not mutually exclusive.		

twice that of vegetable and legume farmers and reinforces the argument of greater enthusiasm towards farming as a way of life, at this stage of the progression. As usual, the JAS evoked the most dissatisfaction even though it had the highest membership. Membership in this organization was most common among older farmers, i.e. age > 55 years, who seemed to have continued their association with the JAS out of mere sentiment; in memory of a past when this organization was vibrant, committed and, in essence, the sentinel of small farmers' interests

and needs. The nine domestic-provision farmers who had People's Cooperative Bank shares, were all over 60 years, but none of them had received dividends during the past 20 years. Although four of them had applied, none was able to secure a loan in the past 11 years. Similar to the sample, members of the Christiana Potato Growers' Cooperative felt positive about the institution, although two farmers were of the opinion that it was being taken over by "big man", who they perceived as having no interest in the needs of the average farmer.

CASE STUDY

Personal History

Dudley is 49 years old and was brought up in the community of Ralph Mountain where he still resides. Being a participant in the overseas farmworkers' programme, he travels once per year to North America. Consequently, he had an outside opportunity for social and economic advancement. In addition to farming and overseas farm work, Dudley owns a shop which he was able to set up with money earned overseas and which is run by his spouse. His formal education consists of seven discontinuous years at primary school where he attained the 5th grade. He explained that the discontinuity in his schooling resulted because his parents could not afford to send all their nine children to school on a continuous basis, and also because he was required to assist his father

on the farm. In spite of his low level of schooling, Dudley reads and writes reasonably well.

During his youth, Dudley wanted to become a mechanic and even "went to trade" for a few months when he was 15 years old. However, the grease and dirt of this trade did not agree with him so he returned home to farm. He explained that being already a grandfather he will "stick with" farming, especially since in conjunction with his shop and overseas employment, he is able to live reasonably well. He plans to expand his farm and "business" in order to ensure the continuation of this level of living when he is too old to "get a card" for overseas employment. In this regard, he contemplates buying "a piece more land" to establish in coffee and sugar cane, because these crops have "better prices on them" than ground provisions, and are more manageable once they reach maturity. In the mid-1980s, Dudley attempted to expand his yam operation by entering into partnership with his brother in England. The plan was for him to make monthly shipments of yams to his brother, who would be the distributing agent. After the fourth shipment they would have accumulated enough money for his brother to send him a truck to be used in transporting yams to the port. Three shipments were made, but the third was confiscated by British authorities because marijuana was found in it. His brother was sent to prison, thereby ending that partnership.

Dudley occupies a five-room house with his wife of 20 years, their five children ranged in age from eight to 20 years, with a two-year old grandson belonging to a teenage daughter. As a shopkeeper, he is a source of credit for many residents, hence Dudley commands respect in his community. His family's status is further enhanced by the active involvement of his wife in a church.

Farming Activities

Dudley rises at about 5:30 a.m., except on Sundays. He normally begins his day's chores by "letting go the cow-calf" which is penned overnight, and allows it to suckle before he milks the cow. Although Dudley's houseplot is the smallest of his fragments, and contains little pasture, the cow and calf are always brought home in the evenings in order to prevent them from being stolen. After the cow is milked, his 12-year old son takes the animals to graze on a larger fragment of 1.2 hectares situated about 1.6 kilometres from the farm house. Dudley opens the shop at 7:00 a.m. to allow "people to buy things for their tea". In the meantime, his wife prepares breakfast and the children prepare for school. After the children are dispatched, he closes the shop around 9:00 a.m. and prepares the donkey for his wife to ride to an adjoining district about 4.8 kilometres away, where they own a fragment of 0.6 hectare and on which they cultivate vegetables. He then departs to the "grung" situated on the 1.2 hectares fragment, leaving his daughter to take care of his grandson and to do house chores.

During the busiest period of the cropping cycle when land is being prepared for yams, Dudley usually works from 10:00 a.m. to 4:00 p.m. with a short break for lunch at about 1:00 p.m. In less demanding periods, such as during weeding and "sticking" of yams, his work-day ends at 2:30 p.m. When working alone he takes his lunch to the field, but if he is "working men", i.e. employing wage labour, he "runs a boat", i.e. cooks lunch in the field. Between three and four labourers are employed for about one week of the cropping cycle. At six hours per day per man, and a wage rate of between J\$160-J\$180 per day, wage labour contributes between 126-168 man-hours over a one-week period at a cost of between J\$3,570-J\$4,410. These figures are substantially increased when he goes overseas, because his personal labour input is replaced by hired hands. He never uses informal arrangements, because he lacks the time to reciprocate labour. Moreover, he might "get a call" and be away on farm work at any time. When the day's work is completed in the field, he returns home to reopen the shop to "allow people to buy things for dinner". If his wife is late returning home, then his daughters will prepare supper, and later his son will bring the animals home for the night. Dudley remains in the shop until around 10:30 p.m., but later on Fridays and Saturdays, doing business and socializing with friends.

Agrophysical Resource

Dudley's farm consists of three fragments totalling 2.2 hectares. His houseplot, which is 0.4 hectare in size, was inherited from his father. The largest plot (1.2

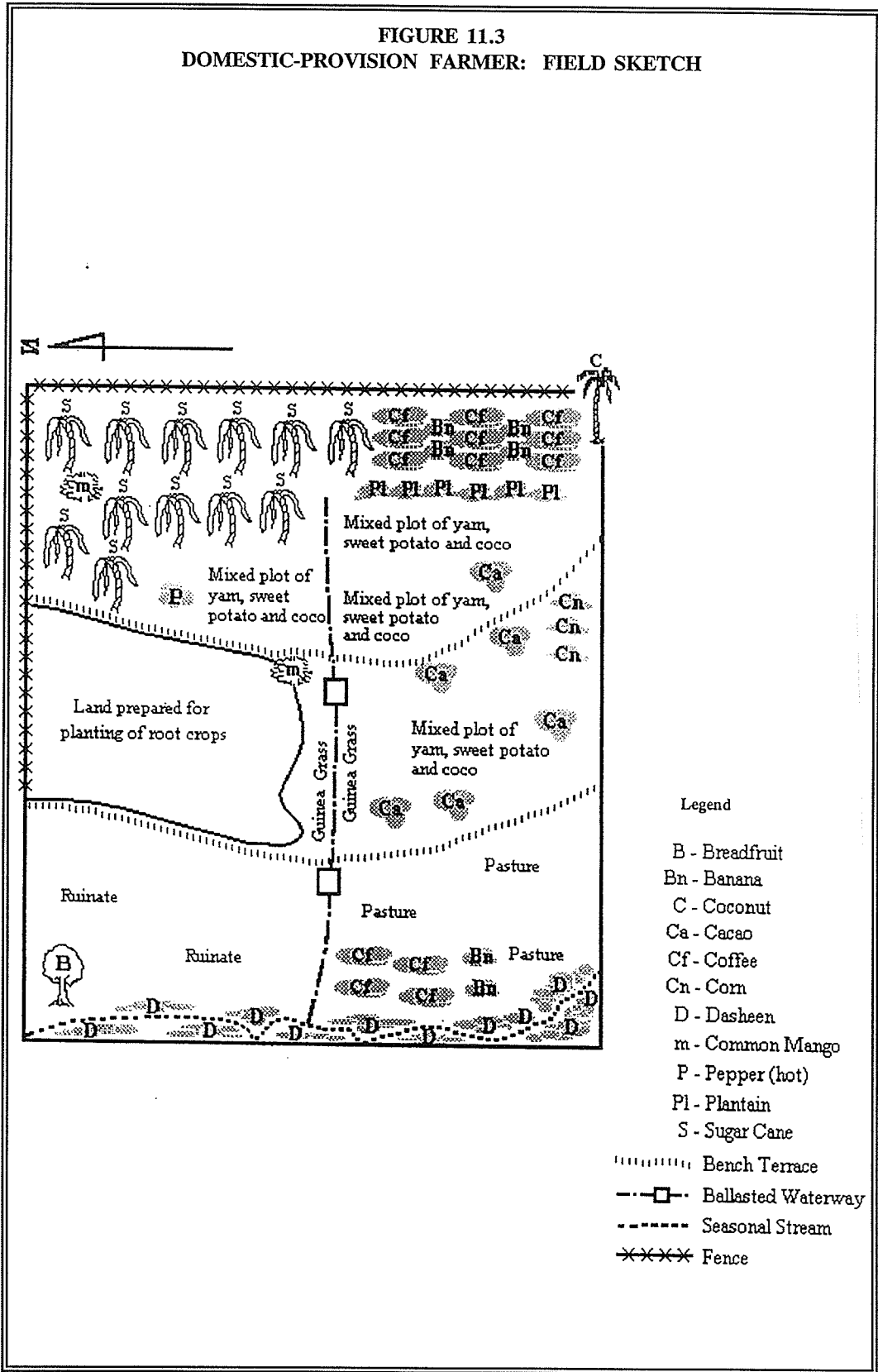
hectares) was purchased 22 years before with money from his first trip overseas. The third plot (0.6 hectare in size) was his latest acquisition.

Land Use

Although ground provisions generate the most income, a variety of other crops are grown. Sugar cane runs a close second to ground provisions in terms of income generation. If plans to expand sugar cane and coffee production come to fruition, then his production emphasis would shift from domestic to export crops. Although vegetables are grown on one of his plots, he is contemplating replacing it with sugar cane or citrus, because he considers vegetable farming to be too time-consuming and too vulnerable to praedial larceny. Except for a small kitchen garden tended to by his wife, there is little active cultivation on his houseplot, although food trees, such as breadfruit, jackfruit and banana, abound. Lower-layered crops, such as coffee, cacao, dasheen, herbs and spices, grow below these food trees, resulting in a typical food-forest configuration.

The rationale for the spatial distribution of crops of his 1.2 hectare fragment (Figure 11.3), is a function of physical factors such as slope angle and soil moisture considerations, as well as human factors such as susceptibility to

FIGURE 11.3
DOMESTIC-PROVISION FARMER: FIELD SKETCH



praedial larceny. Sugar cane and coffee interplanted with banana, border the track, because these crops are less susceptible to praedial larceny than ground provisions. Dudley explained that, "nobody nah thief coffee because it tek too long fi pick, and if dem cut one or two cane it wo'nt kill me because they will grow back. But when dem dig one hill of yam, its hundreds of dollars" in terms of input cost and potential income. Therefore, ground provisions consisting of yams interplanted with sweet potato, coco and corn are located on the terraced, well-drained portion of the fragment, where they are shielded from view of the track by coffee and sugar cane, and from the adjoining property by ruinate and rows of corn. Dasheen is planted at the bottom of the slope close to the stream because of its ability to tolerate high levels of soil moisture. Pasture is located below the terraces so as to prevent animals from trampling and destroying them, as well as allowing the animals easy access to water from the stream.

The bench terraces and ballasted waterway on this fragment were constructed in 1979, under the Integrated Rural Development Programme (supra p.68), but unlike many farmers who received these soil-conservation treatments, Dudley has maintained his, because he found them useful in protecting his land from soil erosion. Significant disparity between actual and preferred land use was evident for this farmer. If all the assistance he requires to improve his farm were available, then his preferred land use would emphasize export rather than domestic crops. Specifically, he would expand sugar-cane and coffee production

and introduce citrus orchards. He prefers such land use because there are better marketing arrangements for these crops and they would be more manageable than ground provisions when his physical strength and stamina begin to fail. His least preferred land use is domestic provisions, highlighting a major problem of improving domestic-food security in Jamaica.

Infrastructural Resource

Dudley utilized a variety of options in the marketing of domestic provisions. About 40 percent of his crops was sold to higglers, but he and his wife took produce to the local market at Kellits every Saturday. In addition to ground provisions and sometimes vegetables, dry goods and pickled fish from his shop are taken along to be sold in the market. In this way, sales are not lost when the shop is closed for most of the day on Saturdays. However, if crops are "in flush" he and his wife may travel to the Coronation Market in Kingston, using the opportunity to purchase stock for the shop. On occasions, Dudley took crops to Ocho Rios, a resort town on the northern coast of Jamaica, where he "wholesales" to street higglers.

Throughout his career, Dudley has received various types of assistance for his farm. For instance, in 1979 he received soil conservation treatments through the IRDP. In February 1980 he was given coffee seedlings, and in September of the same year he received chicken manure for coffee and banana, from the same

project. In 1981 he received a loan from the local People's Cooperative Bank, to plant sugar cane and in 1984, received a home improvement loan, also from that institution. The fact that none of this assistance related to domestic provisions, underlines the low priority accorded to these crops by providers of farm assistance. Dudley is not adverse to using his land as collateral for farm loans, because if the venture for which he receives the loan fails, he is confident that he can generate enough "backitive" to repay.

Factors Influencing Decision-Marking

The factors which influence Dudley's decision-making are no different from those in Linval's case (supra p.246). However, the specific nature of interaction between factors differ. As with any type of low technology farming, the agrophysical capability of his land is the foundation of his crop emphasis, within the range of land-use options available to him. However, his utilization of one option as opposed to another is not always due to preference, but is often dictated by his age and, therefore, the stage he is at on the age-land accumulation continuum. In other words, his current emphasis of ground provisions is not merely a result of his comparative ability to undertake the arduous tasks associated with cultivating these crops, but also because he perceives further land acquisition as a prerequisite for promoting export-crop production. Thus, even though an export-crop emphasis is his most preferred land-use option, the dictates

of time will determine his degree of land acquisition and, therefore, the age at which he realizes this preference.

Dudley's agriculture decisions were also influenced by his exposure to infrastructural factors. He is actively involved in the JAS, the People's Cooperative Bank and the All-Island Cane Farmers' Association. For example, his experience with the IRDP in relation to soil conservation has influenced his soil-management decisions, as well as his spatial pattern of land use. His cropping cycle is influenced by the annual pattern of rainfall, but the fine-tuning of this cycle is achieved through the use of a MacDonald's Almanac which he buys from the JAS. The precise influence of his spouse on decision-making is apparent, in that their partnership is evident in every aspect of their farming.

SUMMARY

Domestic-provision farmers in most respects, represent the average small farmer because of the close coincidence between values of their agro-variables and those of the sample. Although similar to vegetable and legume farmers with respect to their market orientation of production, they are at a stage on the farming continuum where most have embarked on a commitment to small farming as a way of life. However, within the ambits of land capability, their specific crop emphasis is delicately balanced between further entrenchment of domestic land uses and the emergence of export-oriented uses. Where land capabilities allow

for export-crop options, the balance is likely to be tipped in that direction under the influence of age. For this reason, and unlike vegetable and legume farmers, they have already devoted a large proportion of their land to export uses, in anticipation of this transition.

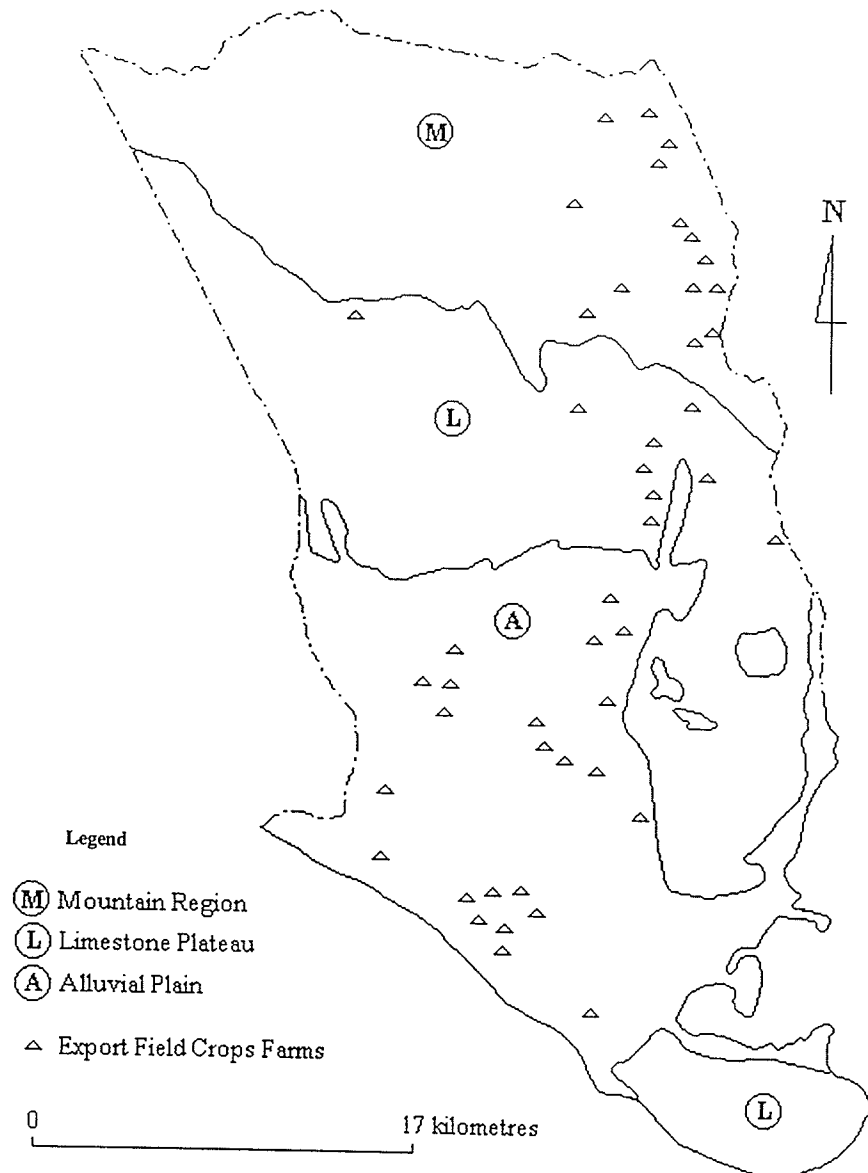
CHAPTER 12

TRADITIONAL EXPORT FIELD-CROP FARMING

Traditional export field-crop farming is a first of the three parallel export-oriented categories of farming on the progression. In this regard, it marks the beginning of a transition in crop emphasis from a domestic to an export option. As such, the farmers are the youngest of the export-oriented categories, but older than either of the domestic groups. Besides its unique placement on the continuum, export field-crop farming is distinguished from other categories by its spatial distribution. This is the only type of farming which is equally distributed between the Alluvial Plains and the upland physiographic regions (Figure 12.1). The concentration of these farms in the eastern portion of the upland regions coincides with the location of interior valleys, some of which are associated with karstification of limestone, while others are formed where the Rio Minho and distributaries cut through these upland landscapes.

The cultivation of sugar cane and, to a lesser extent tobacco, defines the production emphasis of this type of farming. Physiographic and agro-climatic factors such as topography, moderate rainfall and finely-textured alluvium, provide ideal conditions for sugar cane and tobacco cultivation on the Alluvial Plains and interior valleys of the upland regions. The soil-moisture requirements of tobacco are generally greater than those for sugar cane and, therefore, tobacco

FIGURE 12.1
TRADITIONAL EXPORT FIELD-CROP FARMS: DISTRIBUTION BY
PHYSIOGRAPHIC REGIONS



fields are located closer to the Rio Minho River system, where rainfall can be supplemented by simple irrigation. Besides these physiographic considerations, the location of farms is influenced by agro-economic factors, such as the presence of large tobacco plantations owned by the Cigarette Company of Jamaica, and sugar processing factories at Monymusk and Bernard Lodge. In addition to being principal markets for tobacco and sugar cane, both the cigarette company and sugar factories provide infrastructural support to the region's farmers by supplying specialized extension services.

Of the 46 farms in this category, 23 (50 percent) were situated on the Alluvial Plains. That 23 (69.7 percent) of the 33 farms sampled on the Alluvial Plains emphasized traditional export field-crops, reiterates the strong influence of physiography on this type of farming.

HUMAN RESOURCE CHARACTERISTICS

Characteristics of Farmers

Age distribution within this group mirrors the sample (Table 12.1), with nearly 46 percent older than 55 years. While slightly larger than the domestic categories, the standard deviation for this group reflects a wide intra-group range of ages. Only eight farmers in this group were female, a number which is too

small to be the basis of valid statistical inferences. Levels of educational attain-

Age Category	Number	Percentage
< 40 years	10	21.7
40 - 55 years	15	32.6
> 55 years	21	45.7
Total	46	100.0
Mean Age = 51.3 years		
Standard Deviation = ±13.5 years		

ment mirrored the sample with the majority reaching only the primary level (Table 12.2). Those with vocational training were all males under 40 years of

Level of Education	Number	Percentage
Primary	35	82.6
Vocational	4	8.7
Secondary	3	6.5
No formal education	1	2.2
Total	46	100.0

age and had been trained in carpentry or plumbing at a vocational school in the neighbouring parish of Manchester.

Off-farm employment, mainly as seasonal casual labourers was a source of additional income for 50 percent of these farmers. This proportion was 10.5 percent lower than the norm and nearly 20 percent lower than any of the domestic categories. This difference lends further credibility to the thesis of an age-influenced continuum. In this regard, it would be expected that being older, these farmers have a lower propensity to work off-farm than younger groups and perhaps less chance of being employed elsewhere. Seven of them were regularly employed, two of whom were shopkeepers, and the others including a tractor driver, a sugar-boiler, a mason, a mail carrier and a pre-trained primary school teacher. In addition, 12 (26.1 percent) farmers had spent between two and eight years in overseas employment, mainly as farmworkers in North America. At the time of survey eight of them, all under 50 years old, still participated in this programme.

That the most common marital status was legal marriage (Table 12.3), suggests

Marital Status	Number	Percentage
Married	25	54.3
Common Law	10	21.7
Single	5	10.9
Widowed	3	5.5
Divorced/Separated	3	5.5
Total	46	100.0

a greater level of stability existed in this than the domestic farming systems

situated earlier on the progression.

Characteristics of Households

With an average of 5.2 persons, these households were 10.6 percent larger than the sample mean. However, unlike those of the domestic categories they were comprised primarily of fit adults consisting of grown children and their parents (Table 12.4). As a result, their dependency ratio being 1:1.8, was 33.3 percent

TABLE 12.4
TRADITIONAL EXPORT FIELD-CROP FARMERS: AGE-SEX
COMPOSITION OF HOUSEHOLDS

Age-Sex Category	Number	Percentage
Fit Females > 15 years	79	33.2
Males > 15 years	74	31.1
Males < 15 years	44	18.5
Females < 15 years	35	14.7
Unfit Adults	6	2.5
Total	238	100.0

lower than the domestic categories and 20 percent below the norm. This level of dependency results because many of the children of farmers at this stage of the progression are adults and therefore are no longer dependent, even though they reside in the parental household. However, they are sufficiently young as to contribute only a small number of potentially dependent grandchildren to the household of their parents.

Farm Labour Input

Labour Input of Household Head

On average, traditional export field-crop farmers worked on their land for 27.5 hours per five-day week, or about one hour less than the norm. This lower than normal labour input reflects the seasonality of labour demand, particularly in sugar-cane cultivation. Because sugar cane is ratooned, maximum labour demand occurs mainly during harvesting between December and March, with minimal tending of the crop during its growth. Therefore, labour input per cultivated hectare per five-day week, averaged 14.5 hours or 3.1 hours less than the sample.

The labour input per hectare of cultivated land of the household head is a main distinguishing factor between export field crop and the domestic categories of small farming. While weekly labour input per household head was only 2.6 hours less than the domestic categories, input per hectare was over eight hours less, attesting to the less labour-intensive nature of sugar-cane cultivation.

Household Labour Input

The labour contribution made by households to the operation of these farms is summarized in Table 12.5. Despite seasonality in labour demand the amount of person-hours contributed per household per week was 14.4 hours or 28.9 percent more than that of the sample, reflecting a larger proportion of potential labour

contributors by way of fit adults. These values are in synchrony with this stage

	Mean Labour Input Per 5-day Week (hrs.)	Mean Labour Input per cultivated ha. Per 5-day Week (hrs.)
Per household	64.3	33.8
Per household head	27.5	14.5
Per fit adult	19.3	10.2

of the continuum because, compared with the domestic categories where potential labour contribution of other household members is lower due to the preponderance of young children, the labour contribution of these households was 14.3 hours more.

Like other categories of farming, division of labour by gender was manifest within this group. In the case of sugar cane, the forking of fields, planting of new crop, removal of excess trash from maturing plants, and harvesting, are men's work. Women on the other hand, are more active in the "dropping of cane tops", fertilizing and weeding of canefields. On tobacco farms, men till the fields, prepare nurseries, irrigate and harvest crops. However, because transplanting tobacco seedlings is considered a delicate operation, it is undertaken by women. They also weed fields, assist with harvesting and the initial drying

of tobacco leaves. Children perform their universal role of carrying out light tasks which supplement adult chores.

Wage Labour Input

Although the occurrence of wage labour among this group of farmers was marginally (4.9 percent) higher than the norm, the mean number of hired labourers per season was 32.4 percent higher, being 4.5. Labour was hired seasonally (Table 12.6), particularly during the harvesting of sugar cane, because

Wage Labour	Number	Percentage
Use of Hired Labour	43	93.5
Seasonal	34	79.1
Intermittent	7	16.3
Regular	2	6.9
Mean Hired Labour = 4.5		

the crop should be reaped quickly while its sucrose content is at its peak. During the early stages of sugar-cane growth, female labourers were sometimes hired to fertilize and weed. Traditional export field-crop farming was nearly 11 percent more dependent on wage labour than the domestic categories in spite of higher household input and lower intensity of cultivation. In addition, the occurrence of informal arrangements was nearly 13 percent higher. Higher overall use of labour among these farmers also results from the larger size of their farms.

Informal Labour Arrangements

A variety of informal labour arrangements were utilized in the operation of these farms (Table 12.7), with their occurrence being 15.7 percent above the norm.

TABLE 12.7
TRADITIONAL EXPORT FIELD-CROP FARMERS: INFORMAL
LABOUR USAGE

Type of Arrangement	Number	Percentage
Informal Labour Use	31	67.4
Day-for-Day	27	87.1
Partner	13	41.9
Morning Sport	5	15.2
Evening Sport	2	6.5
Digging	1	3.2

The specific character of some arrangements is unique to sugar-cane cultivation. For instance, among farmers located in the Mountain and Limestone Plateau Regions, where comparatively steep terrain makes those farms inaccessible to motor vehicle, harvested sugar cane is transported over steep slopes by animals, to locations where it can be loaded onto trucks. Because this activity is laborious, it is beyond the financial scope of most farmers to utilize wage labour.

Therefore, mules and donkeys belonging to other farmers in the community and managed mainly by teenage children, are commissioned for this exercise on a labour exchange basis. Informal arrangements are also utilized to prepare land

for planting sugar cane in some of these hillier locations, where ox-drawn ploughs are employed. The particular nature of this arrangement is further discussed in relation to the agronomic practices of these farmers. Day-for-day arrangements among this group were noticeably more flexible than was the norm, in that unlike the typical arrangements whereby reciprocity of labour has fixed time limits, its duration among these farmers is defined by the time required to complete a specific task, such as land preparation or harvesting of crop.

AGROPHYSICAL CHARACTERISTICS

Farm Size

Being 2.3 hectares, the mean size of farms in this group was 0.25 hectare larger than the norm. The distribution of farms by size categories (Table 12.8),

Size Category (ha.)	Number	Percentage
< 2.0	20	43.4
2.0 - 3.0	13	28.3
> 3.0	13	28.3
Total	46	100.0
Mean Size = 2.3 ha.		

mirrored the sample, but provides a sharp contrast with vegetable and legume and

domestic-provision farming, in that farms 2.0 hectares and over, dominated this group. This pattern of farm-size distribution reflects a higher level of land accumulation at this than previous stages of the farming continuum.

Farm Fragmentation

A total of 104 fragments amounting to 107.8 hectares was recorded among farmers in this group. Thus, each farm was comprised of an average of 2.3 fragments, whose mean size was 1.04 hectares. While the average size of fragments was comparable to the norm, the mean number of fragments per farm was 15 percent higher. Thus, fragmentation was about 21 percent higher in this than the domestic farming groups.

While no identifiable pattern of fragment size and distance relationship was observed, that between distance and period of occupancy conformed to the norm, in that the farthest fragments were the most recently acquired (Table 12.9). This

TABLE 12.9
TRADITIONAL EXPORT FIELD-CROP FARMERS: PLOTSIZE, DISTANCE AND PERIOD OF OCCUPANCY

Ranked Fragment Distance	Mean Size (ha.)	Mean Distance (km.)	Mean Period of Occupancy (yrs.)
F1	0.7	0.0	21.3
F2	1.4	1.1	16.8
F3	1.2	1.4	7.8
F4	0.4	1.5	4.0

pattern relates to the spatial process of land accumulation, whereby fragments are accumulated at increasing distance from houseplots, because lands which are contiguous to a farmhouse are often the houseplots of other farmers, and are therefore unlikely to be sold. Overall, fragments were located at an average distance of 1.3 kilometres from the farmhouse and were occupied for 17.5 years.

Land Tenure and Use

At 55.8 percent, the occurrence of individually-owned fragments among these farmers was 8.6 percent less than the sample (Table 12.10). More relevant however, is the fact that fragments with secure tenure accounted for only 53.0 percent of total farmland, or 18.6 percent less than normal. In light of the age-land accumulation thesis pursuant, this comparatively low proportion of farmland with secure tenure seems to be out of synchrony with this stage of the farming continuum. Its explanation relates to the incidence of leased land among these farmers in association with spatial factors pertaining to Project Land-Lease. The single Land-Lease Project encountered during this survey was located on the Alluvial Plains where one-half of the farms in this group occur. Consequently, 18 of the 19 Land-Lease fragments sampled, were associated with this category of farming. Although the Land-Lease projects have been obsolescent since 1981, participant farmers have continued to occupy project lands and at the time of survey, plans were underway to transfer legal ownership to occupants. In this

regard, tenure of these lands is considered by farmers to be secure, and as a result, they might have been less aggressive in their quest for further accumulation of land, especially since at a mean size of 2.02 hectares, leased

TABLE 12.10
TRADITIONAL EXPORT FIELD-CROP FARMERS:
LAND TENURE AND USE

Tenure	FRAGMENTS				Total
	F1	F2	F3	F4	
No. of fragments					
Owned	35.0	18.0	5.0	0.0	58.0 (55.8)
Family	8.0	2.0	0.0	0.0	10.0 (9.6)
Rented	0.0	9.0	6.0	2.0	17.0 (16.3)
Leased	2.0	11.0	5.0	0.0	18.0 (17.3)
Squat	1.0	0.0	0.0	0.0	1.0 (0.9)
Total	46.0	40.0	16.0	2.0	104.0 (100.0)
Area (ha.)					
Owned	19.2	23.9	5.5	0.0	48.6 (45.1)
Family	6.0	2.5	0.0	0.0	8.5 (7.9)
Rented	0.0	7.9	4.0	0.8	13.7 (12.7)
Leased	5.7	21.4	9.3	0.0	36.4 (33.8)
Squat	0.6	0.0	0.0	0.0	0.6 (0.5)
Total	30.6	57.6	18.8	0.8	107.8 (100.0)
Land Use					
Area (ha.) in:					
Export crops	16.1	23.9	6.4	0.0	46.4 (43.1)
Domestic crops	9.5	11.6	4.7	0.4	24.2 (22.4)
Pasture	0.5	10.2	3.8	0.0	14.6 (13.5)
Ruininate	10.7	12.0	6.9	0.4	22.6 (21.0)
Total	30.6	57.6	18.8	0.8	107.8 (100.0)

Note: values in parentheses denote percentages

fragments are more than twice the average fragment size and account for 33.8 percent of aggregate farm area.

This group of farmers allocated only 8.8 percent more of their total farm area to export crops than was the norm. Allocations to domestic crops, pasture and

ruinate were however marginally lower (Table 12.10). The small percentage difference in land allocated to export crops, between these farmers and the sample, represents an affirmation of the export-orientation thesis of small farming. That this group allocated 20 percent more land to export crops than had domestic-crop farmers, is a major distinction between them. Domestic land use primarily involved the cultivation of yam, cassava, sweet potato and food trees. There was an average of 3.4 grazing animals per farm, consisting mainly of goats which are better suited to the dry conditions of southern Clarendon. Although lower than the norm, or either of the two domestic categories, the proportion of farmland in ruinate is unexpectedly high, given the gentle terrain on which most of these farms are situated, as well as the fact that both sugar cane and tobacco require heavy application of chemical fertilizers. In the case of sugar cane, ratooning eliminates the need to rest land. The occurrence of ruinate relates to the domestic component of this type of farming, since land rotation involving these crops was a common practice.

Unlike other categories, neither praedial larceny nor topography are major considerations in inter-plot land use, for two reasons. Firstly, the crops they emphasize are not particularly vulnerable to praedial theft and, secondly, the dominant location is of fairly flat topography, except for some farms located on the riverine slopes and poljes of the upland regions.

Agronomic Methods

Crop Distribution

Forty-one (89.1 percent) of the farmers in this group grew sugar cane, while 15 (32.6 percent) cultivated tobacco on their farms.

Cultivation Practices

The cultivation practices of these farmers have seven components. These include: soil tillage and seed preparation; soil conservation and irrigation; planting; weeding and moulding; fertilizing; pest control and harvesting.

With regard to sugar-cane cultivation, soil tillage practices differed from the norm in that this was the only group in which human labour did not provide the main source of power. Although fragment sizes are similar to the overall sample, the gentle terrain allowed for the use of mechanical power in tilling land. Some farmers in southern Clarendon had collective arrangements with the Monymusk sugar estate to use its tractors for ploughing and harrowing their sugar-cane fields. Others had private arrangements with tractor operators for this service. A group of farmers in the Crofts Hill area of Clarendon operated a partnership in which they collectively owned and operated oxen and ploughs for cultivating steeper lands.

The propagative portion of sugar cane or cane tops are usually prepared from select specimens of the previous harvest and must be cut to a specific length to ensure a maximum number of "eyes" (sprouting points) over the shortest length, because each eye represents the stalk and root potential of the cane top. Prepared tops are usually "dropped" by women along the ridges of the harrowed fields, where they are planted vertically by men using crowbars. A more recent technology in sugar-cane cultivation involves the horizontal planting of entire stalks of young plants on the bottom of shallow furrows. The advantage of this method is that it allows farmers to burn their canefields in order to facilitate quick harvesting, while establishing small nurseries as a source of new plants. These nurseries were established on only three of the sampled farms, because most farmers were adverse to the burning of fields. Land preparation and replanting may occur once every 10 years, although five farmers had ratooned their fields in excess of 20 years.

In the case of newly planted fields, weeding and fertilizing, which is undertaken by women, occur between seven and eight weeks after planting. All farmers but one used chemical fertilizers on their cane fields. The most common was a brand called Salt (ammonium sulphate), and this was often supplied on credit by the processing factory. The tending of ratooned fields differs slightly from newly planted ones in that there is no weeding. Where fields are burnt before harvesting, a tractor is used to mulch the cane sprouts with ash and other organic

debris from the burn. If burning is not employed, then the sugar-cane stalks are "trashed" about four months before harvesting and debris moulded around the roots of plants. Fields are usually sprayed to prevent sugar-cane rust disease, a fungal infection to which the plants are susceptible.

Due to gentle gradients, soil erosion is not a major concern of sugar-cane farmers on the Alluvial Plains. Nevertheless, a network of trenches were used to control water movement and levels in the fields. In the Mountain Region where soil conservation concerns are greater, contour planting along with the dense foliage of sugar-cane leaves serves to reduce soil loss. In addition, a network of drains controls water velocity and discharge downslope. Some sampled farmers in southern Clarendon were in proximity to irrigation facilities administered by the Mid-Clarendon Irrigation Authority (MCIA), but none was formally connected to these systems and they were of the opinion that the Authority served only larger farms. However, a few admitted to "thieving irrigation water" during periods of drought.

Human labour is employed for reaping sugar cane, and, although principally a male-dominated activity, women sometimes assist. Though a common practice on sugar plantations, only two small farmers on the Alluvial Plains burnt their fields before reaping. Burning is used to eliminate trash, to speed up the reaping process and to facilitate the use of mechanical loaders.

Despite their commonality in location, tobacco farming differs markedly from that of sugar cane. Land prepared for tobacco is lightly ploughed, using human labour and suckers are transplanted from nurseries into the prepared fields. Tobacco is normally cultivated in pure stands, with very little weeding of fields occurring because the broad leaves of the plant provides an almost complete ground cover, preventing the propagation of weeds. A few weeks after planting, fields are fertilized and sprayed with fungicide. One farmer explained that tobacco plants are not particularly susceptible to insect pests because most insects are repelled by the scent of the plants. Mature tobacco plants are reaped and stored in specially ventilated drying sheds until they are ready for market.

INFRASTRUCTURAL CHARACTERISTICS

The narrow range of cash crops constituting the focus of this category of farmers, simplifies discussion of their infrastructural characteristics.

Marketing

Marketing of sugar cane is organized by the All-Island Cane Farmers' Association. Membership in the AICFA is a prerequisite for marketing sugar cane, but six farmers bypassed this prerequisite by selling their crops on the quota of relatives and friends. In two other cases, farmers who had inherited canefields from deceased parents had not joined the Association but continued to market sugar cane in the name of their parents. Under the marketing arrangements

secured by the AICFA, the purchasing factory provides the farmer with a reaping schedule so as to avoid a handling and processing backlog at the factory. There is an insurance built into this schedule, because in the event that the factory is unable to accept a scheduled harvest, the farmer is compensated to the tune of 80 percent of its value. The factory also organized transportation for the majority of farmers and if the service is not provided when required, the insurance arrangement applies.

At the time of the survey, farmers were paid 62 percent of the projected value per tonne of sugar, while manufacturers received 32 percent, the remaining six percent going to the AICFA. Farmers therefore received J\$1,499 per tonne, paid in two instalments. If a higher than projected price for sugar is realized by the industry, farmers receive a bonus payment.

The marketing of tobacco was more *laissez-faire* and although 12 of the 15 tobacco farmers sold some of their crops to the Tobacco Company, some was twined into "jack-ass rope" and sold locally or stored for personal consumption.

Farm Assistance

The level of farming assistance received is yet another of the characteristics which distinguishes this category from other types of small farming . The proportion of farmers in this group who received farm assistance was 18.8 percent more than

the norm, 16.7 percent greater than vegetable and legume farmers and 30 percent more than domestic-provision farmers. This factor probably more than any other, reinforces the argument of bias in farm assistance to export production. Assistance consisted mainly of loans and chemical inputs organized by the AICFA. In this regard, the AICFA was instrumental in securing credit for its members. Besides, these farmers have more actively sought assistance, particularly loans than any other, so that 17.4 percent had done so, compared with the norm of 12.5 percent. This attitude towards credit results from factors related to the marketing, especially of sugar cane. Under the Lomé Agreement with the EEC, and quota arrangements which the United States has with the Caribbean, preferential prices are paid for sugar imports. The quotas to these markets have been under-subscribed since the 1970s, resulting in a relatively secure market for sugar (Planning Institute of Jamaica 1988:7.4). In addition, the transportation and insurance facilities provided locally, reduces the risks usually associated with farm credit.

Support Organizations

Thirty-six farmers (78.3 percent) were members of an official organization, specifically the AICFA. Membership in support organizations was thus, 32.7 percent above the norm, and could be anticipated given the prerequisites for marketing through the AICFA. The virtual absence of the JAS in this group is

yet another of its distinguishing characteristics, and indicates the irrelevance of that organization to these farmers.

CASE STUDY

Personal History

Raj is a 52-year old farmer and has spent his entire life in the district of Pink Hill, situated in the heart of the sugar-belt on the Alluvial Plains of southern Clarendon. Farming is not his only source of livelihood because he has a regular job as a tractor driver on the Monymusk sugar estate. Raj's level of educational attainment is similar to the majority of farmers in his community, in that he attended primary school for eight years, reaching the 5th grade. Similarly, his schooling was discontinuous because he sometimes had to help in the paddy his father cultivated. He also remembers helping his mother "drop manure" on the Monymusk estate, because his family "didn't have much". In spite of his discontinuous education, Raj is functionally literate and claims to have a "really good head for figures". As a child he was fascinated by tractors and aspired to be a driver. After "outing" school he continued helping his father on the paddy as well as planting sugar cane. In addition, he had seasonal employment with the estate as a cane-cutter. His uncle drove a "water tractor" for the estate, so Raj was allowed to "catch his practice" driving the tractor. By the time he was 22 years old, he had a regular job driving a tractor which delivered water to workers

in the field. During the planting season he operated a tractor-drawn harrow and sometimes hauled trailers during harvesting.

By his community's standard Raj is not badly off, living in a seven-room concrete and wood house with his 45-year old wife, five of their six children, ages ranging from 15-25, five grandchildren and his elderly parents. While Raj and his wife had been together for 34 years, they became legally married 11 years ago.

Farming Activities

Raj's family provides most of the labour required on his farm. Because the labour demands of sugar-cane cultivation is seasonal his typical day relates to his off-farm job. However, during land preparation for replanting and during moulding, Raj uses the estate tractor to plough his fields. He, his 25-year old son and his 76-year old father do most of the planting of new fields and "supplying" of ratoon fields when some plants need replacing. His wife and two older daughters are entirely responsible for weeding and fertilizing the sugar-cane field. When replanting occurs, they also "drop" cane tops. Harvest is the busiest time for the family. Raj, his son and father do a substantial portion of the reaping on weekends. In addition, two men are hired to help with reaping at a wage rate of J\$78 per tonne. From the harvest prior to the survey, Raj sold 34 tonnes of sugar cane generating an income of J\$33,127.90. His total expenditure excluding family labour (which is not costed), amounted to J\$13,433.60. It is on this basis

that he considers sugar-cane farming to be a profitable undertaking. Like most sugar-cane farmers, Raj kept records of his expenditures and income in the form of payment receipts and deductions, which he received at the estate "paybill". In an arrangement with the estate, he is provided with fertilizer and transportation for his sugar cane on a credit basis. The cost of these inputs are deducted from his payments.

Agrophysical Resource

Raj's farm consists of three fragments amounting to 3.2 hectares. The houseplot which is on family land, has an area of 0.2 hectare, a second fragment is 1.0 hectare and was purchased by income generated by his off-farm job, and the largest consisting of 2.0 hectares was accessed under the Land-Lease project.

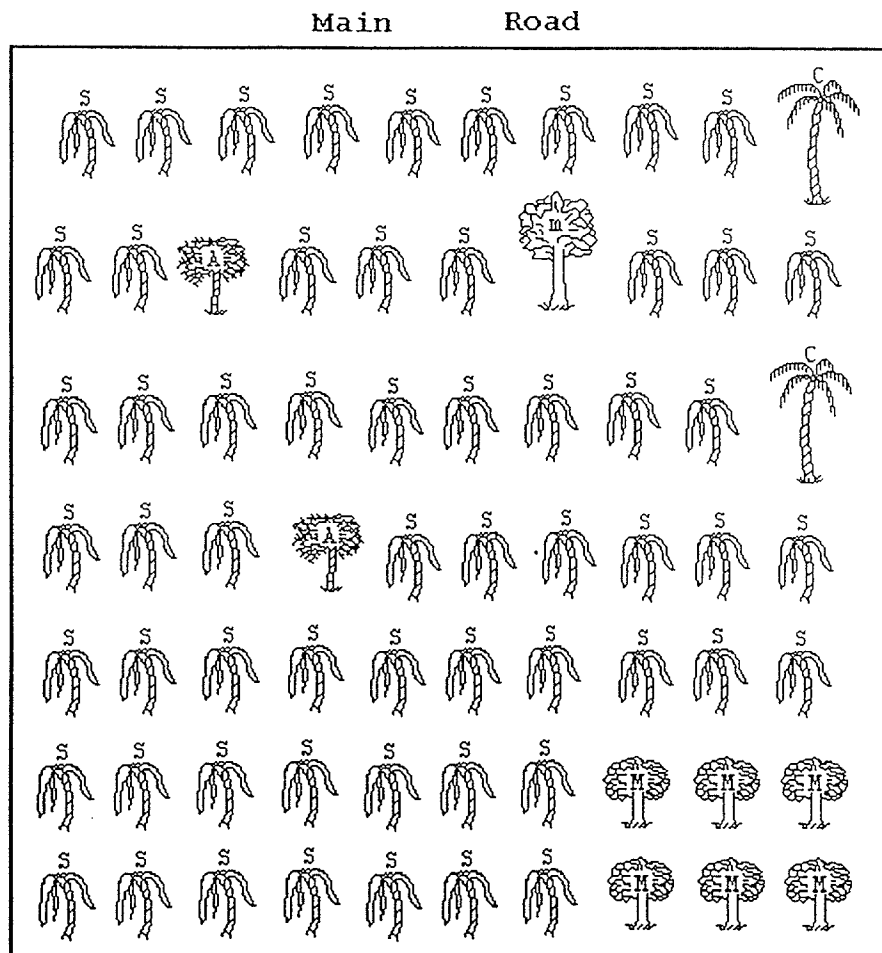
Land Use

Although sugar cane is the mainstay of Raj's farm, a variety of other crops are also grown. The houseplot is devoted to food trees and a small kitchen garden which is tended to by his mother. The 1.0 hectare fragment has a vegetable patch, some sugar cane and a livestock pen where his wife and older daughters keep six goats and one sheep. Approximately 18 percent of this plot is in ruinate. It is the 2.0 hectare fragment, located 2 kilometres from the farmhouse which is most extensively used. Here, 90 percent of the land is in sugar cane, the rest planted with Tommy Atkins/Keith varieties of mangoes. Raj explained that he "caught the mango breeds" from the Agro 21 project at nearby Spring Plains. He

is experimenting with these varieties of mangoes because there is a good local and export market for them, but he is especially interested in the export opportunity, and plans that by the time he reaches retirement from his off-farm job, he should have a title for the 2.0 hectare fragment, because the Jamaican government had informed Land-Lease participants of its intention to sell this land to them. In addition, a Land Titling programme had been launched, and this would speed up the titling of these lands. Therefore, his long-term plan is to secure a farm loan and with income from his pension, convert the entire fragment from sugar cane to mangoes. Not only does he consider a mango operation to be more profitable in the long run, but he also anticipates that when his children leave home, he and his wife might not be able to fulfill the labour demands of sugar-cane cultivation, albeit seasonal. Therefore, although Raj is satisfied with his income generated from sugar-cane farming, in anticipation of retirement as an estate employee, he is tending towards a less labour-demanding crop emphasis.

Typically, Raj's distribution of crops on his fragments is a response to the threat of praedial larceny. Although sugar cane is not particularly vulnerable to this threat, owing to the fact that the variety used to manufacture sugar is hard and fibrous, his Tommy Atkins/Keith mango trees are an attractive target, and for this reason they are situated as far as possible from the road (Figure 12.2). Although these trees are visible from the road, especially when sugar cane is harvested, Raj explained that their location is nevertheless a deterrent to thieves who are more

Figure 12.2
 TRADITIONAL EXPORT FIELD-CROP FARM: FIELD SKETCH



Legend

- A - Avocado
- C - Coconut
- M - Tommy Atkins Mango
- m - Common Mango
- S - Sugar Cane

likely to be caught should they venture that far onto his property. When queried about the implications of his proposal to expand his Tommy Atkins/Keith orchard, he explained that he would fence the property, buy a shotgun and "fix" some trees near the road. His meaning of "fix" implies that he intends either to place Obeah-related paraphernalia which conveys a message related to local superstitions, or more sinisterly, poison some fruits.

Infrastructural Resource

Raj's entire sugar-cane crop is sold to the Monymusk sugar factory. His other farming activities are for household subsistence, although a few of his mango trees have started bearing and their produce had been sold to higglers. Raj regularly attends meetings of the local chapter of the All-Island Cane Farmers' Association, because he considers the organization to be effective in securing credit arrangements with the sugar factory, as well as in bargaining for a reasonable price for his cane. He had also secured a "small loan" through that organization to finance expansion of his cane fields.

Factors Influencing Decision-Making

The land which Raj farms is capable of a range of arable uses. A soil survey of the area undertaken in the mid-1980s and published in 1990 indicated its suitability for sugar cane, livestock rearing, food forest, orchard crops, tobacco, mixed agriculture (root crops) and vegetables (Jamaican Ministry of Agriculture

1990:18). A major factor which influenced his sugar-cane emphasis seemed to be the size of his farm, which is a function of his age and industry. Farm size, along with his experience working in sugar-cane cultivation at Monymusk, and the agrarian infrastructural support given to sugar-cane production, reinforces the economic merit of his current crop emphasis. Raj did not always emphasize sugar-cane production on his farm, as during the mid-1970s when domestic crops were easily marketed through the AMC, and sugar prices were low, crop emphasis was on pumpkin, sweet potato and "greens". It was when he acquired land through the Land-Lease project that his decision and cash-crop emphasis changed in accordance with economic factors.

Summary

The crop emphasized in this typology, and the position of this group on the progression, are defined by interrelationships between human, physical and infrastructural agrarian factors which influence small farming. Age influences the definition of this group, because being older than the previous categories, the quest for non-farm occupational options has virtually disappeared. Moreover, their marital unions have become more stable and their farming focus more long-term. Small farming, which for many was an occupation of default, has become more entrenched as a way of life. Underlying their decision making are transformations which have occurred in land resources, because land accumulation coincides with the ageing of farmers, thus increasing the economic viability of

their holdings. Their specific crop emphasis results from a balance between their age and physical abilities, the size of their holdings, their land-use capability and external economic factors, such as infrastructural provisions and prices. Sugar cane and tobacco thrive well on the Alluvial Plains of Clarendon and the interior valleys of upland regions, and these farmers are not yet too frail to deal with the labour demands of these crops. In addition, export field-crop farming represents greater stability than the domestic categories, not only because of greater permanence of plants such as sugar cane, but also due to the provision of greater infrastructural support for these crops.

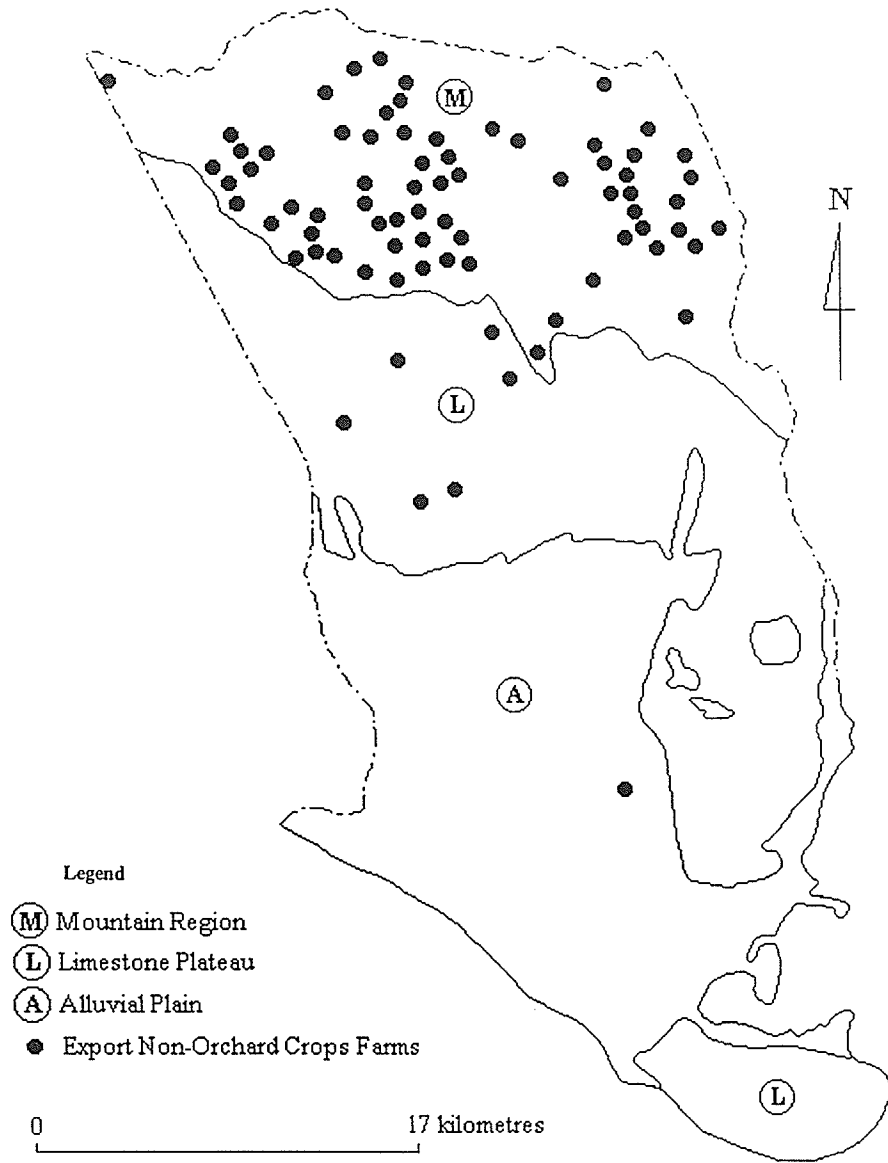
CHAPTER 13

TRADITIONAL EXPORT NON-ORCHARD CROP FARMING

By virtue of age, much of the transience and potential dynamism which characterized younger groups, especially those with a domestic-market emphasis, is absent from this category. Advancing age and associated evanescence of non-farm occupational alternatives, along with increased accumulation of land, have dictated a more serious and long-term approach to farming as a way of life. However, the implicit stability associated with this group, has negative implications for agricultural development initiatives aimed at improving productivity of small farming, because the majority are already too old to realize any benefit from such strategies.

With a compliment of 76 farmers this group is modal within the sample. They produce primarily perennial tree crops, such as coffee, cacao and pimento (allspice). A high level of environmental cognizance is indicated by the fact that over 90 percent of the farms are located on steeper slopes and more rugged terrain of the Mountain Region (Figure 13.1), where layered foliage and varied root depth which result from interplanting, reduces the potential level for soil erosion.

FIGURE 13.1
TRADITIONAL EXPORT NON-ORCHARD CROP FARMS:
DISTRIBUTION BY PHYSIOGRAPHIC REGIONS



HUMAN RESOURCE CHARACTERISTICS

Characteristics of Farmers

On average, these farmers are nearly three years older than the norm, with more than one-half of them older than 55 years (Table 13.1). This contrast with earlier

Age Category	Number	Percentage
< 40 years	14	18.4
40 - 55 years	23	30.3
> 55 years	39	51.3
Total	76	100.0
Mean Age = 54.0 years		
Standard Deviation = ±13.4 years		

portions of the continuum, where 45.7 percent of the traditional export field-crop group and an average of 31.8 percent of the domestic categories exceeded 55 years.

That this group contained 15 (19.7 percent) female farmers, lends support to the earlier hypothesis that older categories will contain a larger female population, who have acceded headship of their households due to the death of their spouses (supra p.94). Thus, while this proportion was marginally (3.7 percent) more than the norm, it was 12.3 percent greater than that of vegetable and legume farming.

The pattern of educational attainment within this group is consistent with the

Level of Education	Number	Percentage
Primary	63	82.9
Secondary	7	9.2
Vocational	4	5.3
University	2	2.6
Total	76	100.0

sample (Table 13.2).

In light of their position on the progression, that 65.8 percent of these farmers had part-time jobs, albeit mainly on a seasonal and intermittent basis, is an unexpected characteristic. This anomaly in the progression relates to the nature of their part-time jobs. Within any group, the tendency is for younger members to work off-farm seasonally or intermittently, while the off-farm jobs of older farmers tend to be regular. Manifestation of this tendency also occurs between groups, hence the incidence of regular off-farm jobs was 22.2 percent among vegetable and legume farmers, 29.5 percent among those engaged in domestic-provision farming, 30.4 percent within the export field-crop category and 34.2 percent within this group. Older farmers are likely to continue regular off-farm work, because unlike seasonal and intermittent employment, these jobs have

retirement benefits such as pensions, which must be factored into the evaluation of the propensity to work off-farm. Eleven (14.9 percent) farmers worked overseas, mainly as farmworkers. That the incidence of overseas employment was eight percent below the norm, 12 percent lower than the domestic categories and about four percent less than that of traditional export field-crop farming, is consistent with this stage of the continuum as it conforms to the general thesis of reduced participation in overseas employment as farmers grow older.

Being (67.2 percent), the proportion of married and common-law unions (Table 13.3) in this group is marginally lower than the norm and indeed than all preced-

TABLE 13.3
TRADITIONAL EXPORT NON-ORCHARD CROP FARMERS:
MARITAL STATUS

Marital Status	Number	Percentage
Married	34	44.7
Common-Law	17	22.5
Single	13	17.1
Widowed	9	11.8
Divorced/Separated	3	3.9
Total	76	100.0

ing categories except domestic-provision farming. This is not contrary to the hypothesis of a direct relationship between marital stability and the age of farmers, because this group contains the largest proportion of widowed farmers, resulting from the death of older male spouses in particular.

Characteristics of Households

The households of these farmers were the smallest among the groups. With an average size of 3.8 persons, they were 19.1 percent smaller than the norm, and 26.9 percent smaller than the domestic categories. Their household size is consis-

TABLE 13.4
TRADITIONAL EXPORT NON-ORCHARD CROP FARMERS: AGE-SEX
COMPOSITION OF HOUSEHOLDS

Age-Sex Category	Number	Percentage
Fit Males > 15 years	101	34.6
Fit Females > 15 years	82	28.1
Males < 15 years	48	16.4
Females < 15 years	48	16.4
Unfit Adults	13	4.5
Total	292	100.0

tent with this stage of the farming progression and it reflects the departure of mainly older children from parental households. However, that 32.8 percent of the population of these households comprised children 15 years and under, who along with unfit adults, results in a dependency ratio of 1:1.7 (Table 13.4), is an important benchmark in the dependency dynamics of these farming systems. Although household dependency among traditional export non-orchard crop farmers was 13.3 percent lower than the sample norm and 25.9 percent below the domestic groups, it was 5.5 percent more than export field-crop farming. This phenomenon results from social norms whereby as farmers grow older, increased

numbers of grandchildren and older, infirmed individuals, such as their own parents, begin to reside in their households. But as previously cautioned, evaluation of dependency ratios in systems of extended families, must consider the effects of external financing (supra p.142).

Farm Labour Input

Labour Input of Household Head

In spite of their age, these farmers cultivated their land for an average of 27.4 hours per five-day week, or just 1.2 hours less than the norm. This level of personal labour input is reasonable relative to the overall sample (supra p.148), because overall labour input is low and generally within the capability of some of the feeblest farmers. The personal labour input of farmers in this category is consistent with this stage of the farming progression, being 9 percent lower than the more physically capable domestic categories, but marginally lower than export field-crop farming.

Household Labour Input

The weekly labour contribution of these households averaged 42.9 hours, i.e. seven hours or 14 percent less than the sample (Table 13.5). Among the categories, these households contributed the least number of hours to farm labour, a factor which reflects the comparatively low labour demand of many of the perennial tree-crops cultivated on these farms.

At 63.8 percent, the proportion of total household labour accounted for by household heads, was the largest among categories of farming and 6.5 percent

TABLE 13.5
TRADITIONAL EXPORT NON-ORCHARD CROP FARMERS:
HOUSEHOLD LABOUR INPUT

	Mean Labour Input Per 5-day Week (hrs.)	Mean Labour Input per cultivated ha. Per 5-day Week (hrs.)
Per household	42.9	28.6
Per household head	27.4	18.3
Per fit adult	17.3	11.5

more than the norm. While this proportion appears high in light of the fact that at this stage of the progression, female spouses have for the most part completed childbearing and, therefore, would be expected to make greater contributions to farm labour, it should be borne in mind that in absolute terms this proportion represents fewer hours than any other category.

Division of labour by gender is most marked on these farms. Where cacao was grown, men are responsible for every aspect of the operation except the drying of beans. Where coffee was a main crop emphasis, men carried out pruning, spraying and the general maintenance of plants, but harvesting of coffee berries was normally carried out by women. On pimento farms, pruning and harvesting is undertaken by men because these tasks involve climbing trees, an activity which is socially taboo for women. Women's role on pimento farms involved

separating the berries from the harvested branches, drying berries on specially constructed "barbecues", as well as "fanning", i.e. removal of trash and underdeveloped berries. Packaging was usually carried out by men because a sack of berries weighs as much as 45 kilograms and would therefore be difficult for most women to handle.

Wage Labour Input

Wage labour usage by these farmers was similar to the sample, in that 67 (88.2 percent) used hired help either seasonally, intermittently or on a regular basis (Table 13.6). While this occurrence is not very different from other categories,

	Number	Percentage
Incidence of hired labour	67	88.2
Seasonal	55	82.1
Intermittent	10	14.9
Regular	2	3.0

the average number of hired hands (2.7) employed during each cropping cycle was 20.5 percent less than the sample and was the second smallest among the categories. This number appears small and is out of synchrony with this stage of the progression, but it should be borne in mind that the wage labour demand

of a farm is not only a function of household labour availability and use, but is also dictated by the crop emphasis of farms. In this regard, the crops emphasized on these farms require comparatively little tending once they are established, thus substantially reducing the need for wage labour.

Informal Labour Arrangements

Use of informal labour by this group of farmers was only marginally lower than the norm (Table 13.7). Typically, day-for-day was the most favoured and was

TABLE 13.7
TRADITIONAL EXPORT NON-ORCHARD CROP FARMERS:
INFORMAL LABOUR USAGE

Type of Arrangement	Number	Percentage
Occurrence of Informal Labour Use	36	47.4
Day for Day	23	63.8
Morning Sport	18	50.0
Partner	8	22.2
Evening Sport	6	16.6
Digging	2	5.5

employed mainly for pruning coffee, pimento and cacao. Women were the main organizers of morning and evening sport, which they used to reap coffee and pick pimento berries. While relatively uncommon, evening sport was employed to "fan" pimento and clean coffee berries before sale. Morning and evening sport

have other social values as they allowed the womenfolk an opportunity to "labrish", i.e. gossip and catch up with community news.

AGROPHYSICAL CHARACTERISTICS AND AGRONOMIC METHODS

Farm Size

With an average size of 2.1 hectares, the holdings occupied by these farmers were 0.1 hectare larger than normal. However, the size of these holdings seems contrary to the age and farm-size trend observed so far, particularly in relation to export field-crop farming. Although the average size of holdings in this group was 10.5 percent larger than that of the domestic categories, it was 9 percent smaller than export field-crop farms. This discordance could have resulted from a combination of two factors. First, export field-crop farms are unique with regard to the farm-size impact of Project Land Lease (supra p.62), a situation which should be considered to be external to the normal farm-size progression theorized in the continuum. Secondly, in accordance with social norms (supra p.79), as farmers grow older a land-divestment process is set in motion as they begin to divest themselves of some farmland, as gifts to older offspring (Cumper 1958:90). Because legal titles to holdings are uncommon throughout small-farming systems, these gifts are informal, but are culturally binding and are therefore subtracted from the farmer's land-access pool. Although the extent of this phenomenon was not ascertained in the survey, evidence from the case

studies suggest that it is particularly likely to occur among older farmers whose holdings can support this land divestment. However, its cumulative impact on farm size increases directly with the proportion of older farmers in a category.

The farm-size distribution of this group resembles the sample, in that the smallest size category accounted for the single largest proportion of farms (Table 13.8). If the discordance in export field-crop farming is ignored, then the general pattern

Size Category (ha.)	Number	Percentage
< 2.0	35	46.1
2.0 - 3.0	26	34.2
> 3.0	15	19.7
Total	76	100.0
Mean Size = 2.1 ha.		

of farm-size distribution is in accordance with this stage of the continuum. Unlike the domestic categories which have an average of 41.9 percent of their farms two hectares and larger, 53.9 percent of the farms in this group were in that size category.

Farm Fragmentation

An aggregate of 161 fragments totalling 159.3 hectares was recorded for this

group. Thus, each farm was comprised of 2.1 fragments having a mean size of 1.0 hectare. Both the number of fragments and their average size were identical to the sample, a factor which could be expected given the modality of this group. There was no clear-cut pattern of fragment-size relationship between this and previous categories, but the mean number fragments is consistent with the land-divestment hypothesis, as it indicates a downturn in plot accumulation as these ageing farmers pass on more inaccessible fragments to offspring.

Although no distinct pattern of relationship was identifiable between fragment-size

Ranked Fragment Distance	Mean Size (ha.)	Mean Distance (km.)	Mean Period of Occupancy (yrs.)
F1	0.9	0.0	23.0
F2	1.2	2.1	22.2
F3	0.8	2.8	17.5
F4	0.5	3.8	17.5

and distance, the general pattern of relationship between mean period of occupancy and distance of fragments, resembled the sample in that more distant fragments were generally the more recently acquired (Table 13.9).

Land Tenure and Use

Export non-orchard crop farmers individually or jointly owned 85.7 percent of

the fragments comprising their farms. More relevant is that the associated area accounted for 90.1 percent of their farmland (Table 13.10), i.e. 10.2 percent

TABLE 13.10
TRADITIONAL EXPORT NON-ORCHARD FARMERS:
LAND TENURE AND USE

Tenure	FRAGMENTS				
	F1	F2	F3	F4	Total
No. of fragments					
Owned	57.0	37.0	12.0	2.0	108.0 (62.1)
Family	20.0	7.0	3.0	0.0	30.0 (18.6)
Rented	1.0	12.0	8.0	2.0	23.0 (14.3)
Total	78.0	56.0	23.0	4.0	161.0 (100.0)
Area (ha.)					
Owned	44.4	49.5	9.4	1.4	105.3 (66.1)
Family	25.5	10.5	2.4	0.0	38.4 (24.1)
Rented	0.4	7.7	7.9	0.4	15.7 (9.8)
Total	70.3	67.9	19.7	1.8	159.4 (100.0)
Land Use					
Area (ha.) in:					
Export crops	38.7	16.6	6.7	1.1	63.1 (39.6)
Domestic crops	14.8	15.3	2.7	0.4	33.2 (20.8)
Pasture	5.8	20.7	5.6	0.0	32.1 (20.1)
Ruininate	10.9	15.1	4.7	0.3	31.0 (19.5)
Total	70.3	67.9	19.7	1.8	159.4 (100.0)

Note: values in parentheses denote percentages

more than the norm and the second highest among the types of farming. Being 11.3 percent greater than the average for the domestic categories and 37.1 percent larger than export field-crop farming, the proportion of farmland owned by these farmers is consistent with their position on the progression. The large difference between this and export field-crop farming relates to the preponderance of leased lands in that group (supra p.296). The real importance of the proportion of farming they own is that it indicates an increased level of tenurial consolidation and security as farmers grow older. This consolidation results from greater

opportunity and ability to purchase land, as well as farm entrenchment of control over family land.

The strong export emphasis of this group is denoted by land allocation to export crops being 5.1 percent more than the norm and nearly twice that allocated to domestic crops (Table 13.10). The comparatively large area assigned to pasture was 5.6 percent more than the norm and exceeded all other categories. This proportion is consistent with the number of grazing animals (4.4 per farm). Grazing animals are comprised primarily of cattle and goats, and the mean number of these animals per farm was higher in this group than any other.

That the proportion of total farmland occupied by ruinate was the smallest among the types of farming, reflects the ability of the crops on which this farming system is based to utilize some of the most marginal lands.

Similar to the sample, the tendency was for these farmers to locate their most important activity, i.e. export-crop production within proximity to the farmhouse. The exception is F2, where a larger proportion of land is allocated to pasture than to export crops, and relates to the fact that being the largest fragment (see Table 13.9), F2s are best able to accommodate the establishment of pasture. Owing to the small number (four) of F4s and the small area they account for, they do not warrant further discussion.

Agronomic Methods

In considering the cultivation practices of these farmers, attention is given to methods associated with cultivating cacao, coffee and pimento. These crops are usually interplanted and in most cases utilize similar agronomic practices.

Crop Distribution

When the survey was conducted, cacao was the most commonly grown export non-orchard crop, however, coffee was more important with regard to income generation. However, a cacao resuscitation project which was formulated in 1985, was being implemented by the Hillside Agricultural Project (HAP), with the objective of improving its production and contribution to farm income. The focus of this project was the provision of new plants and cultivation techniques, and although cacao plants take between seven and eight years before they declare any pods, nevertheless farmers anticipated a more important income contribution from this crop. Implementation of this project gained momentum after the field research in the aftermath of Hurricane Gilbert in September 1988, owing to the complete destruction of 25 percent of all cacao trees and the extensive defoliation of the remainder (Planning Institute of Jamaica 1988:7.3). Cacao was cultivated on 59 (77.6 percent) of these farms, mainly on Terra Rosa and Black Marl, while coffee and pimento were cultivated on 56 (73.6 percent) and 17 (22.4 percent) farms, respectively. The low occurrence of pimento is related to its slow rate of maturation; plants taking up to 12 years to bear. Given the age at which farmers

will become established in export non-orchard farming, many would be reluctant to invest in such a slow-maturing plant.

Cultivation Practices

Except for the few (eight) farms which were involved with the cacao resuscitation project, and which had young plants within the crop assemblage, crops cultivated on these farms were generally at a mature stage. Typical of perennial crop cultivation, land preparation of entire fields occurs only when initial plants are established. This preparation involves minimum disturbance of topsoil, which reduces the potential for soil erosion, an important consideration in these high erosion-vulnerability areas occupied by this type of farming.

Planting methods employed for coffee, cacao and pimento are similar in that seeds are transplanted from pre-established nurseries. Prior to the establishment of coffee and cacao, land is cleared and planted with annuals, especially plantain and banana. Coffee and cacao are then interplanted with these crops. The faster-growing leafy annuals provide shade and protection from heavy rain for coffee and cacao during their early stages of growth, but once these crops are established, the annuals are either removed or more often thinned out. Pimento seedlings do not require any pre-conditions for their establishment and are interplanted with the aforementioned crops or with other categories, such as root

crops. In such instances pimento trees are sometimes used to support yam vines and broad beans.

Except in the case of pimento, farmers do not establish their own nurseries but instead obtain their coffee and cacao seedlings from government nurseries or from those on large plantations for a number of reasons. First, the environment in which these nurseries are established is controlled, requiring constant monitoring and substantial input cost, especially for chemicals and other support systems. Secondly, the breeding of these plants is selective and small farmers generally lack the related technology because cultivation of these crops is external to their traditional farming systems. In addition, the small size of farms is a deterrent to the allocation of space to nursery facilities.

Newly established coffee and cacao fields must be kept free of bush by weeding to avoid "choking" of plants. Women perform most of this weeding. The need to keep fields weed free accentuates the role of interplanted annuals in protecting soils from rainwash. To improve the anchorage of mature coffee and cacao, the roots are usually moulded. This is particularly true of the better-bearing dwarf varieties of coffee found on some farms, because the root depth of these plants is shallower than that of traditional varieties. Pruning is crucial and probably the most technical process of export non-orchard farming. This is the process which determines the height of stems, their number and productive potential. The basic

objective of pruning is to establish equilibrium between these factors. This activity is carried out by men using sharp knives or pruning shears acquired from the extension services, to remove errant buds and stems. It is more frequently required on the dwarf than traditional variety.

Use of chemical input was widespread. Seventy-one (93.4 percent) used chemical fertilizers on coffee and cacao, while 56 (73.7 percent) used pesticides, mainly on coffee. Spraying of coffee to eliminate coffee-berry borer is mandatory for farmers who sell their crops through the Coffee Board. Based on the extent of their production, some farmers were provided with spray cans for this purpose. More commonly, though, teams of sprayers are organized by extension personnel to carry out this task.

Harvesting of coffee is done mainly by women, often using informal labour arrangements. Berries are picked when they ripen enough to be easily plucked from the stems, but before they are too loose to fall to the ground. Because not all berries ripen at the same time, harvesting is often staggered. Harvesting of cacao and pimento is carried out mainly by men. In the case of cacao, the ripened pods are hacked from stems using a sickle attached to a wooden pole. Pods are then split and the seeds removed and dried. Pimento trees are much taller than either cacao or coffee, and because the berries bear near the tip of stems they are not always easily accessible to the picker, who often has to climb

the tree. Forked poles are therefore used to break the tip of branches containing berries. The leafiness of the broken branches provide a cushion for the falling berries and prevent their scattering. These berries are then removed by women and children, fanned and dried. Leaves are also sold for the making of fragrances and spices.

INFRASTRUCTURAL CHARACTERISTICS

Marketing

Both coffee and cacao were marketed through Commodity Associations, namely, the Coffee and Cocoa Boards. Pimento farmers on the other hand, sold their crops to a variety of markets, including private exporters and local spice manufacturers. Like export field-crop farming and in contrast to the domestic categories, buyers are actively involved with arrangements for the marketing of export non-orchard crops. In the case of coffee and cacao, harvesting directives and farmgate collection schedules are issued by commodity associations through local representatives. On the spot grading of the harvest occurs, with payments to farmers being made through the local representatives. Similar yet private arrangements applied to pimento. Because of the formal nature of transactions, these farmers, like those in the export field-crop category, have a better idea of their farm income than domestic-crop farmers, and although reluctant to, they can often produce records in the form of transaction receipts. Coffee grown in the

study area is graded as lowland coffee, as opposed to the internationally renowned Blue Mountain Coffee, and therefore commands a lower price. In the year prior to the survey, coffee farmers in this group estimated that they produced an average of 11 boxes of coffee, which at a farmgate price of J\$98 per box, would have generated an average income of J\$1,078 from sale of this crop. Cacao farmers produced an average of eight boxes, and received J\$75.56 per box for their 1987-88 crop. Owing to the variety of markets to which pimento is sold, volume of production and farmgate prices were not ascertained.

Like the export field-crop farmers, this group was generally contented with the marketing arrangements for their crops, and found their hassle-free nature along with prompt and lump-sum payments for crops, to be one of the most attractive aspects of this type of farming.

Farm Assistance

All coffee farmers received official assistance from the Coffee Board in the form of subsidized spraying for coffee-berry borer. In addition, 53 (69.7 percent) received farm aid in the form of coffee seedlings from the Ministry of Agriculture, particularly in the aftermath of Hurricane Allen in 1980. Farm aid also took the form of chicken manure for coffee and cacao, which was given to 27 (35.5 percent) farmers by the IRDP on a trial basis, between 1979-1983. In addition, 23 farmers stated that they were given cash incentives for accepting

IRDP soil- conservation treatments on their land. Though in its early stage, eight farmers were participating in the cacao resuscitation program, having received seedlings and technical advice from HAP personnel.

Support Organizations

Another benchmark characterized by this group is indicated by a reversal in the level of participation in support organizations. At 38 (50 percent), the proportion of farmers in this group who were members of farmer-support organizations was about seven percent more than the norm, 17 percent greater than the domestic categories, but about 28 percent less than the previous group, marking a downturn in farmers' participation. As was the norm, the JAS commanded the highest level of participation (Table 13.11), although most did not attend the Society's meetings and were often many years in arrears with their annual dues. Despite declining involvement in support organizations, the level of official support to these farmers is indicated by the proportion who had personal contact with extension personnel. The incidence of this contact was 68.4 percent, i.e. 14.8 percent more than the norm, and the highest among the categories. To some extent, this level of contact is cumulative, given that over 50 percent of the members in this group are older than 55 years, but it could also result from the fact that the crops they emphasized have a strong extension focus. Thus, in the three years prior to the survey, farmers had an average of only one visit from extension personnel.

TABLE 13.11
TRADITIONAL EXPORT NON-ORCHARD CROP FARMERS: MEMBERSHIP
IN SUPPORT ORGANIZATIONS

Organization	Number	Percentage
N = 38		
Jamaica Agricultural Society (JAS)	18	47.4
People's Cooperative Bank	13	34.2
All-Island Cane Farmers' Association	14	36.8
Citrus Growers' Association	5	13.2
Christiana Potato Growers' Cooperative	5	13.2
All Island Banana Growers' Association	1	2.6

Note: Membership in organization is not mutually exclusive.

CASE STUDY

Personal History

At 69 years old, George is representative of the modal age group for export non-orchard farming. He has never lived away from his community of Arthur's Seat, a major coffee, cacao and pimento growing region of the study area. Except for occasional "Christmas Work" sponsored by government to reduce unemployment levels during that festive season, George relies solely on his farm as a source of livelihood.

Being the first child of his mother, George was raised by his grandparents, attending elementary school up to the third "book", but frequently missing school in order to attend to chores on his grandparents' farm, as well as to work on a

large pimento estate where his grandfather sometimes found seasonal work. George adheres to the religion of his grandparents and is a deacon at the small Seventh Day Adventist church where he worships.

After leaving school at age 15, George wanted to become a policeman but when he discussed his ambition with a district constable for his community, he was told that he would never be able to meet the height criterion of six feet because he "come from short breed". He was offended by the constable's comments, because he considered them an insult to his grandparents, both of whom were short. He, applied nevertheless for police recruitment when he reached the legal age of 21 years, but was turned down. At that point, George decided to "do some farming" until he could get an overseas farmworkers' card to travel to the U.S.A. There he planned to "run off his contract" and settle down in America. That opportunity eluded him, and he has long ago committed himself to a livelihood in farming. During the early stages of his career, George concentrated on root-crop cultivation because the plot he cultivated was extremely small (about 0.08 hectare), and also because the "planting materials" for root crops were relatively inexpensive. His shift to export non-orchard crops had been gradual, but increased as he got older and less energetic. In the early 1970s these crops, in particular coffee, surpassed yams in their contribution to his farm income. Since then, more of his pimento trees have come into bearing, and since 1980 have generated more income than coffee. Cacao has always been of minimal

importance on George's farm, but he explained that it was now possible to obtain "help" for cacao under the resuscitation programme, and that he was seeking to establish newer and more cacao plants, although being fully aware that it is his "children and grandchildren" who will likely reap the benefits. He still found satisfaction in root-crop cultivation and maintains a substantial "grung", but explained that it has become increasingly difficult for him to "jook fork".

George entered a common-law relationship with his wife when he was 20 and she 18 years old. By then, they each had a child from previous liaisons, both of whom were left in the care of grandparents when the couple started living together. After 10 years of common-law union George and his wife were legally married, producing six children from that union.

At the time of survey, all six children had already left the parental household, but three teenage grandchildren - all boys, resided in George's household. He and his family occupy a modest five-room house, and being regarded as "decent people" by other members of Arthur's Seat, are well respected in that community.

Human Resource

Although George had been diagnosed with "high potential" (hypertension) eight years before, he was generally in good shape and spent most of his time tending

his land. However, due to the low intensity and seasonality of labour demand by his export non-orchard crops, much of his time was spent around his "grung" and with his livestock, which consisted of a "mother cow and calf" and four goats. He also kept a donkey which was used for personal transport and the movement of produce, and a number of "common fowls" for eggs and meat.

Despite potential labour contributions from his teenage grandsons, George rarely asks their assistance with farm chores, because they were doing well in school and he did not want to distract them. He did most of the pruning of his coffee and pimento trees by himself, but when the work became overwhelming, one or two labourers were hired.

Harvesting of coffee and pimento is the busiest time on this farm. His wife organizes the reaping, utilizing "church sisters" and other close friends in a morning sport arrangement to pick coffee berries. If she is unable to arrange enough hands by this method, additional female labour is hired at a wage rate of J\$65 per day. Although his grandsons volunteered assistance after school, George still climbs his pimento trees to harvest the berries. His "high potential" causes headaches if he remains up the trees for too long, so he normally hires additional hands to "break" pimento, and transport the branches containing berries to his house where they are "shelled", i.e. removed from the branches, by the female and child workforce arranged by his wife. Shelled berries are dried in the

sun on a concrete barbecue, but must be removed at nights as dampness from dew results in the rotting of the berries. Likewise, berries are hastily removed if rain showers are threatened. These tasks are performed by all members of the household, and represent the largest labour contribution of the grandchildren, since these chores can be carried out before and after school.

Agrophysical Resource

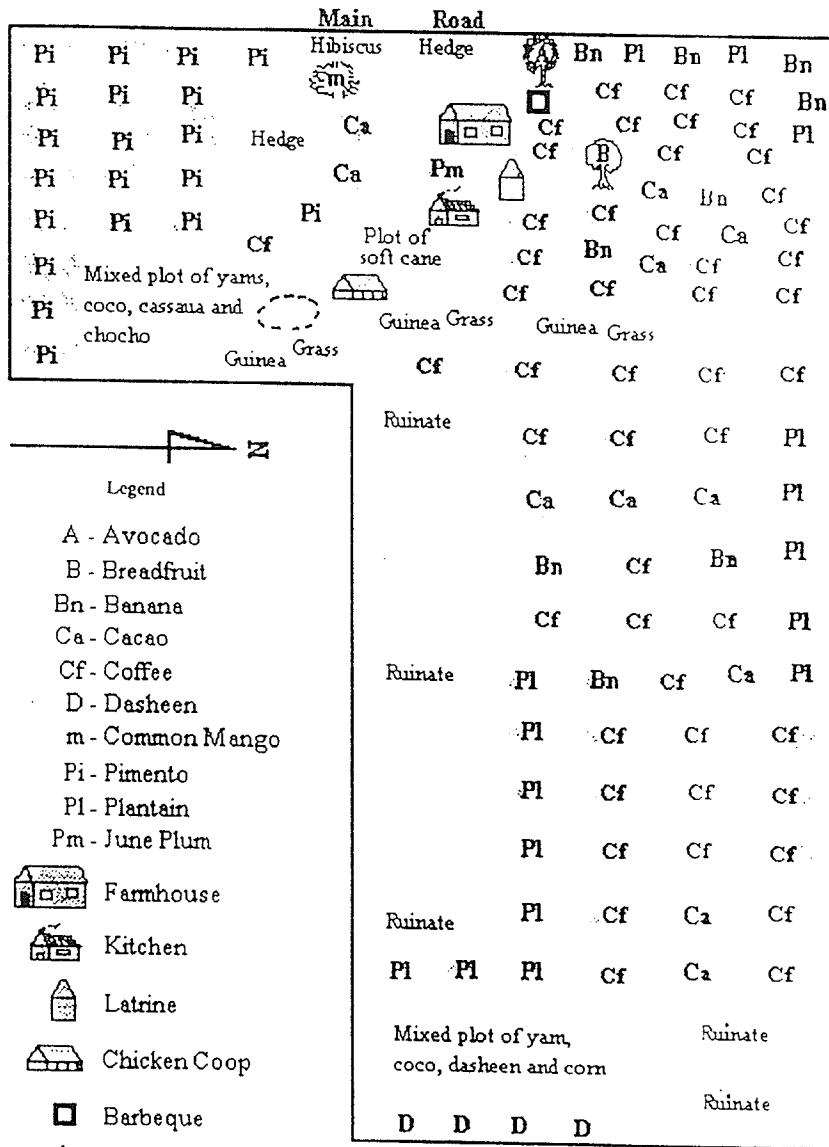
George's farm consisted of two fragments totalling 2.5 hectares. The houseplot which is the larger, is 1.6 hectares and was inherited from his grandfather. The second fragment (0.9 hectare) was purchased and is situated about one kilometre from the farmhouse. George owned a third fragment of 0.3 hectare in a neighbouring village about three kilometres away, but gave it to his oldest son about six years before, because he "could'nt bother with the distance".

Land Use

Like other small farmers, George cultivated a wide variety of crops in addition to those that are the focus of his enterprise. This variety is most evident on the houseplot, where, in addition to coffee and pimento, he also cultivated food trees, such as mango, plantain, banana and June Plum, root crops, such as yams, cassava and dasheen, and vegetables, such as cho-cho (Figure 13.2). The pattern of land use on this fragment reflects social as well as agrophysical considerations. Social considerations included the likelihood of praedial larceny, and the desire

to maintain some degree of visual privacy in his yard, while agrophysical considerations include slope angle, soil depth and soil moisture. With regard to the privacy of his compound and the likelihood of praedial larceny, a hibiscus hedge, tall pimento trees and leafy banana and plantain, border the road and blocked vision to the yard. The commercially useful crops along this border are not particularly susceptible to praedial larceny. For instance, in order to reap banana or plantain, the entire plant must be cut to the ground, because a stem bears fruit once and must be removed to allow a sucker to take its place. This is a noisy activity which could easily be heard from the farmhouse. The general degree of slope on this fragment is from west to east at an average angle of about 26 degrees. The slope angle from the main road towards the eastern boundary of the fragment is fairly uniform and is occupied primarily by coffee interspersed with cacao, banana and plantain. A row of Guinea Grass planted along the contour in the upper portion of this slope, helps to stabilize the soil. This Guinea Grass is also fed to his livestock, which are tethered close to the farmhouse at night in order to prevent theft. An area of gentler slope near the eastern boundary is planted with root crops and corn, while dasheen occupied an intermittently waterlogged area at the bottom of the slope. The concentration of pimento in the southeastern portion of the fragment coincided with rocky outcrops, but the roots of these trees were able to penetrate cracks between rocks and stabilize the plant even on thin soils. An area of deeper soil in the vicinity of the pimento concentration was occupied by a second mixture of root crops.

FIGURE 13.2
TRADITIONAL EXPORT NON-ORCHARD CROP FARMER:
FIELD SKETCH



About 85 percent of this fragment was cultivated and the remainder which was in ruinate, coinciding with the steepest and often rockiest portions.

George's second fragment is occupied primarily by pimento interspersed with cacao and various food trees. About 0.3 hectare of this fragment is reserved for grazing livestock, and being flatter than the houseplot, ruinate is virtually absent.

Infrastructural Resource

George's entire crop of coffee is sold through the Coffee Board, while pimento is sold to export agents in Kingston. Both of these buyers arrange for the collection and transportation of his crops; an aspect of this type of farming which he finds most attractive. Occasionally he sells pimento leaves to spice manufacturers who "come around" in search of this product. During the previous harvest George sold 16 bags of pimento amounting to 1,091 kilograms, eight boxes of coffee and one box of cacao.

George regularly received farm assistance in the form of spraying for coffee-berry borer, and he received chicken manure for coffee and cacao plants during the operation of the IRDP. At the time of this survey he had arranged with HAP personnel for the receipt of cacao seedlings to improve his cacao production under the resuscitation programme. Despite a good rapport with extension officers for his subdivision, George had never attempted to obtain formal credit for his farm,

because "the Lord has always provided" for him. Although dissatisfied with the current operations of the JAS, he has been a paid-up member for the past 27 years and is of the opinion that the organization was extremely helpful to small farmers during the 1960s and 1970s because they were allowed a greater say in the operations of the organization than they do now.

Factors Influencing Decision-Making

George's farming decisions were influenced by his age, the physical capability of his land and the partnership he shares with his spouse. For instance, his temporal shift from a domestic-crop emphasis to export non-orchard crops was influenced by his desire to establish a crop complex which would be his "old-age pension", when advancing age reduces his ability to cope with the rigours of root-crop production and marketing. However, the success of his transition to export non-orchard crops would be impossible without corresponding suitability of his farmland for the production of those crops, and his age-related accumulation of land. The influence of his spouse relates to labour expenditure, especially for reaping coffee.

Summary

Although occupying a parallel stage of the progression with export field-crop farms, the level of economic stability has become further entrenched in this group, reflecting their higher mean age. However, the most notable contrasts are

in relation to the domestic categories. Perennial tree crops have reached levels of maturity where they can provide an adequate income without continuous physical demands on labour. With more than 50 percent of these farmers being over 55 years old, farming is their only viable option, eliminating much of the transience which is characteristic of younger categories. However, with regard to the potential for improving domestic food supply within the existing status quo, a high level of stagnation exist in this group. This results from the large proportion who are older than 55 years and whose production emphasis is considered to be fixed. Although their average household size is smaller than normal and consistent with this stage of the progression where children have departed parental households, potential dependence has remained high due to the presence of grandchildren. However, this takes on a different meaning as these children are often supported by their parents.

The activities associated with this type of farming are less rigorous than those of previous categories, but the mean personal labour contribution of these farmers is only marginally lower than the norm, indicating that their age has not decreased their commitment to their enterprise.

An apparent anomaly of this group as it relates to the progression thesis, is the fact that the average farm size, was smaller than the previous group and therefore out of synchronization with the land accumulation trends among the categories.

The explanation for this relates to a unique land-tenure characteristic of the preceding export field-crop farmers, as this relates to the land-lease project.

With over 90 percent of total farm area individually or jointly owned, consolidation of tenure is extremely pronounced. Being lower than for any other category, the proportion of farmland in ruinate refutes a common misconception that the occurrence of idle lands in Caribbean small-farming systems results from an ageing farm population which is increasingly unable to cope with the physical labour demands of small farming. Not only does this misconception ignore the diversity within these systems, but it fails to acknowledge the role in differences of type of farming in the efficient utilization of land.

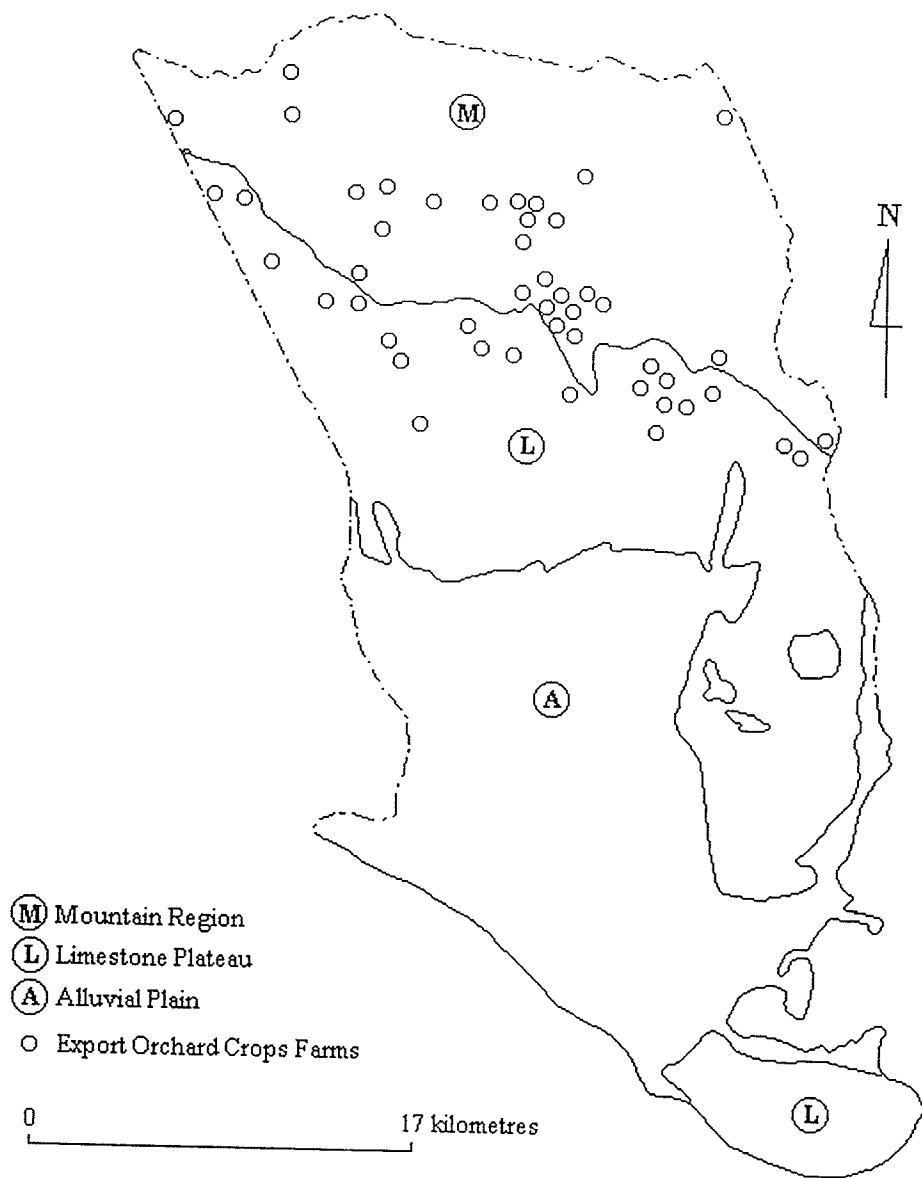
CHAPTER 14

TRADITIONAL EXPORT ORCHARD-CROP FARMING

Although various components of the human, agrophysical and infrastructural characteristics of this group identify it as a distinct type of farming, the small difference (0.3 years) in mean age between this and the previous category, supports the concept of parallel categories on the small-farming progression. Although age is considered to be an important influence on the crop emphasis of farmers, there are other underlying factors such as land capability and farm-size which influence farmers' land-use decisions (supra p.246). With regard to land capability, locational difference in the distribution of traditional export orchard and non-orchard farms, may account for their difference in crop emphasis (compare Figures 13.1 and 14.1). In addition, the agrophysical base of these two categories is sufficiently different as to foster differences in land use.

Consistent with this stage of the farming progression, the farmers in this group, like those in other export-oriented groups, have become settled in small farming as a way of life and have adopted therefore a more long-term approach to their land-use decision-making. The 48 farmers in this group focussed primarily on the production of citrus, such as oranges/ortanique and grapefruit. In recent years however, a few farmers have established orchards of special varieties of mangoes, including Tommy Atkins/Keith, St. Julian (Julie) and East Indian. A

FIGURE 14.1
TRADITIONAL EXPORT ORCHARD CROP FARMS:
DISTRIBUTION BY PHYSIOGRAPHICAL REGIONS



single farmer had established a papaya orchard. Spatial differences in specific crop emphasis was evident. For instance, citrus farms were more common in the Mountain and Limestone Plateau physiographic regions, while mango farms were confined to the Alluvial Plains. These spatial patterns are influenced both by physiographic considerations, especially rainfall, and by economic factors relating to the diffusion of innovation. Citrus, for example, thrives best under conditions of moderate to heavy rainfall and is suited to the conditions in northern Clarendon. On the other hand, mangoes are better adapted to the conditions of southern Clarendon, where lower rainfall reduced the susceptibility of fruits to spoilage. With regard to the innovation diffusion, the Spring Plains Farm had been influential in promoting the cultivation of mangoes, especially the Tommy Atkins/Keith varieties as a commercial crop.

HUMAN RESOURCE CHARACTERISTICS

Characteristics of Farmers

Traditional export orchard crop farmers were the oldest group, their mean age of 54.3 years being 2.5 years higher than that of the total sample, three years older than export field-crop farmers and about 5.9 years older than the aggregated mean age for the domestic categories. The standard deviation being ± 13.4 years is consistent with all other categories. Age distribution is skewed towards the over 55 years age group (Table 14.1). This pattern of age distribution is congruous

with that of other export-oriented categories, but the degree of skewness is most

Age Category	Number	Percentage
< 40 years	10	20.8
40 - 55 years	12	25.0
> 55 years	26	54.2
Total	48	100.0
Mean Age = 54.3 years		
Standard Deviation = ±13.4 years		

pronounced among these farmers. That there were only six (12.5 percent) women in this group was unexpected, because in light of the fact that in Jamaica the life expectancy for males is 71 years and 76 years for females, it was expected that there would be a larger number of female heads of household who have been pre-deceased by their spouses.

Typically, educational attainment was dominated by the primary level (Table 14.2), while the incidence of part-time jobs was 12.6 percent lower than normal, i.e. the lowest of any category. Though consistent with the tendency for small farmers to have a lower propensity for off-farm jobs as they grow older, that this proportion is so much less (19.0 percent) than that of export non-orchard farming is interesting in light of their commonality in age. The explanation may be

related to social status and general level of living within this group. The establishment and maintenance of citrus and other fruit orchards is an activity

TABLE 14.2
TRADITIONAL EXPORT ORCHARD-CROP FARMERS:
EDUCATIONAL ATTAINMENT

Level of Education	Number	Percentage
Primary	38	79.2
Secondary	6	12.4
Vocational	2	4.2
University	2	4.2
Total	48	100.0

which requires comparatively large capital outlay in the acquisition of plants, spacing and pruning of trees and the layout and maintenance of drainage ditches, on a larger scale than any other category. In addition, planting of trees in pure stands can increase the rate of soil nutrient loss, because plant roots compete for the same nutrients at a localized depth of the soil horizon. This practice also increases the susceptibility of plants to insect pests, possibly leading to greater dependence on chemical fertilizers and/or advanced techniques in organic manuring and pesticides (Innis 161:22). As such, export-orchard crop farming attracts those who can meet its capital requirements, and who therefore are most likely to be the most affluent members of small-farming communities. This comparative affluence would likely reduce the need to work off-farm at seasonal and intermittent jobs, as is characteristic of other categories of farmers. That the

proportion of this group who received frequent remittances from children overseas was the largest among the categories of farming, might explain the relative affluence. Nine (18.8 percent) of the farmers in this group had worked overseas; seven with the overseas farm workers' programme, while two had spent 19 and 20 years working in England and at the U.S. Naval Base at Guantanamo Bay.

Marital stability within this group was higher than any other, with 77.1 percent engaged in either married or common-law unions (Table 14.3). This reinforces the notion of social stability in this type of farming.

TABLE 14.3
TRADITIONAL EXPORT ORCHARD-CROP FARMERS: MARITAL STATUS

Marital Status	Number	Percentage
Married	25	52.1
Common-Law	12	25.0
Single	6	12.5
Widowed	4	8.3
Divorced/Separated	1	2.1
Total	48	100.0

Characteristics of Households

With an average of 4.9 residents, these households were marginally larger than the norm, identical to those of domestic provision farmers and about 22 percent larger than those of export non-orchard farmers. That 89 (38.1 percent) of these

household residents were under 15 years old (Table 14.4) is consistent with the

Age-Sex Category	Number	Percentage
Fit Males > 15 years	73	31.2
Fit Females > 15 years	56	23.9
Males < 15 years	50	21.4
Females < 15 years	39	16.7
Unfit Adults	16	6.8
Total	234	100.0

thesis that large household-size among older farmers results from an increased number of grandchildren residing in them. Being 1:1.2, the dependency ratio for this category was therefore about 31.4 percent greater than that of the preceding export-oriented categories, but likewise, this ratio does not necessarily impact negatively on households.

Farm Labour Input

These farmers tended their field for an average of 29.7 hours per five-day week, or about one hour more than the norm. These hours of labour input is exceeded only by vegetable and legume farmers. While this appears to be out of synchronization with this stage of the progression, it should be borne in mind that labour input cannot be evaluated on the basis of absolute number of hours worked, but in addition the intensity and degree of difficulty of the related tasks must be factored in. In this regard, labour demands related to the tending of

orchards are far less intense and vigorous than for instance sugar cane or root-crop cultivation. This is because orchards do not require annual ploughing or moulding, and their maintenance is far less tedious than the activities related to root-crop production. That the number of hours of labour per cultivated hectare, being 17.5 hours per five-day week (Table 14.5), was 5.9 percent lower than the norm, 22.6 percent lower than the average for the domestic categories, reflects this lower intensity of labour demand.

Household Labour Input

At 48.8 hours per five-day week, household labour contribution among this group of farmers was marginally lower than the sample average as well as that of the domestic categories (Table 14.5). This suggests that the rejuvenation of

TABLE 14.5
TRADITIONAL EXPORT ORCHARD-CROP FARMERS:
HOUSEHOLD LABOUR INPUT

	Mean Labour Input Per 5-day Week (hrs.)	Mean Labour Input per cultivated ha. Per 5-day Week (hrs.)
Per household	48.8	28.7
Per household head	29.7	17.5
Per fit adult	18.1	10.6

households by the influx of grandchildren has positive effects on labour, but also that the lower intensity of labour demand for this type of farming allowed household heads to contribute nearly as many hours as the domestic categories.

Lower intensity of labour demands by this farming system is reinforced by the fact that household labour input per five-day week per hectare was 22.4 percent less than that of the domestic categories.

Wage Labour Input

Similar to the sample, wage labour played a critical role in the operation of these farms (Table 14.6). That this group had a higher incidence of wage labour than

Wage Labour	Number	Percentage
Use of Hired Labour	45	93.8
Seasonal	31	68.9
Intermittent	8	17.8
Regular	6	13.3

any other group is an indication that in spite of household labour contributions, the shortfall in labour supply from these household was the highest among the categories. Accordingly, the average number of hired persons was exceeded only by export field-crop farming, reflecting the tendency of these older farmers to assume a supervisory role in the operation of their farms.

Informal Labour Arrangements

The incidence of informal labour arrangements in this group (Table 14.7) was 7.9

percent lower than the norm, due mainly to their decreasing ability to reciprocate

TABLE 14.7
TRADITIONAL EXPORT ORCHARD-CROP FARMERS:
INFORMAL LABOUR USAGE

Type of Arrangement	Number	Percentage
Occurrence of Informal Labour Use	21	43.8
Day-for-Day	17	80.9
Partner	11	52.4
Morning Sport	5	23.8
Evening Sport	2	9.5
Digging	3	12.0

labour. Informal arrangements were used mainly by younger farmers in the group, and mainly in relation to minor crops, such as ground provisions.

AGROPHYSICAL CHARACTERISTICS AND AGRONOMIC METHODS

Farm Size

Farm size is the most distinguishing characteristic of this group, because averaging 2.4 hectares, they were 20 percent larger than the norm, as well as the average for the domestic categories, and 12.5 percent larger than export non-orchard farms. For reasons discussed in Chapter 13 (*supra p.*), a comparison is not made with export field-crop farms. The distribution of farms by size

categories (Table 14.8) is yet another outstanding characteristic of this group,

Size Category (ha.)	Number	Percentage
< 2.0	17	35.4
2.0 - 3.0	14	29.2
> 3.0	17	35.4
Total	48	100.0
Mean Size = 2.4 ha.		

because although the proportion of farms in the <2.0 hectare category steadily declined as the average age of farming categories increased, this is the only group in which this proportion is rivalled by that of the largest (> 3.0 hectares) size category. This pattern of farm-size distribution conforms with the age-land accumulation thesis. Thus, 53.8 percent of the farmers who were older than 55 years, operated farms in excess of 3.0 hectares (Table 14.9). This is in contrast

Age Category (yrs.)	Farm Size Category (ha.)			Total
	< 2.0	2.0 - 3.0	> 3.0	
< 40	5 (50.0)	4 (40.0)	1 (10.0)	10 (100.0)
40 - 55	7 (58.3)	3 (25.0)	2 (16.7)	12 (100.0)
> 55	5 (19.2)	7 (26.9)	14 (53.8)	26 (100.0)

to 10.0 percent operated by farmers under 40 years old. This relationship is supported by χ^2 value of 10.75 at the 0.95 confidence level. Nevertheless, there

is evidence of further entrenchment of the age-related land divestment trend discussed in relation to the previous category. Hence, of the 26 farmers who were older than 55 years, nine (34.6 percent) had given land ranging in size from 0.2 to 0.4 hectare to their offspring.

Farm Fragmentation

The number of fragments comprising these farms totalled 87 and amounted to 115.6 hectares. Thus, each farm consisted of 1.8 fragments having a mean size of 1.3 hectares. That the mean number of fragments was about 5.0 percent less than the domestic categories is consistent with the land-divestment hypothesis. The hypothesis of increased consolidation of holdings as farmers grow older is supported by the fact that the mean size of fragments was nearly 28 percent larger than those in the domestic groups.

While there was no clear-cut relationship between fragment size and distance, F2

**TABLE 14.10
TRADITIONAL EXPORT ORCHARD-CROP FARMERS: FRAGMENT SIZE,
DISTANCE AND PERIOD OF OCCUPANCY**

Ranked Fragment Distance	Number	Mean Size (ha.)	Mean Distance (km)	Mean Period of Occupancy (yrs.)
F1	48	1.3	0.0	21.4
F2	35	1.4	2.2	17.6
F3	4	1.1	3.1	8.3

has the largest mean size (Table 14.10). Likewise, farthest fragments were the most recently acquired.

Land Tenure and Use

That export orchard-crop farmers individually or jointly owned 85.1 percent of the fragments on which they farmed (Table 14.11) is in synchrony with their

Tenure	FRAGMENTS			
	F1	F2	F3	Total
No. of fragments				
Owned	42.0	25.0	1.0	68.0 (78.2)
Family	4.0	1.0	1.0	6.0 (6.9)
Rented	0.0	8.0	2.0	10.0 (11.5)
Caretake	2.0	1.0	0.0	3.0 (3.4)
Total	48.0	35.0	4.0	87.0 (100.0)
Area (ha.)				
Owned	55.1	40.6	1.9	97.6 (84.4)
Family	4.4	0.5	2.0	6.9 (6.0)
Rented	0.0	6.4	0.1	6.5 (5.6)
Caretake	2.4	2.0	0.0	4.6 (4.0)
Total	61.9	49.5	4.2	115.6 (100.0)
Land Use				
Area (ha.) in:				
Export crops	26.2	9.9	1.2	37.3 (32.3)
Domestic crops	15.4	9.4	0.0	24.8 (21.5)
Pasture	5.3	11.3	0.8	17.4 (15.0)
Ruininate	15.0	18.9	2.2	36.1 (31.2)
Total	61.9	49.5	4.2	115.6 (100.0)

Note: values in parentheses denote percentages

position on the farming progression, being 11.3 percent more than the sample, 9.7 percent more than the domestic categories and 19.7 percent greater than the proportion for export field-crop farmers. More revealing, is the fact that these

farmers individually or jointly owned 90.5 percent of their aggregate farm area. This proportion exceeds the norm by 10.7 percent and the domestic categories by 11.8 percent. The salient point of this comparison is that it indicates a consolidation of legal/customary rights to land as farmers grow older and their holdings increase. An implication of this consolidation is that it increases the potential for productive use of land because it becomes free from tenurial constraints to land use. The irony is that this improved potential occurs among a group of farmers who by virtue of their advancing age are physically least capable of capitalizing on it, given the existing situation of rural labour shortage.

A feature of land use in this category, is the proportion of land in ruinate. With 31.2 percent of total farm area in ruinate (Table 14.11), these were the second most underutilized of small farms. While this underutilization may be a perfectly rational use of land, and while the value of land to farmers is not only as a productive unit, because it also embodies various aspects of cultural symbolism, this degree of land underutilization nevertheless represents a reduction in potential productivity. It represents the culmination of a complex interrelationship between cultural symbolism, farmers' symbolism, farmers' age, farm size, tenurial security, income expectations and to some extent, remittances. Thus, this group of farmers have accumulated the largest farms and have attained the highest degree of tenurial security, but these have not been translated into the maximization of farm output. While their generally advanced age may be a

constraining factor, it is also true that current remuneration from the sale of crops are perceived to be adequate compensation for their efforts. While they willingly divest some land to older offspring, the social status associated with land ownership and size ensures that they balance such divestments with the maintenance of their own social standing.

Agronomic Methods

Discussion of the agronomic methods of this group focusses on the cultivation of their orchard crops, namely citrus and mangoes. Since these crops are perennials, which had already reached maturity at the time of the survey, this discussion is confined to the topic of distribution, maintenance and harvesting.

Crop Distribution

Of the citrus crops, grapefruit was most widely cultivated, although farmers were of the general consensus that they could just as easily have emphasized oranges, given similarity in land capability requirements (Table 14.12). Preference for grapefruit cultivation is related to its lower susceptibility to praedial larceny, because it is usually consumed in a processed form. More importantly however, is the fact that the tree-life of ripened grapefruits exceeds that of oranges, making them less susceptible to spoilage. This is an important consideration because unlike sugar cane, there is no compensatory payment if crops spoil before

TABLE 14.12
TRADITIONAL EXPORT ORCHARD-CROP FARMERS: CROP DISTRIBUTION

Crops	Occurrence on Farms	Percentage of All Farms
Citrus		
Grapefruits	39	81.3
Oranges/Ortaniques	18	37.5
Mangoes		
Tommy Atkins/Keith	4	8.3
East Indian	2	2.1
St. Julian	1	4.2
Papaya	1	2.1

reaching the market. Cultivating grapefruit instead of oranges therefore represents a risk-minimization as opposed to a profit-maximization strategy, because oranges normally command a better price.

Although having a much lower occurrence than citrus, St. Julian and East Indian mangoes have been commercially grown by farmers for many years, but at the time of survey, cultivation of Tommy Atkins/Keith varieties was in its experimental phase. However, farmers were generally optimistic about the income-generation potential of these varieties.

Cultivation Practices

Once established, orchards are rarely replanted, however replacement of old and diseased plants occurs frequently. Citrus orchards are established from seedlings

acquired either from the Ministry of Agriculture nurseries through local extension officers, or from nurseries on large vicinal farms. Minimum tillage is involved in planting the seedlings in holes excavated to a depth of about 25 centimetres. Entire seedlings are normally "dusted" with a powdered pesticide to deter worms and aphids. Specifications for the layout of citrus orchards are available from a variety of official sources including the JAS and extension officers, but farmers seem to have relied primarily on more knowledgeable members of their community for such information. An extension officer explained that specification for citrus orchards involves a grid layout with a distance of about 3.5 metres between plants in a row, and the same distance between rows. For this reason, land being prepared for citrus is normally "stringed out" to ensure straight rows and appropriate spacing of plants. These specifications were not always adhered to on the farms observed, and spacing was often irregular, reflecting instead the contours of the slopes on which these farms were located. Normally, citrus orchards are cultivated under a system of monoculture, but there were a few cases where grapefruit and oranges were interplanted with non-orchard tree crops, such as coffee and cacao. Newly established citrus orchards have a maturation period of between five to six years, but once maturity is reached, maintenance of the orchard progresses at an even pace. To prevent battering and bruising of fruits during harvesting, a mat of short grass is encouraged to grow under the trees, providing a cushion for falling fruits and a source of mulch for the orchard. Seasonal pruning occurs and the base of plants

are painted with white lime, a limestone derivative mixed with water, as a deterrent against citrus mites.

Except for a specification requirement of four metres between plants, the layout and maintenance of mango orchards is similar to that of citrus. St. Julian and East Indian seedlings were obtained from the Ministry of Agriculture nurseries, but the four farms which were experimenting with Tommy Atkins/Keith varieties, obtained their seedlings from the former Spring Plain Farm.

Use of chemical fertilizers was widespread among these farmers. A local extension officer explained that although minimum tillage helps to maintain the nutrient equilibrium of the soil, as with most systems in which crops are planted in pure stands, large inputs of fertilizers are required to maintain soil fertility. In cases where grazing livestock are kept, the animals are tethered among the trees to keep the grass low. Even goats, which are the most voracious of grazing animals do not feed on citrus leaves. Farm manure produced by these animals also helps to maintain soil nutrients in the orchards. Some animals such as cattle will feed on mango as well as on the leaves, but the trees are sufficiently tall as to avoid this problem. If "weakness" is discerned in the fruit trees, then fertilizer might be added, assuming the tree was not old or diseased. Aphids and citrus mites are of particular concern to orchard farmers, and trees are sprayed with pesticides if infestation is observed.

Harvesting of citrus normally occurs between March and the beginning of the rainy season in May; a time when extra hands are usually hired for the process. Two or more persons are required to harvest each tree because the ripened fruits which are picked by a climber must be caught by person(s) on the ground so as to prevent battering and bruising. This concern becomes less severe if the grassy undergrowth is sufficiently matted so as to prevent damage. As most orchards lack vehicular access, donkeys and mules are employed to transfer the harvest to sites where they can be loaded onto trucks for transport to markets. Harvesting of mangoes is similar to citrus, except that fruits are reaped when "fit" or "turn", i.e. at the stage just before ripening.

INFRASTRUCTURAL CHARACTERISTICS

The infrastructural considerations which follow are specifically related to export-orchard crop farming and are identical to those of the export non-orchard farming group.

Marketing

Although farmgate prices were negotiated by the Citrus Growers' Association, citrus were sold directly to processing factories. Membership in the CGA was not a prerequisite either for benefits from these negotiated prices or for the collection and transportation arrangements between factories and farmers. Nevertheless, liaison between factories and farmers was usually established

through a local CGA member, who conveyed reaping and farmgate pick-up schedules from factory to farmers. Payment advice was also conveyed by the same personnel. At the time of this survey, the farmgate prices for oranges, ortanique and grapefruit were J\$6,834, J\$9,259, and J\$6,355 per tonne, respectively. No attempt was made to ascertain precise incomes from these crops because of prior knowledge of farmers' suspicion of income-related questions. However, based on farmers' estimate of their average production of between three and four tonnes of grapefruit per season, average income generated from sale of this produce is about J\$19,065 to J\$25,420 per season. Some citrus, particularly grapefruit were sold to higglers for resale at urban outlets. As higglers bought grapefruit at J\$126/100 fruit, or about J\$5,510 per tonne, the preference of farmers was to sell their crops to the processing factory.

Marketing of mangoes was less formal than citrus and prices were negotiated between individual farmers and buyers, namely processing factories, private exporters and agricultural higglers.

Farm Assistance

Receipt of farm assistance by this group was the lowest of the export categories of farming, and probably relates to the fact that receipt of assistance is often related to membership in commodity associations. None of the crops emphasized by this group involved automatic receipt of assistance, nor was membership in an

organization mandatory for sale of produce. Twelve farmers received farm assistance from formal sources. Assistance consisted primarily of technical advice pertaining to pest management and the acquisition of quality seedlings from the Ministry of Agriculture nurseries. Three farmers received farm loans from the People's Cooperative Bank, two for the expansion of citrus orchards and one for the planting of mangoes. However, like other small farmers, this group seemed generally reluctant to seek farm loans, reflecting the notion that their land title might be required as collateral.

Support Organizations

Fifteen (31.3 percent) farmers were members of support organizations. This proportion was 14.3 percent lower than normal and the second lowest among the categories of farming. It is consistent with the pattern of farm-assistance receipt among them as well as with the trend whereby farmers' interest and participation in these organizations begin to decline after a certain stage in their career (supra p.334). As with the previous group, this attitude stems from a general perception that there were no real benefits to be reaped from participation in these organizations because they have consistently failed to deliver on their mandate. Although citrus is the main crop grown by this group, only three farmers were paid-up members of the CGA. The consensus was that the few additional benefits, such as occasional provision of equipment, for example pruning shears, were not sufficient to attract potential participants. Generally, farmers perceived

the CGA as a "big man" organization, since larger farmers benefited most from its activities, especially negotiation of reduced duties on imported farm equipment such as tractors and pesticide applicators. Despite their low level of participation in support organizations, the frequency of visits by extension officers was similar to the sample average, supporting the earlier argument that the level of interest displayed by extension officers towards farmers is related to crop emphasis rather than to their level of participation in support organizations.

CASE STUDY

At 68 years old, Fred is representative of this category of farmers, not only because he belongs to the modal age group of over 55 years, but in addition, over 70 percent of the farmers in this modal age group are over 60 years old. Likewise, the agrophysical characteristics of Fred's farm are modal to his group.

Personal History

Fred lives in the small community of Rooseths located in the Mountain region of northern Clarendon. Although he receives a "small" pension from the sugar factory where he worked for 26 years before he was forced to retire 16 years ago due to a severe neuritis, his main source of income is from grapefruit farming. Prior to his retirement Fred was a part-time farmer, cultivating mainly sugar cane and ground provisions. His grapefruit venture started after his retirement, and at the expense of sugar-cane cultivation.

Fred attended school up to Form Two where he sat and was successful in the Third Year exams. This exam qualified him to matriculate for a teachers' college but instead he went into a two-year apprenticeship as a mechanic after leaving school at age 16. This apprenticeship was cut short owing to the migration of his boss, leaving Fred to return home and help his parents on the farm. When he was 26 years old, Fred went to work as an assistant in the boiler room at a sugar factory in southern Clarendon where he remained until his retirement, by which time he held the position of supervisor. He was legally married two years after being employed at the factory. There are no children from this union, but the couple have "raised many children from the area" and at the time of the survey, the 81-year old parents of his wife, a grandniece and two informally adopted boys aged 14 and 11 resided in his household. By community standards, Fred and his wife are considered well-off since they occupy a four-bedroom house complete with basic utilities, such as electricity, refrigerator, gas stove and plumbing. In addition, the couple's strict adherence to Christian principles of kindness and regular attendance at church have earned for them a high level of respect in their community.

Human Resource

Fred's illness prevents him from doing any of the physical work on his farm, but he actively supervised all agricultural activities. Likewise, his wife's contribution to farm labour is minimal. Farming activities were therefore undertaken by four

seasonally-employed labourers with some input from the two adopted boys. Labourers were required twice per year. First, during the pruning/cleaning season between June and July, and then at harvest in April. During pruning, Fred supervised the removal of feeble and dead branches from the orchard and the white liming of the bases of trees. The adopted boys are usually commissioned to help with the latter. Labourers were employed on a piece rate of J\$2.50 per square metre for cutting down undergrowth in the orchard, but pruning was undertaken on a day-work basis at a rate of J\$130 per day. On this basis, Fred estimated that the maintenance cost of his orchard was J\$11,500 in the previous season.

Harvest is the busiest time on Fred's farm and in addition to three or four labourers he normally hires, the two boys were often required to be absent from school in order to "work the donkeys" which were used to transport the fruits to roadside locations where they could be loaded onto trucks. Like other small grapefruit farmers and in contrast to the large citrus estates which used climbers with burlap sacks to harvest grapefruit, Fred used the picker-catcher method on his farm. He produced 7.5 tonnes of grapefruit in the previous harvest, and at a farmgate price of J\$6,355 his estimated income from this source was J\$47,663.

Agrophysical Resource

Fred's legal landholding consists of two fragments totalling 3.9 hectares, but his

decision-making responsibilities are confined to a 3.5 hectares fragment, the other having been "given" to his nephew "to work". Although larger than the average farm size for this category, Fred's holding can be considered to be representative because it falls within the modal farm size for this category.

Fred's houseplot slopes gently from southwest to northeast and although the soil is clayey, drainage is enhanced by slope. He bought this piece of land about 34 years ago, with money earned from his job as a sugar-boiler. His second plot was a part of the family land which was subdivided among him and his siblings after the death of his mother.

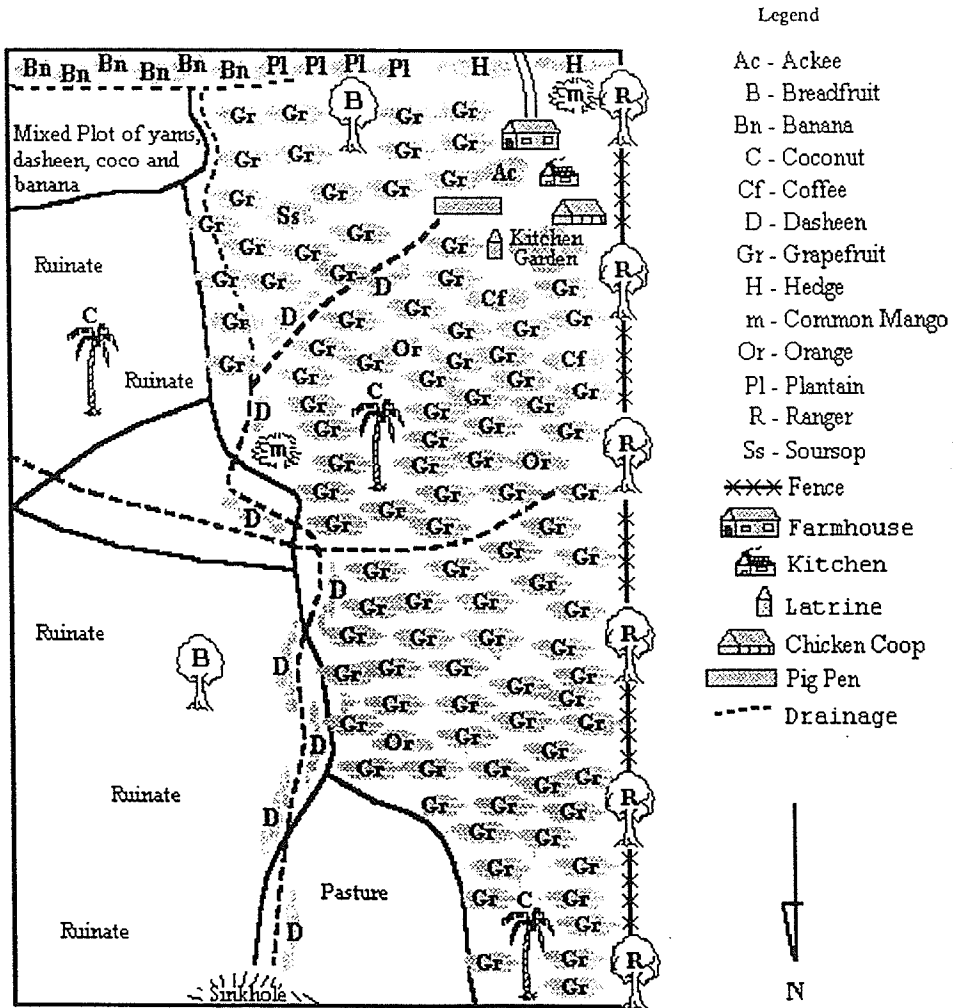
Land Use

Besides his citrus orchard, Fred cultivated a wide variety of other crops mainly for the subsistence of his household. When there is surplus of them, they are sold to higglers. In addition he had two cows, five goats, one sheep, some common fowls, one donkey and four pigs kept in a large pen located on his property. Before his health declined Fred reared "quite a number" of pigs, but over the years he had reduced the number, not only because of failing health but also because the feed had become too expensive and the price of pork had declined. At the time of survey he was contemplating complete cessation of his pig-rearing activity. As is typical of other small farmers, the livestock component of Fred's farm represent part of the day-to-day subsistence of his household as

well as his pool of "hardship income". For instance, his common fowls are a regular source of meat and eggs, while cows, pigs and goats are sold to provide funds for special occasions such as Christmas festivities.

The pattern of land use on Fred's holding (Figure 14.2) is influenced both by agrophysical considerations, such as slope angle and soil drainage, and human factors, primarily praedial larceny and the desire for privacy of his yard and the contents of his property. As a deterrent to praedial larceny, the farmhouse is situated at the highest point on his land, overlooking the rest of the property. Tall, leafy banana and plantain, along with a dense hibiscus hedge forms the boundary with the main road and provided a visual barrier to the yard and orchard. The orchard is further protected on the western boundary of the property by a four-strand barbed-wire fence stretching between "quickstick" or ranger trees. Quickstick is preferred as fencing support because they become full-grown trees and are a common source of fodder for grazing livestock. In this regard, these trees were constantly harvested by the two boys and fed to the cows and goats. Close to the farmhouse is a small kitchen garden where Fred's wife cultivated vegetables, legumes, and various herbs and spices for household consumption. The grapefruit orchard spans the entire length of the property from south to north, but is somewhat skewed towards the western portion. The entire orchard is therefore visible from the farmhouse, deterring praedial thieves. The "grung", which consists mainly of root crops is vulnerable to praedial theft and

FIGURE 14.2
 TRADITIONAL EXPORT ORCHARD-CROP FARMER: FIELD SKETCH



is therefore located on the flatter portion of his land in proximity to the farmhouse where it can be "watched". Planting root crops on the gentlest slope is a strategy to reduce soil erosion, because extensive tilling and exposure of soil to the elements before the germinating plants can provide vegetative cover, increases the risk of soil erosion.

Land allocated to pasture or ruinate was situated farthest from the farmhouse. Fred explained that much of the area that is ruinate and pasture consists of heavier soil which is susceptible to waterlogging during heavy rainfall, but which could easily be treated with trenches. A revealing feature of Fred's land use is the large proportion in ruinate. Over a third of his land is unused, although he acknowledges that with minimum soil treatment much of the unused land could be cultivated with citrus, sugar cane, root crops and food forest. Indeed, much of the area in ruinate along with that in citrus orchard was formerly occupied by sugar cane. Although the price for sugar was good, securing labour and supervising sugar-cane cultivation was sufficiently stressful to him that he switched to citrus cultivation. His citrus orchard was confined to its present limit because he could not properly supervise a larger operation. Nevertheless, he was optimistic that when the boys got older they might be able to help supervise and provide the physical labour to expand the orchard, that is, if they remained in his household.

Infrastructural Resource

Fred's entire grapefruit harvest is marketed through the CGA of which he was one of its few members. In spite of his relative success at farming, Fred had always been apprehensive about the use of farm loans. During the period when he emphasized sugar cane, he had toyed with the idea of applying for a loan to expand production, but was dissuaded by his wife because of her paranoia of losing their land should they be unable to repay the loan.

Although Fred's farm had not been visited by an extension officer during the two years prior to this interview, these officers had visited occasionally, providing advice on aspects of his farm operation, such as pruning and the application of pesticides. Fred is a member of the JAS and the CGA, and although dissatisfied with their performances because "dem never keep dem promises", he has secured some of the principal literature they publish. He is one of the few farmers to keep an updated McDonald's Almanac. In addition, he keeps a Farmers' Guide and a Citrus Guide, published by the CGA.

Factors Influencing Decision-Making

Fred's agricultural decisions are influenced by human factors, such as his age and health, and agrophysical considerations such as his farm size and land capability. By virtue of his age, the position he occupies on the farming continuum is characterized by the largest mean farm size among the categories of farming.

However, in spite of failing health and the land he has accumulated, his shift from sugar cane to citrus was only possible within the physical capability of his land.

Summary

This group of farmers share jointly with the other export-oriented categories, a location on the progression which is characterized by committal to small farming as a way of life. At a mean age of 54.3 years and with over 54 percent of them older than 55 years, their focus as small farmers is to a large extent fixed, and their potential for further development more or less stagnant.

Despite commonality in age with the previous group, these farmers are distinct from other categories not only because of a difference in crop emphasis, but also with regard to their agrophysical resource base. They have accumulated holdings which are on average 20 percent larger than the norm and have achieved the highest level of tenurial security among the categories of farming, individually or jointly owning over 90 percent of the land they occupy. Export orchard-crop farmers have continued the land-divestment trend initiated in the previous group, passing on more distant fragments to older offspring. In spite of their land-divestment trend, they had the highest proportion of unused land among the categories of small farmers, an ominous sign for improvements in the productivity of their land. There are indications that the level of unused land stems from the

inability of these ageing farmers to physically cope with maximizing the productive utility of their holdings.

Despite their high level of tenurial security, the occurrence of formal credit, particularly loans was woefully lacking. To some extent, this reflects paucity in the provision of credit for small farming, but more profoundly it results from a low occurrence of legal claim to land in the form of titles and the general reluctance of farmers to utilize existing facilities, owing to a mainly unsubstantiated fear of losing their land.

CHAPTER 15

CONCEPTUALIZATION OF THE DEVELOPMENT OF TYPES OF SMALL FARMING

Comparison of key variables which distinguishes the categories of farming, indicate that these types of farming have not emerged randomly, but instead have followed defined pathways, which are influenced by on the one hand a set of social and economic factors and on the other by ecological considerations. This chapter is the final of the three-tiered rationalization of small farming which was proposed earlier (supra p.123). In this regard, it establishes the empirical foundation for a conceptual model of the relationships between these categories, and the physical setting in which they predominate.

Observation of these defining variables suggests that while differences occur among individual categories of farming, the greatest distinction exists between the two broad groups into which they fall, namely, those which are either domestic-market or export-market oriented (Table 15.1). As such, statistical analysis involving comparisons of proportions (χ^2) for these variables, focusses on these broad groups. It follows therefore, that the conceptual model which is proposed highlights these two groups. This focus is in line with the basic concern of this research, i.e. problems relating to domestic-food supply in Jamaica.

Chi-square results from the crosstabulation of these variables with domestic- and

TABLE 15.1
COMPARISON OF KEY VARIABLE AMONG CATEGORIES OF FARMING

Variables	TYPES OF FARMING						
	Domestic-Market Oriented			Export-Market Oriented			
	Vegetable and Legume	Domestic Provisions	Domestic Group	Export-Field Crop	Export Non-Orchard Crop	Export Orchard Crop	Export Group
Age:							
Mean Age (yrs.)	47.1	49.6	48.8	51.3	54.0	54.3	52.7
Age distribution (%):							
< 40 yrs.	33.3	21.2	24.7	21.7	18.4	20.8	20.0
40-55 yrs.	33.3	48.5	44.1	32.6	30.3	25.0	29.4
> 55 yrs.	33.3	30.3	31.1	45.7	51.3	54.2	50.6
Intensity of labour input:							
Mean no. of hrs./ha./week	24.3	20.9	21.9	14.5	18.3	17.5	17.0
Farm Size:							
Mean farm size	1.86	1.90	1.86	2.30	2.10	2.40	2.25
Farm size distribution (%):							
< 2.0 ha.	55.5	60.6	59.1	43.4	46.1	35.4	42.3
2.0 - 3.0 ha.	37.0	21.2	25.8	28.3	34.2	29.2	31.2
> 3.0 ha.	7.5	18.2	15.1	28.3	19.7	35.4	26.5
Tenure:							
% Area:							
Owned *	80.3	79.9	79.9	86.8	90.2	90.4	89.2
Rented	18.5	19.3	19.1	12.7	9.8	5.6	9.5
Caretake	1.2	0.8	0.9	0.0	0.0	4.0	1.2
Squat	0.0	0.0	0.0	0.5	0.0	0.0	0.1
Land Use:							
% Area in:							
Domestic crops	35.1	28.8	30.6	22.4	20.8	21.4	21.1
Export crops	18.2	38.3	32.5	43.0	39.6	32.3	38.3
Pasture	19.6	8.1	11.4	13.5	20.2	15.1	16.8
Ruininate	27.1	24.8	25.5	21.0	19.5	31.2	23.8

* Leased land is incorporated into the owned category for this comparison, owing to the moves by government to transfer ownership of these lands to occupant farmers. As such, their tenure is considered to be secure.

export-oriented farming show that there is an over 90 percent probability that the differences between these two groups are not due to chance (Table 15.2). What is noteworthy is that the variable displaying the lowest level of confidence (0.1)

Variable	Calculated χ^2	Critical χ^2	Confidence Level
Age Distribution	10.05	9.21	0.010 (0.990)
Farm Size Distribution	7.50	7.38	0.025 (0.975)
Land Tenure	12.80	11.70	0.020 (0.980)
Land Use	7.50	6.25	0.100 (0.900)

Note: Values in parentheses denote probability levels

land use - the very basis for the classification of farming categories. This implies that the area of land allocated to specific crops or groups of crops among different categories of farming is not always a reliable proxy of the economic importance of these crops, as they relate to income generation. Indeed, the scenario has arisen where domestic-provision farmers allocated a larger proportion of their land to export crops, although these were not the main source of their farm income (supra p.262).

That the distribution of proportions among domestic-market and export-market oriented farming is not due to chance, implies longitudinal transitions between these groups and points to the existence of a progression in small farming - within ecological zones. Modelling of such transition would be valuable in order to gain

further comprehension of how farmers evolve in this progression, as well as to determine its specific characteristics. However, because the focus of the survey is on cross-sectional data, a model depicting longitudinal change must therefore be largely based on conjecture, owing to the absence of sufficient longitudinal data. Thus, the conceptual model of small farming derives from the observation and analysis of cross-sectional data from this survey, together with personal familiarity and knowledge of the dynamics of Jamaica's rural sociology, anthropology and economic research which had presented profiles of small farmers, such as that of Smith (1956, 1960), Cumper (1958), Clarke (1957) and Edwards (1961). In addition, the case studies previously presented in this study go some way in providing longitudinal data as a basis for reasoned conjecture.

There are three steps which are involved in the development of this model. The first is the provision of a conceptual framework for its development. The second is an examination of its components and their interrelations via transitional pathways. The third is a debate of the implications of the model, particularly with respect to its usefulness in small-scale agricultural development planning.

Conceptual Framework

Ecological factors strongly influence the productive capability of these farmers, as within any ecological zone there exists a range of feasible agricultural production options, because unique combinations of physiographic factors allow

a variety of land uses. The option chosen is a function of the interrelationship between human, agrophysical and infrastructural factors. Although these options may vary from one physiographic region to another, this study has established five production categories of small farming, which in terms of market orientation are either domestic or export.

In developing this model, it is assumed that there is within the ecological zones, at least one choice between a domestic- and an export-crop emphasis available to farmers. It is further assumed that farmers generally perceive export-crop emphasis to be more desirable than a domestic one, owing to better market security, income expectation and social status. Consequently, the export-crop emphasis stage of the progression is characterized by a higher level of tenurial security and larger farm size.

The Model

Figure 15.1 represents a schematic view of the linkages between types of small farming. The model consists of four components whose interrelationships provide some insights of the progression from one stage to another. These components are:

- 1) Ecological considerations which underscore the entire process.
- 2) Production options and crop emphasis which currently exist among sampled farmers and are the basis of the farm categories.

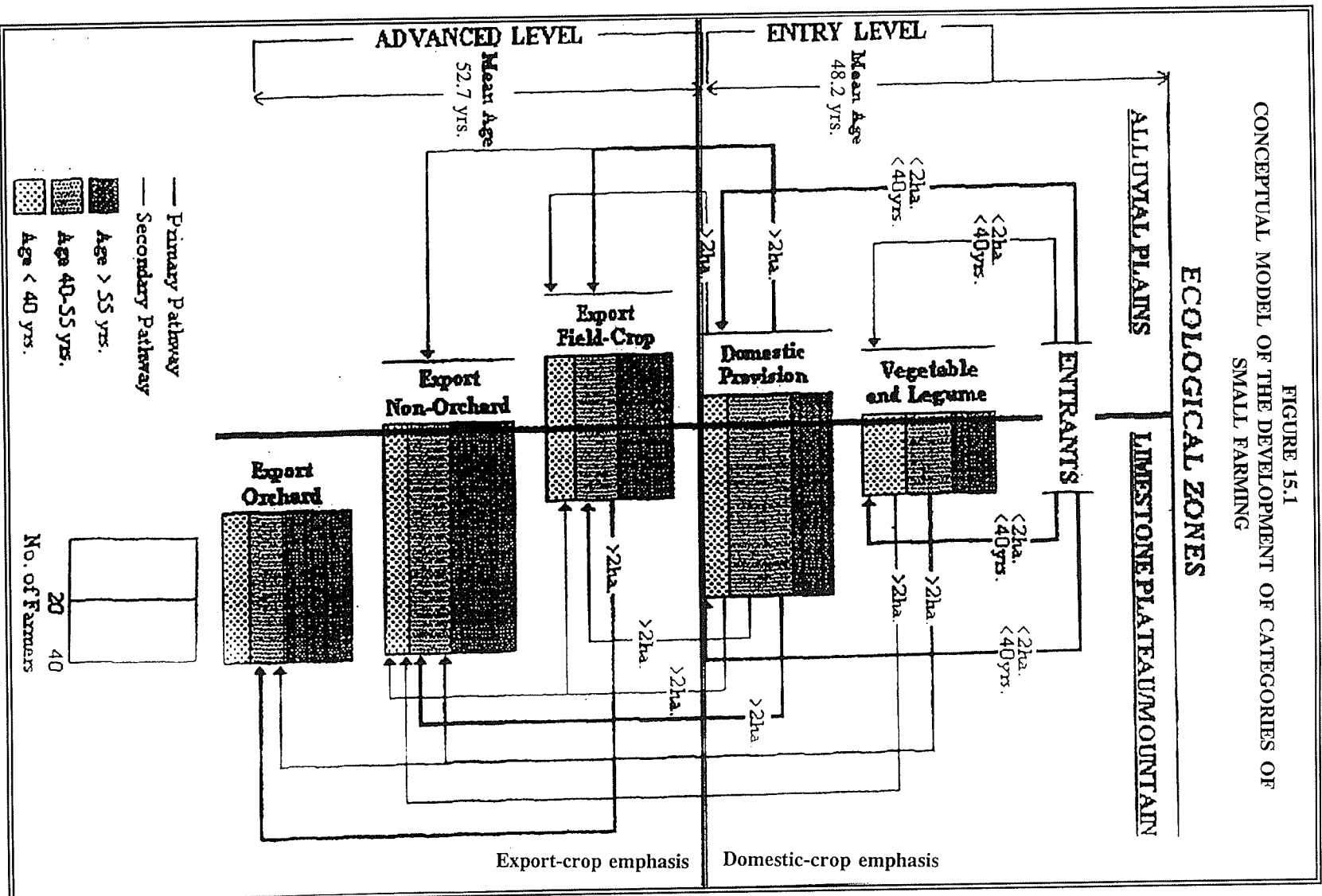
- 3) Social considerations, reflecting the relationship between age of farmers and farm size.
- 4) Transition pathways which define the relationships between the categories of small farmers.

Although the study area was subdivided into three physiographic regions (supra p.93), for the purposes of this model, these have been combined into two; namely Alluvial Plains and Limestone Plateau/Mountain ecosystems. This division forms the vertical axis for the model. As the majority of sampled farmers reside in the latter ecosystem, Figure 15.1 is heavily skewed to the right of this axis. The horizontal axis divides the model into the domestic- and export-crop emphasis categories of farming.

Production options in the model are based upon the distribution of farmers in their respective categories, and are aligned along the vertical axis in proportion to their relative prevalence and distribution between the ecological zones. Despite their vertical alignment, the categories comprising the domestic group and those comprising the export group are considered to be parallel stages of the progression, owing to the commonalities which exist within groups and the differences which exist between them.

Considerations of age and farm size serve dual functions in the model. Age distribution of farmers within individual categories defines the origin,

FIGURE 15.1
 CONCEPTUAL MODEL OF THE DEVELOPMENT OF CATEGORIES OF
 SMALL FARMING



destination and to some extent, relative significance of the transition pathways which link the categories. In this regard, the under 40-year and 40-55 year age groups were considered to be the origin and destination of the transitions between types of small farming. The shading tone distinguishes age groups within categories and also helps to identify the groups like to progress and which are most active and potentially most receptive to initiatives for the improvement of food supply among small farmers. This assumption is based on the premise that farmers' age is an important aspect of the character of small farming, as it denotes the degree of youthfulness and potential progressiveness or oldness and staidness. Division of the main farming groups according to mean age in relation to the horizontal axis highlights the role of younger farmers in domestic food-crop production. Age, in conjunction with farm-size are key indicators of the stage when farmers will transform their production emphasis from one level of the progression to the next. Such a transition is gradual and calculated on the part of individuals and reflects their personal assets, health and crop preferences. The pathways defining transition between types of farming are considered to be either primary or secondary in nature.

Assumptions of the Model

The model presupposes that farmers initiate their own farming activities, so that land use (initial and subsequent) on their holdings results from their individual decisions. In this regard, land uses which precede their occupation of land have

minimal influence on the production option they emphasize at any point in time. Because inheritance of land is common among farmers, existing land use on a plot which is inherited can affect the crop emphasis of the recipient farmer. The assumption of minimal influence from antecedent land use is considered to be realistic for two reasons. First, purchased land occurs more frequently than inherited land and is characteristically devoid of productive use, in accordance with the maxim that people may sell land but not farms, i.e. land in productive use is generally not for sale. Therefore it is unlikely that by its contents, land which is purchased will influence the productive objectives or emphasis of a farmer. The second reason relates to the nature of inherited land, in conjunction with the stage of a farmer's career when possible inheritance occurs. A farmer may inherit land at two stages in his career. First, when he/she becomes a small farmer or second, when he/she is already an established farmer. Land inherited in the first stage is unlikely to be in productive use, because it typically consists of the most underutilized and inaccessible fragments, which correspond with the land-divestment stage of the progression (supra p.323). The second stage, usually coincides with the death of parents/grandparents, but these recipients are likely to be already pursuing a production option. Finally, the model assumes that small farmers will generally enter their occupation before they are 40 years of age and will transist to other crop emphasis if the necessary criteria are met, i.e. an age at which commitment to farming is entrenched, and a minimum farm size which will support the option which the farmer decides upon. This farm size is assumed

to be at least 2.0 hectares, i.e. about the average size of holdings in the sample. While somewhat arbitrary, this size of holding is considered to be sufficient to support the viable cultivation of export crops, because the majority of these farms exceed this area.

Entrant Farmers

Case studies presented in this study support the claim made by Cumper (1958) and other pioneer sociological researchers in Jamaica, that a young person entering small farming is unlikely to be in a financial position to purchase land. In this regard, access to land is gained initially by permission of a relative, such as parents/grandparents, to use portions of the securely tenured holdings to which the household has access. In instances where relatives have access only to rented land, the entrant farmer may begin farming as a tenant. The default nature of their entry to small farming, in conjunction with non-farming aspirations which limit their commitment to short-term objectives, low levels of financial resources which prohibit establishment of more long-term slow-maturing export crops and comparatively low levels of tenurial security, direct them to the production of quick-maturing seasonal and annual crops such as vegetables, legumes and domestic provision. Consequently, their initial focus of production is considered to be domestic-market oriented.

Entry-Level Farming

Ninety-three (35.4 percent) of the farmers in the sample were operating at the entry level. That the larger proportion of farmers in this group emphasized domestic provisions as compared with vegetable and legume, reflects the wider greater versatility of root crops to grow in a wider range of ecological environments (supra p.249).

Farmers entering this stage of the progression have multi-faceted goals. Although many still harbour aspirations to find non-farming employment, they, nevertheless, consciously endeavour to improve their land-resource situation. This pursuit is not always merely a safeguard against not realizing their non-farming aspirations, because many rural people have a sentimental bond with the working of land and will continue supervising farming activities while pursuing other occupations.

If an entry-level farmer does not meet the land-resource criteria for advancement by the time he/she reaches 55 years, then it is unlikely he/she will progress from this stage. Even if land accumulation beyond this age fulfills the advancement criteria, transition is unlikely to occur because they are beyond the peak of their physical abilities, and the desire for development of land and change in crop emphasis is lacking in the individual. Typically, such people are among the poorest and most resource-deficient of small farmers; a situation which is

exacerbated as they grow older and less able to meet the strenuous labour demands of food-crop production. Within the sample, there are 29 (11 percent) who are thus classified.

Transition Pathways and Processes

The desirability to cultivate export-crops is related not only to better infrastructural provisions and income expectations, but also to farmers' perception that this activity is more status enhancing than the more labour-intensive, cultivation of domestic crops. This perception is likely founded in the social development of plantation societies such as Jamaica, where there has been a long-established association between export production on plantations and affluence, and cultivation of root crops on small plots and poverty. The move to the export stage of the small farming progression is also influenced by the fact that the farmers who meet the criteria for transition have by then, a sizable investment in their land and are at a stage of their life when non-farming options are increasingly limited.

Their declining physical strength limits their capability to undertake the arduous tasks associated with domestic-crop farming, while the need to establish some form of old-age security in farming propels them towards export perennials.

Transition pathways in the Limestone Plateau/Mountain ecological zone are more

varied than those associated with the Alluvial Plains. The primary transition pathway for upland farmers will be towards export non-orchard farming because of the suitability of this ecological zone to such cultivation. Given the absence of any time-series data, the model does not predict the proportion of entry-level farmers who will follow this pathway, however it is reasonable to assume that it will account for the bulk of the movements. The secondary pathway to traditional export field-crop farming in upland locations involves domestic-provision farmers who are located within proximity to interior valleys where sugar cane and tobacco are options. Vegetable and legume farmers are unlikely to make this transition because their dominant location is too far removed from these interior valleys.

The transformation of entry-level production emphasis into traditional export field-crop farms is also more likely to involve farmers who are under 45 years because although sugar cane is classified as a perennial and its labour demand highly seasonal, it is a strenuous activity. Moreover, traditional export field-crops have a lower level of permanence than tree crops, which allows younger farmers to continue entertaining non-farming aspirations. The secondary transition between entry-level farming and traditional export-orchard crops often involves those farmers whose rate of land accumulation has been more rapid than normal. They are therefore considered to be the more fortunate of entry-level farmers.

Movement from domestic-provision farming to traditional export field crops constitutes the primary transition pathway between entry- and advanced-level farming in the lowland ecological zone. The link with traditional export non-orchard crop farming is considered to be secondary because of the low occurrence of these farms on the Alluvial Plains.

Farming transition ends at traditional export field-crop production for those in the lowland ecological zone. Domestic-provision farmers who have met the criteria for transition will therefore enter old age as sugar-cane or to a lesser extent tobacco farmers.

Implications of the Model

This model has implications which, not only have relevance to the study area but can be more widely interpreted, given commonalities in small farming between this region and Jamaica as a whole. These implications are considered within the context of the character of small farming, especially as it relates to domestic-food supply in Jamaica.

The model portrays spatial differentiation in farming activities in the progression, owing to ecological variations between upland and lowland zones. The bias of farming activities towards upland zones occurs not only because of a greater

concentration of farms there, but also as a result of the existence of a wider range of production options.

The level of transition between domestic- and export-market oriented farming is highlighted by a difference in mean age between these two types of farming, by age distribution within individual categories and by the farm-size threshold which influences movement between stages of the progression. That transition pathways are unidirectionally towards export-crop farming, implies a flow of human and agrophysical resources in that direction - a situation which holds negative implications for domestic-food supply. The pattern of age and production orientation also draws attention to the stage when external intervention to improve domestic-food supply can be most effective. In this regard, farmers who are older than 55 years have already settled into the production option which is their final destination and therefore are dormant with regard to the entertainment of alternative options. That this age category accounts for nearly 44 percent of the sample, represents a challenge to strategies for improving and sustaining domestic-food supply. Consequently, the success of these strategies depends on the extent to which those farmers who are under 55-years, and particularly those in their 40s or younger, are targeted. Paradoxically, this research demonstrates that younger farmers are not only more deficient in agrophysical resources than older ones, but their level of tenurial security - a common criterion for participation in agricultural development projects, is lower. Resolution of this

paradox will therefore depend on the extent to which a new set of paradigms in agricultural development planning can be formulated to allow participation of the potentially most receptive stage of the small-farming progression.

Summary

Irrespective of ecological location, each category of farming represents farmers' rationalization of interrelationships between their human, agrophysical and infrastructural resources, within the ecological constraints of the location of their farms. For those who are younger, this rationalization is in constant flux as they adjust their land-use decisions in accordance with changes in resources and their interrelationships. These adjustments define the pathways and establishes linkages between categories of farming on a dynamic development progression. The model shows a small-farming system which is complex and sequential, involving relationships between ecological, social and agrophysical components. The model reveals the dominance of export-crop orientation by small-farmers; a factor which in conjunction with a large proportion of ageing and dormant farmers, present a formidable challenge to improvements in domestic-food supply.

These paradigms should address the issues which bode ill for small farming in Jamaica, such as:

- 1) After the farmers of 55 years and over exit the system, there are few below to take their place. This highlights the urgency with which younger people must be attracted to agriculture.

- 2) The need for policies to allow small farmers, especially the entrants, greater access to land. Related to this issue is the lingering debate on the viability of farms which are less than five hectares.
- 3) The need for government intervention in providing effective marketing outlets for domestic-food crops.

Spatial differences in small-farming dynamics evident in the model are associated with ecological variations. This emphasizes the need for a new set of paradigms in small-scale agricultural development planning which is cognizant not only of social and agrophysical variations in small farming, but also recognizes that these variations have a spatial dimension.

CHAPTER 16

CONCLUSION

By studying a sample of small farmers in the parish of Clarendon, Jamaica, the goal was to improve comprehension of the complex of factors which impact on small farming and by extension, domestic-food supply. As such, the study is intended to make a contribution to an empirical database which can be the basis for the formulation of initiatives to redress the problems of domestic-food security, which plagues Jamaica. The conclusion to this research therefore examines the extent to which these objectives have been achieved. Although these conclusions are based on the survey of small farmers in Clarendon and are therefore particularly relevant to that region of Jamaica, they are intended to be more widely interpreted, because the farming systems in Clarendon are considered to be representative of those throughout Jamaica (supra p.23). The results of the survey have highlighted key factors which influence small farming as it relates to domestic-food supply. These are summarized as:

- 1) ecological considerations;
- 2) the nature and use of human resources;
- 3) the nature and use of agrophysical resources;
- 4) infrastructural considerations and;
- 5) the structure and dynamics of small farming.

Ecological Considerations

The distribution of the sample according to physiographic regions, implies that the majority of small farmers in Jamaica occupy marginal ecological zones, which are characterized by rugged topography, steep slopes, shallow soils and high vulnerability to soil erosion. These factors do not only limit the productive potential of land, but also aggravate problems of land degradation, owing to the low resource and low technological environment in which small farmers operate. As this specifically relates to domestic-food supply, increased levels of land degradation will lead ultimately to further reduction in food output and incomes, thus exacerbating problems of rural poverty.

This scenario implies the need for strategies designed for the development of small farming and improvement in food supply to be holistic, addressing not only issues of more equitable distribution of land, but also taking into consideration its quality and the level of technology available to small farmers.

The Nature and Use of Human Resources

The survey generated data on two aspects of human resource, namely, education and labour. The level of educational attainment was homogeneously low throughout the sample, having weak linkages with other factors which influence small farming, a finding which corroborates those of Brierley (1974:272), and Collymore (1985:161). As such, this study did not attempt to relate level of

education with productive behaviour among the sampled farmers.

Shortage of labour was a common complaint among sampled farmers. Analysis of household size, age/sex composition and fitness levels of their households, provide a proxy of potential labour availability and it reveals that an adequate if not surplus supply was available from this source. That household members are not utilized by farmers to their full potential, results in household heads consistently contributing over 60 percent of total household labour input. The implications of this phenomenon for the continuity of small farming and improvement in domestic-food output is far-reaching, because at an average age of 51.8 years, most of these farmers are either approaching or beyond the peak of their physical capabilities. As domestic-food crop production is the most arduous component of their enterprise, it is likely the first to be subject to a decline in production as farmers become physically restricted in their labour inputs. Most will continue producing food for their households given their innate desire to satisfy household demands, but the cash-crop portion of this activity is likely to diminish and ultimately be eliminated.

In all likelihood, younger members of farm families will become involved in small farming, providing a degree of continuity to the production of domestic-food crops. However, this usually occurs by default, i.e. when non-farming aspirations have failed or while they await the opportunity to attain these

aspirations. In this regard, this continuity of domestic-food supply is unreliable. Interventions to address problems relating to the underutilization of farm labour must be cognizant of the perceptions and attitudes which bring about this problem. This study has examined these attitudes only in a cursory manner, but indications are that unless development strategies can improve levels of income among small farmers, thereby promoting this occupation as a viable and respectable source of livelihood, then the negative perception of small farming connoting as it does, low social status and poverty, will continue to prevail. Consequently, parents will continue to discourage their offspring from becoming involved in small farming and to encourage them to aspire towards non-farming endeavours.

This prevailing trend implies the need for further research into how small farming can be promoted and improved. With respect to domestic-food production, the favourable assessment given the disbanded AMC by sampled farmers reflects the need for a domestic-marketing system which guarantees an outlet for their produce and provides the opportunity to obtain a reliable source of income. The challenge of such a system is the extent to which prices and incomes can be made to be competitive with those of export crops in order to stymie the progression of farmers towards export-crop production (supra p.391). In light of the fact that Jamaican agricultural producers function in a global arena, where markets are becoming increasingly open, this challenge is especially formidable. As Jamaica

is signatory to the General Agreement on Tariffs and Trade (GATT), there is created the potential for increased levels of competition from low-cost producers, such as those in the United States (Planning Institute of Jamaica 1993:VII). In view of the binding requirements of the GATT and in face of such disparate competition, promotion of the need for domestic-food security could be an elusive task.

The Nature and Use of Agrophysical Resources

The agrophysical resources of the sampled farmers were assessed with regard to the size of farms, land tenure and use. Two aspects of agrophysical resource use are of particular concern, as they relate to domestic-food output, namely: the proportion of unused or idle lands which occur on holdings; and the allocation of productive land use between domestic- and export-crop production.

The pervasiveness of a substantial proportion of unused land, irrespective of the size of farms, the age of farmers and the orientation of their production, is a puzzling phenomenon. While some unused lands are in fallow, as commonly explained by farmers, because even where the production emphasis is on export perennials, thereby eliminating the need for rotation of fields and bush-fallow, it is still necessary to rotate the domestic provision component of their enterprises. But herein lies another dimension to this puzzle, because chemical fertilizers which can eliminate the need for bush-fallow, is widely used by most farmers on

all categories of crops. From this perspective, the proportion of "fallowed" land observed on these farms, seem unwarranted.

The true cause for unused lands is not substantiated by this study, but two possibilities can be proffered. The first is economic and relates to the fact that the unproductive use of land might be a rational economic decision by farmers, especially as it relates to domestic-food crops, the market for which is highly fluctuating, uncertain and poorly organized. In this regard, farmers may perceive their current use of land and level of production as optimum, which minimizes the risk of income loss due to an uncertain market. This would explain the lamentation by some farmers about times when their crops "spoiled in the fields" or when they had to "give food away" to higglers.

The second relates to the use of chemical fertilizers. That fertilizer was often inappropriately applied in terms of quantity and quality, might explain the need to continue land rotation and hence fallowing, because crops will not benefit from liberal applications, especially if these can burn root systems.

Irrespective of the cause of these unused lands, they impact negatively on total output and potential production for domestic consumption, because the productivity of land is reduced by precisely the amount which remains unused. However, if the utilization of idle lands results in surplus which leads to flat

markets, then there can be no economic rationale for bringing such lands into production. This indicates the need to provide domestic-market outlets within the ambits of a national plan for agriculture development. The promotion of agro-processing should be a crucial component of this plan.

That small farmers collectively devote a larger proportion of their land to export than domestic crops, is one of the paradoxes highlighted in this study. This situation cannot be explained merely by the economic rationale related to higher levels of income expectation associated with better market security for export crops. Indications are that it might also be related to the social dynamics of the small-farming progression (supra p.388). This is a disturbing revelation, because it adds another degree of complexity to the issues which must be addressed in the resolution of domestic-food supply problems. Merely attracting younger people in farming cannot be a sustained solution, especially if their progress ultimately leads to their becoming export-crop producers. Moreover, there is no guarantee that by providing land for younger people as an incentive to attract larger numbers of would-be farmers, will not result in immediate transition to export-oriented farming. Here again, solutions to this problem clamour for a holistic approach, which appropriately matches corrective measures with strategy objectives. In this regard, recommendation is for the design of small-scale agricultural development initiatives which not only attract younger, vibrant

individuals, but also ensures that the objective is to increase domestic-food production.

Infrastructural Considerations

Infrastructural constraints which plague small farming have been a common and extensively explored theme in a large number of studies relating to rural development of Jamaica. The findings of this study do not add any new insights to this concern, but serve to reiterate the need for a comprehensive set of policies relating particularly to market and farm credit, that will bring small farmers into the mainstream of agricultural development planning.

The Structure and Dynamics of Small Farming

The development of a classification scheme based on the crop emphasis of sampled farmers and subsequent conceptualization of linkages between types of farming via a series of stages, is considered to be the most insightful contribution of this study. The highlight of the model (Figure 15.1) is its identification and schematic presentation of stages in a small-farming progression, which is characterized by an age-influenced progression from domestic- towards export-market oriented farming. The model suggests that new entrants to small farming have a domestic-market orientation in their crop emphasis, but as they grow older and become better established and committed farmers, this emphasis shifts in favour of the production of export crops. However this shift in emphasis depends

on the extent to which a basic farm-size criterion is met. The specific crop(s) option emphasized by farmers at any stage is limited by ecological factors, because small farmers typically lack the resources and the technology to create new ecological possibilities.

With regard to the potential for improvements in domestic-food supply, the model implies the need for intervention at the entry level of small farming, because older farmers, although better endowed with agrophysical resources, have already become entrenched in the production option which is likely to be their final destination on the progression. As such, they are unlikely to be receptive of initiatives which promote an alternative option. However, the targeting of entry-level farmers must first address the issue of land-resource endowment. This is because the portion of the continuum occupied by young farmers is also the most land-resource deficient. Given the historically poor success rate of initiatives relating to land redistribution in Jamaica, this is a daunting task. While there are no easy solutions to this problem, further research is required. Such research can, for instance, focus on the evaluation of past strategies, such as Project Land Lease, thereby shedding new light and providing a more informed basis for agricultural policy-making.

While this study has provided some new insights on small farming as they relate to domestic-food supply in Jamaica, it has also generated a host of pertinent

topics which require research, so as to contribute to further comprehension of the complex issues relating to improving food output from the small-farming sub-sector. For instance, in light of the internal and external factors which impact on domestic-food supply:

- 1) Can there be food self-reliance in Jamaica?
- 2) Given the prevailing situation in Jamaica's agriculture, can there be sustainable food supply from a domestic source?
- 3) What are the potential effects of an increasingly open market on domestic strategies for improvements in food supply in Jamaica?
- 4) In the global arena, what is the role of Jamaican domestic-food producers, particularly in relation to the GATT?

Whatever the responses to these topics, it is evident that a comprehensive understanding and appreciation of the dynamics of small farming is a necessary prerequisite to effectively address the problems of domestic-food security. Critical to this understanding is cognizance of the diversity within small farming and the nature of interactions among its various components. When these components are identified and clarified, they can form the basis for educated strategies for the sustainable development of small farming and the enhancement of domestic-food security. It is in this regard, that the classification scheme and the modelling of the small-farming progression, provides a basic platform for agricultural development planning and lays the groundwork for further research,

which will further enhance comprehension of the interrelationships between small-scale agriculture and national food security.

ENDNOTES

- (1) Food forest is a term used in the Caribbean to describe a particular type of agronomic practice where a large number of useful plants are grown together in a multi-tiered configuration. The number of useful species in a food forest can exceed 50 and this complex is not only of importance to the system of food supply, but in addition, is of ecological advantage, especially in regard to natural biological pest control, more effective utilization of solar energy and better distribution of carbon dioxide, which enhances the rate of photosynthesis (Hills and Iton 1983:26).

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Plan of Action

Annex I - Economic and Social Development

Annex II - Rural Poverty

Annex III - Food Systems and Food Security

Annex IV - Natural Resources and the Environment

Annex V - Crops, Livestock, Fisheries and Forestry

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APPENDIX I

COMMON AND BOTANICAL NAME OF CROPS

Common Name

Botanical Name

Export Crops

Cacao	Theobroma cacao
Coffee	Coffea arabica, c. robusta
Citrus	Citrus spp.
Sugar Cane	Saccharum officinarum
Tobacco	Nicotiana sp.
Pimento	Pimenta officinalis

Domestic Crops

Roots/Tubers

Yams	Dioscorea spp.
Sweet Potato	Ipomoea batata
Dasheen	Colocasia esculenta
Cassava	Manihot esculenta
Sorrel	Rumex sorale
Irish potato	Solanum tuberosum
Badoo	Colocasia antiquorum
Beetroot	Beta vulgaris
Arrowroot	Maranta arundinacea

Vegetable/Legume

Lettuce	Latuca sativa
Tomato	Lycopersicum esculentum
Cabbage	Brassica oleracea
Cucumber	Cucumis sativus
Carrot	Daucus carota
Pumpkin	Curcubita pepo
Cho-cho	Sechium edule
Okra	Hibiscus esculentus
Sweet pepper	Capsicum frutescens
Eggplant	Solanum meligena
Calaloo	Smarathus viridus
Red pea	Phaseolus vulgaris
Cow pea	Vigna unguiculata
Congo pea	Cajanus cajan

Vegetable/Legume (Cont'd)

Peanut

Arachis hypogaea

Condiments/Spices

Ginger

Zingiber officinale

Hot pepper

Capsicum annum

Annatto

Curcuma longa

Thyme

Thymus vulgaris

Eskellion

Allium ascalonicum

Mint

Mentha sp.

Onion

Allium cepa

Fruits

Breadfruit

Artocarpus incisa

Banana (including plantain)

Musa spp.

Ackee

Blighia sapida

Mango

Mangafera indica

Soursop

Annona muricata

Starapple

Chrysophyllum cainito

Coconut

Cocus nucifera

Jackfruit

Artocarpus integrifolia

Naseberry (sapodilla)

Achras sapota

Sweetsop

Annona squamosa

Guava

Psidium guajava

Melon

Curcubita melopepo

Roseapple

Eugenia spp.

Cashew

Anacardium occidentale

Guinep

Melicocca bijuga

Papaya

Carica papaya

Custard apple

Eugenia malaccensis

Cereals

Corn

Zea mays

Rice

Oryza sativa

Source: Wigley (1988) Appendix III pp.xiii.

APPENDIX II

QUESTIONNAIRE
DOMESTIC FOOD PRODUCTION AND SMALL FARMING - CLARENDON, JAMAICA, 1987

LOCATION: _____ DATE: _____ CASE NO: _____

SECTION 1: BASIC FARM INFORMATION

1. How long have you been working land for yourself? (No. of years)
2. About how much of your income is derived from sale of produce?
0 - None 1 - 1/4 2 - 1/2 3 - 3/4 4 - All
3. a) Do you work for wage elsewhere?
0 - No 1 - Yes
- b) If YES, then on what basis?
1 - Intermittently 2 - Seasonally 3 - Regularly
- c) If YES, what is the nature of the employment?
1 - Casual labourer 7 - Low income professional
2 - Fisherman 8 - High income civil servant
3 - Skilled labourer 9 - Businessman
4 - Tradesman 10 - High income professional
5 - Shopkeeper 11 - Other _____
- 6 - Low income civil servant
- d) In a normal year, about how much of your time is spent in this employment?
- 1 - Less than 1/4 3 - 1/2 to less than 3/4
2 - 1/4 to less than 1/2 4 - 3/4 to less than 1
4. a) In terms of on-farm work, which time of the year is for you?
1 - the busiest time 2 - the slowest time
- b) On average, how many hours per day did you work on the farm last year during,
(i) the busiest time
(ii) the slowest time
- c) How many days per week do you normally engage in farmwork?

SECTION 2. HUMAN RESOURCE AVAILABILITY AND USE

5. a) Do you think you are working your land to the best advantage?
0 - No 1 - Yes
- b) Please explain!

6. a) If 3a, NO, if part-time jobs were available on a regular basis would you,
1 - continue full-time farming 2 - take part-time job
- b) Please explain why?

7. a) How many people are living in your household?
- b) Would you please tell me about these members? (see next page)
8. a) Do any of your children farm on their own?
0 - No 1 - Yes
- b) If YES, how many?
9. a) If 8a, YES, would you have preferred if they had a different occupation?
0 - No 1 - Yes
- b) Could you please explain?

10. a) Do you use any informal (non-wage) labour arrangement?
0 - No 1 - Yes

Household Member	Gender	Age (years)	If they farm, then how?			If they don't, then what are their off-farm employment or status*?
			Farm Work*	Average Hours per 5-Day Week	Type of Work*	
Spouse/Common Law						
Children	1					
	2					
	3					
	4					
	5					
	6					
Other Relationship	1					
	2					
	3					
	4					
	5					
	6					

* Coding for Farm Work, Type of Work and Off-work Employment or Status are as follows:

Farm Work:

0 - None 1 - Intermittently 2 - seasonally 3 - regularly

Type of Work:

1 - Land preparation	4 - Weeding	7 - Fertilizing	10 - Marketing	13 - Preparation for market/storage
2 - Planting	5 - Irrigation	8 - Harvesting	11 - Record keeping	14 - Other works (specify)
3 - Hoeing	6 - Pest control	9 - Storage	12 - Tending Livestock	

Off-farm Work or Status:

1 - Student	4 - Casual labourer	7 - Tradesman	10 - Low income professional	13 - Businessman
2 - Retired	5 - Fisherman	8 - Shopkeeper	11 - Middle income professional	14 - High income professional
3 - Infirm	6 - Skilled labourer	9 - Low income civil servant	12 - High income civil servant	

10. b) If YES, which of the following?

- 1 - Day-for-day
- 2 - Morning sport
- 3 - Digging
- 4 - Evening work
- 5 - Partnership
- 6 - Other _____

11. a) Do you fire help?

0 - No 1 - Yes

11. b) If YES, on average how many?

c) If YES, on what basis?

1 - Intermittently 2 - Seasonally 3 - Regularly

d) If YES, for what purpose(s)?

- 1 - Land preparation
- 2 - Planting
- 3 - Weeding
- 4 - Reaping
- 5 - Other _____

20. Land Tenure and Use

Fragment No.	No. of Years Occupied	Tenure*	Dist. (km)	Dist. (hrs.)	Dist. (ha.)	Size (ha.)	Current Land Use				Prop. in Food Crops	Freq. of Visit per Week	Reasons for unused land*	Soil Class and Slope	Main Cash Crop Last Year	
							Export Crops*	Domestic Crops*		Pasture (ha.)						Ruininate Forest/ Shrub (ha.)
								Spring	Fall							
1																
2																
3																
4																
5																
6																
7																
8																
9																
Housespot and Kitchen Garden																

* Coding for Tenure, Export Crops, Domestic Crops and Reasons for unused land are as follows:

Tenure:

O - Owner R - Rent S - Share crop F - Family land C - Caretake Q - Squat T - Legal title

Export Crops:

1 - Cacao 2 - Coffee 3 - Citrus 4 - Sugar cane 5 - Tobacco 6 - Pimento

Domestic Crops:

Roots/Tubers: Y - yams Sp - Sweet potato D - Dasheen C - Cassava Cc - Coco S - Sorrel Ip - Irish potato B - Badoo Br - Beetroot Ar - Arrowroot
 Vegetables/Legumes: Rp - Red pea L - Lettuce T - Tomato Cp - Cow pea Cg - Congo pea Cb - Cabbage Cu - Cucumber Pn - Peanut Ca - Carrot Be - Bok choy Pu - Pumpkin
 Ch - Cho-cho Ok - Okra Sp - Sweet pepper Ep - Eggplant Cl - Calaloo
 Condiments/Spices: Hp - Hot pepper Gi - Ginger An - Annatto Th - Thyme Es - Eskellion Mi - Mint On - Onion
 Fruits: Br - Breadfruit Ba - Banana Pl - Plantain Ac - Ackee Ma - Mango Ss - Soursop St - Starapple Jf - Jackfruit Pl - June Plum Nb - Naseberry
 Gu - Guava Me - Melon Ro - Roseapple Gu - Guinep Pp - Papaya Cr - Custardapple Sw - Sweetsop
 Cereals: Cn - Corn Ri - Rice

Reasons for Unused Land:

1 - Family land 2 - Uncertainty of tenure 3 - Too far to supervise 4 - Inaccessible 5 - Arid 6 - Poor quality 7 - Old age 8 - Ill health
 9 - Shortage of workers 10 - Praedial larceny 11 - Lack of incentive 12 - Other (specify)

d) If INCREASED, then what is this attributed to?

- 1 - Incentives of Agro 21
- 2 - Improved market
- 3 - Acquisition of more land
- 4 - Reduction of more land
- 5 - Other _____

e) If DECREASED, then what is this attributed to?

- 1 - Natural disasters _____
- 2 - Poor market conditions
- 3 - Reduced help (Government)
- 4 - Poor roads
- 5 - More difficulty in getting credit
- 6 - Increased praedial larceny
- 7 - Poor transport
- 8 - Shortage of labour
- 9 - Poor health/old age
- 10 - Less land
- 11 - Other _____

22. a) Do you now produce less foodcrops than when the AMC bought your crops?

- 0 - No 1 - Yes 2 - Not applicable

b) If YES, what has become of the land withdrawn from food crops?

- 1 - Become idle (ruinate)
- 2 - Put to export crops
- 3 - Put to pasture
- 4 - Rent to other farmers
- 5 - Other _____

23. a) Do you consider land shortage a serious drawback to your farming?

- 0 - No 1 - Yes

b) Could you please explain!

24. a) Do you keep livestock?

- 0 - No 1 - Yes

24. b) If YES, type and quantity.

- 1 - Cattle
- 2 - Sheep
- 3 - Goats
- 4 - Pigs
- 5 - Beasts (donkey, mules, etc.)
- 6 - Rabbits/Guinea pigs
- 7 - Birds (fowls)
- 8 - Other _____

Qty.	
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

25. a) Assuming you could get all the help you need to develop your land, what would be your first, second, third, fourth preference.

- 1 - Produce mainly export crops
- 2 - Produce mainly domestic food-crops
- 3 - Equal combination of export and domestic crops
- 4 - Rear mainly livestock

b) What are the reasons for your

- (i) first choice _____
- (ii) second choice _____

SECTION 4. AGRONOMIC PRACTICES AND FARMING KNOWLEDGE

26. a) How long do you normally cultivate a field before making another? (No. of yrs)

b) Why do you normally change the location of your ground after this time?

27. a) Do you use chemical fertilizers on a regular basis?

- 0 - No 1 - Yes

b) If YES, do you use specific ones on specific crops or do you "broadcast" indiscriminately?

- 1 - Use specific fertilizer 2 - "Broadcast"

c) How often do you fertilize per season?

d) About how many bags of fertilizers do you use?

28. Which of the following types of manures do you use?

- 1 - Bogadill
- 2 - Mulch
- 3 - Famyard
- 4 - Burying of bush
- 5 - Other _____

29. a) Do you use pesticides on a regular basis?
0 - No 1 - Yes
- b) If YES, on which crops? (see question 20 for crop codes)

30. Do you use any of the following soil conservation measures?
1 - Trench
2 - Grass barriers
3 - Stake barriers
4 - Contours
5 - Retaining walls
6 - Ballasted waterways
7 - Bench terraces
8 - Hillside ditches
-

31. a) How did you acquire the plots you own?
1 - Inherit
2 - Purchase
3 - Other _____
- b) Which plots did you inherit? (see question 20 for crop codes)

32. From which of the following have you received farming information?
(i) Informal Sources
1 - Parents/foster parents
2 - People in the district
3 - Employers
4 - Observation
5 - Personal trials and experiment
6 - Other _____
-

- (ii) Official Sources
1 - School (elementary)
2 - Extension officers
3 - Demonstration
4 - J.A.S. courses
5 - Farmers' Handbook
6 - The Farmers' Guide
7 - McDonald Almanac
-

33. a) Type of farming literature kept.
1 - Farmers' Handbook
2 - Farmers' Guide
3 - McDonald Almanac (Year _____)
4 - Other _____
-

33. b) Do you read the farmers' supplement?
0 - No 1 - Yes
34. a) Do you normally consult with your spouse when making farming decisions?
0 - No 1 - Yes
- b) Please explain! _____

SECTION 5. ECONOMIC INFRASTRUCTURE

35. List your three most important income-generating crops for the last 3 years on a scale of 1-3 and estimate the quantity of each produce. (see question 20 for crop codes)
- | | | | |
|---|--------------------------|-----|--------------------------|
| 1 | <input type="checkbox"/> | kg. | <input type="checkbox"/> |
| 2 | <input type="checkbox"/> | | <input type="checkbox"/> |
| 3 | <input type="checkbox"/> | | <input type="checkbox"/> |

36. If surplus is produced, how do you dispose of it?
1 - Sell in local market
2 - Sell to higglers
3 - Take to Kingston
4 - Sell to government agency
5 - Give to relatives/neighbours
6 - Other _____
-

37. a) Can you always sell your food-crops?
0 - No 1 - Yes 2 - Not applicable
- b) If NO, what are the three main reasons?
1 - Competition with imported food
2 - Market glut at harvest
3 - Unscrupulous higglers
4 - Lack of transportation
5 - Poor roads
6 - Competition with large farms
7 - Other _____
-

38. a) If 26a, NO, would you produce more food if there was a guaranteed market?
0 - No 1 - Yes
- b) If YES, how would this be achieved?
1 - Utilization of idle lands
2 - Utilize wage labour
3 - More personal efforts
4 - Utilize better tools
5 - Use more chemicals
6 - Other _____
-

39. a) Have you ever sold food-crops to a government agency?
0 - No 1 - Yes

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39. b) If YES, which agency/agencies?
- 1 - AMC
 - 2 - Christiana Potato Corp.
 - 3 - Other _____

- c) If YES, but not currently selling, during which periods were you selling?
- 1 - Before 1969
 - 2 - 1968-1972
 - 3 - 1973-1980
 - 4 - Since 1980
- (i) AMC
 - (ii) Christiana Potato Corp.
 - (iii) Other

40. a) Would you rather sell your food-crops to a government agency than personally marketing them?
- 0 - No 1 - Yes

b) Could you please explain why?

41. What improvements would you want to see in food-crop marketing?
- 1 - Reintroduction of AMC
 - 2 - Reduction of food imports
 - 3 - Prevention of glut at harvest
 - 4 - More local markets
 - 5 - Better transport service
 - 6 - Better roads
 - 7 - Regulation of farm prices
 - 8 - Other _____

42. a) If you grow export crops, are they easier to see than food-crops?
- 0 - No 1 - Yes

b) Could you please explain!

43. a) Have you ever had credit for your farming?
- 0 - No 1 - Yes

43. b) If YES, then state purpose, date, and source.

Type of Assistance	Purpose*	Date	Source*	Dictation of Purpose*
1 - Loan				
2 - Subsidy				
3 - Pesticides				
4 - Fertilizer				
5 - Seeds				
6 - Soil Treatment				

contd.

* Coding for Purpose, Source and Dictation of Purpose are as follows:
 Purpose: 1 - Grow export crop 2 - Grow local food crops 3 - Land improvement
 4 - House/Tank building 5 - Buy livestock
 Source: 1 - Government Agency 2 - Commodity Association
 3 - Private organizations

2 Dictation of Purpose: 0 - Not dictated 1 - Dictated

43. c) If NO, would you use credit to improve your farming?
- 0 - No 1 - Yes

- d) If YES, and dictation of purpose by the source was not a condition of credit, for what specific aspect(s) of farming would you use credit?
- 1 - Grow/improve export crops
 - 2 - Grow/improve food-crops
 - 3 - Improve farm buildings
 - 4 - Invest in livestock
 - 5 - Buy/rent more land
 - 6 - Improve water supply
 - 7 - Other _____

44. a) If 43a, NO, have you ever applied for credit?
- 0 - No 1 - Yes

44. b) If YES, why were you unsuccessful?

 c) If NO, why haven't you applied?

SECTION 6. DEVELOPMENT INITIATIVES

45. a) Have you ever been involved with any agricultural development project(s) in this area?
 0 - No 1 - Yes
45. b) If YES, which project(s)?
 1 - C.A.L.A.
 2 - Croplein
 3 - I.R.D.P.
 4 - Agro 21
 5 - Clarendon Land Authority
 6 - Other _____
- c) If YES, how were you involved?
 1 - Received credit
 2 - Received fertilizer/manure
 3 - Received seeds
 4 - Received soil conservation
 5 - Utilized market facilities
 6 - Advised on cultivation methods
 7 - Other _____
46. a) Are you currently involved with any of these projects?
 0 - No 1 - Yes
- b) If YES, then which projects?
 1 - C.A.L.A.
 2 - Croplein
 3 - I.R.D.P.
 4 - Agro 21
 5 - Clarendon Land Authority
 6 - Other _____

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46. c) If involved with project(s) in which year did you become involved?
 1 - C.A.L.A.

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19
19
19

 2 - Croplein
 3 - I.R.D.P.
 4 - Agro 21
 5 - Clarendon Land Authority
 6 - Other _____
- d) If not currently involved, when did your involvement cease?
 1 - C.A.L.A.

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 2 - Croplein
 3 - I.R.D.P.
 4 - Agro 21
 5 - Clarendon Land Authority
 6 - Other _____
- e) Why did your involvement cease?
 1 - Project ended 2 - Not beneficial 3 - Poor health 4 - Other _____
 (i) C.A.L.A.

 (ii) Croplein
 (iii) I.R.D.P.
 (iv) Agro 21
 (v) Clarendon Land Authority
 (vi) Other _____
- f) Please explain?

47. If was/is involved in project, why did/do you become involved?
 (i) C.A.L.A. _____
 (ii) Croplein _____
 (iii) I.R.D.P. _____
 (iv) Agro 21 _____
 (v) Clarendon Land Authority _____
 (vi) Other _____
48. If never been involved with project, why not?

49. If was involved with project, how have you benefitted?
