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Changes in Small Scale Agriculture, Jamaica, 1962-1980

CHANGES IN SMALL SCALE AGRICULTURE: THE ROLE OF GOVERNMENT, WESTMORELAND PARISH, JAMAICA, 1962 - 1980

ABSTRACT

Since the last decade, governments have been faced with an exceedingly urgent task of developing and implementing programmes and projects designed to provide land, credit, subsidy and technical assistance to small scale farmers in Jamaica. Island governments have realized that modification in the plantation system and an improvement in small scale agriculture would reduce the nation's over-dependency on foreign supply of basic food items, particularly protein and calorie foodstuffs

The primary objective of the thesis has been to evaluate the effectiveness of government involvement in small scale agriculture in order to determine what changes, if any, occurred in Westmoreland Parish between 1962 and 1980

The data upon which the study is based were obtained from primary and secondary sources The primary data were collected in a field survey during the summer of 1980. Evaluation is made on the basis of the objectives for which the programmes and projects were established and the targets which they were intended to meet.

M.A. Thesis
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[illegible]

[illegible] programmes [illegible] l'assistance [illegible] petits cultivateurs) en [illegible] l'évaluation du système de plantation et de répartition de l'agriculture à petite échelle réduiraient la trop grande dépendance nationale pour l'approvisionnement étranger en aliments de base particulièrement les [illegible] protéiques et calorifiques.

L'objectif principal de la thèse a été d'évaluer l'efficacité de l'implication gouvernementale dans l'agriculture à petite échelle, afin de déterminer si des changements ont eu lieu, et lesquels, dans la paroisse de Westmoreland entre 1962 et 1980.

Les données de base de l'étude ont été obtenues de sources primaires et secondaires. Les données primaires ont été recueillies lors d'un stage sur la terrain durant l'été 1980. L'évaluation en est faite à partir des objectifs des programmes et des projets, et des buts qu'ils devaient rencontrer.

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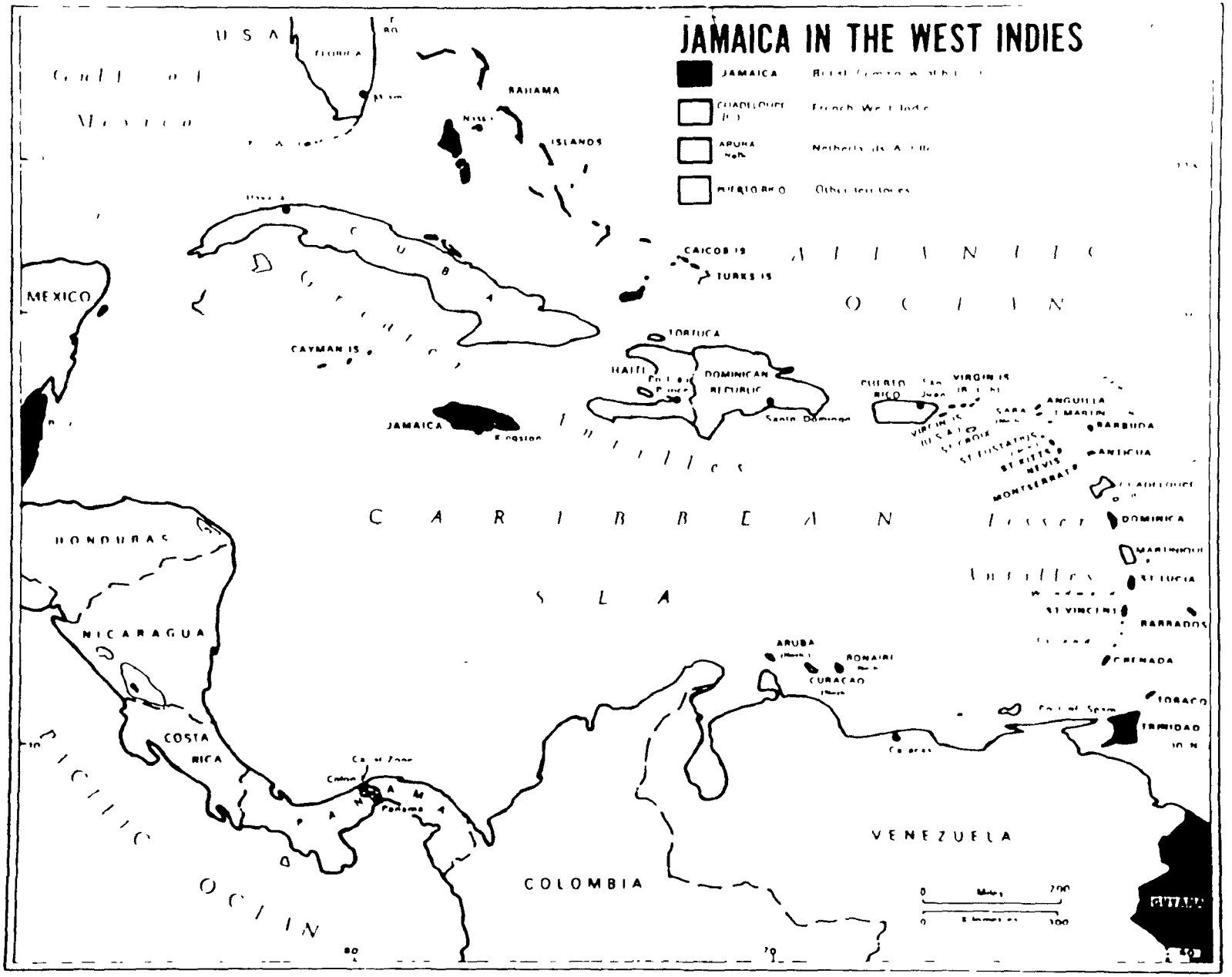
CHAPTER I

GENERAL INTRODUCTION

1.1 Development of Smale Scale Agriculture in the Commonwealth Caribbean

The Caribbean islands are by no means homogeneous in terms of climate, physiography, soil and vegetation. However, they do share limitations in the development of small scale agriculture. Even though physical and biological factors do in part condition these limitations, it is the plantation system, an externally imposed economic system, that is primarily responsible. This socio-economic system has displayed remarkable resilience over the almost four centuries of its existence in the Caribbean, adapting to a great variety of economic and political changes. Adaptation during the 18th and 19th centuries was greatly aided by local legislatures, which rapidly became instruments of the planter class, and which assumed active roles in facilitating the development, continuity and dominance of the plantation system, economically, socially and politically. The legislatures established unequal structures of representation, whereby the small scale sector was forced to accept a subordinate role in national policies. The major objective of the local legislatures, acting on behalf of the plantation system was to maintain an accessible supply of cheap labour. The struggle of the small scale sector to gain access to land and other resources as well as to participate in decision-making, forced the British legislature to intervene during periods of crisis. Such interventions, however, were less than effective since the traditional relationship between the plantation system and the small scale sector remained unresolved.


JAMAICA IN THE WEST INDIES
JAMAICA
U S A
MEXICO
CUBA
CAYMAN IS
CAICOS IS
TURKS IS
TORTUGA
HAITI
DOMINICAN REPUBLIC
JAMAICA
PUERTO RICO
VIRGIN IS
ANGUILLA
BARBUDA
ANTIGUA
MONTSERRAT
DOMINICA
ST LUCIA
ST VINCENT
BARBADOS
GRENADA
TOBAGO
TRINIDAD
HONDURAS
NICARAGUA
COSTA RICA
PANAMA
ARUBA
BONAIRE
CURACAO
VENEZUELA
COLOMBIA
GUYANA
ATLANTIC OCEAN
CARIBBEAN SEA
PACIFIC OCEAN

Map 1.1

The major objective of this introduction is to provide an historical perspective to the role of governments in the development of the plantation system and more specifically, in affecting changes in the condition and status of small scale agriculture.

From a generic viewpoint, plantation refers to a large estate, cultivated by a flexible supply of involuntary or cheap labour, where factors of production such as capital in the form of land, factory and machinery are privately owned by an individual or a corporation, and the main produce is export-oriented. The establishment of the plantation also involved the "movement of peoples voluntary or involuntary", and the organization of social, cultural, economical and political institutions (Rubin, 1959: 1-4).

The Navigation Act (1660), Staple Act (1663) and Plantation Act (1673) of Great Britain gave the planters monopoly of the market for cane sugar* and other staples, while England acted as an entrepôt for European trade. On the other hand, the Caribbean provided a secured market for imported manufactured goods and foodstuffs.

Foodstuffs were also produced locally by the coerced labourers, on marginal plantation land granted by the planters, for their own subsistence. The practice was later secured by law in order to reduce expenditure on imported rations (Beckford, 1790, 2,151-158, in Mintz, 1960: 12). The provision grounds, as they were commonly called, helped to preserve a vital link between the labourers and their lost tradition of self-sufficiency. This idea of lost tradition helps to explain the differences between the Caribbean small scale farmer and his counterpart in other areas of the humid tropics, who has continued to maintain a strong cultural tradition.

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*The botanical name of this plant and all others are listed in Appendix A.

The Emancipation Act altered the status of the coerced labourers and their right to provision grounds. At the dawn of emancipation (1838), most of the land in the smaller islands was already usurped by the plantations. However, in the case of Guyana, Jamaica and Trinidad, marginal land was available in less accessible areas not otherwise suitable for staple production or livestock rearing. Where marginal land was available, missionaries, especially the Baptists, immediately purchased a portion of such land to establish independent settlements for the eager and freed labourers, as independent small farmers. The settlement of the freed labourers was in direct conflict with the interests of the planters who needed a flexible supply of cheap labour. It was the hope of the planters to "organise the distribution so that the group, at no distance from the estates, should remain in contact with them by employment" (Paget, 1956: 203). The Land Clause Law also discouraged the sale of land to independent small scale farmers. According to Mandel (1973: 36) the Crown Land Regulation placed the minimum size of allotment (100 acres),* and the price per acre (ten dollars), beyond the reach of those who were prepared to undertake non-estate cultivation.

The exodus of the labourers from the plantations to the newly established settlements facilitated the development of small scale agriculture. Most of the farmers in this category devoted most of their time to the cultivation of food crops, and "were left to themselves to experiment with different crops and techniques" (Eisner, 1961: 255). However, some continued to produce sugar cane and other staples for home consumption in spite of restrictive laws and costly licenses for the sale of small quantities of crude sugar and coffee.

*See Appendix E for Metric (SI) Conversions

The Equalization Act of 1846, which removed the tariff barrier that prevented the Dutch and French from practicing free trade within the European market, created a period of depression in the sugar industry. This Act created financial difficulty for many planters, who were now unable to hire freed and indentured labourers.* To minimize the financial problem cash tenancy was developed in Trinidad in 1872 and was later adopted in other islands. Although sharecropping was less popular, it was another form of arrangement which helped to offset economic risks and uncertainty in the price of staples (Beachley, 1957: 114). These events provided an opportunity for the small scale sector to acquire more land (Figure 1.1). Those who failed to gain access to land legally resorted to squatting. Eviction often resulted in open conflict. According to members of the local legislatures, the discontented labourers "were seeking a life of uncivilized ease", and an export-oriented economy was best for the region in order to prevent "a relapse into barbarism and the Savage State". The British Parliament therefore made it clear that the labourers should continue to work for wages as long as it was wanted (Williams, 1944: 90). Nevertheless, the Royal Commission recommended in 1897 that the labouring population should be settled on land as small farmers. "It is not impossible for the two systems . . . to exist side by side with mutual advantage" (Royal Commission Report 1898: 116-117).

St. Vincent was the first island to settle small farmers on land not otherwise used for export crops. Other islands merely expanded the export base by incorporating other staples such as cacao, banana and spices.

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*The indentured labourers were attracted from the East Indies to the Caribbean on contract, to alleviate the labour problem that developed after 1838.

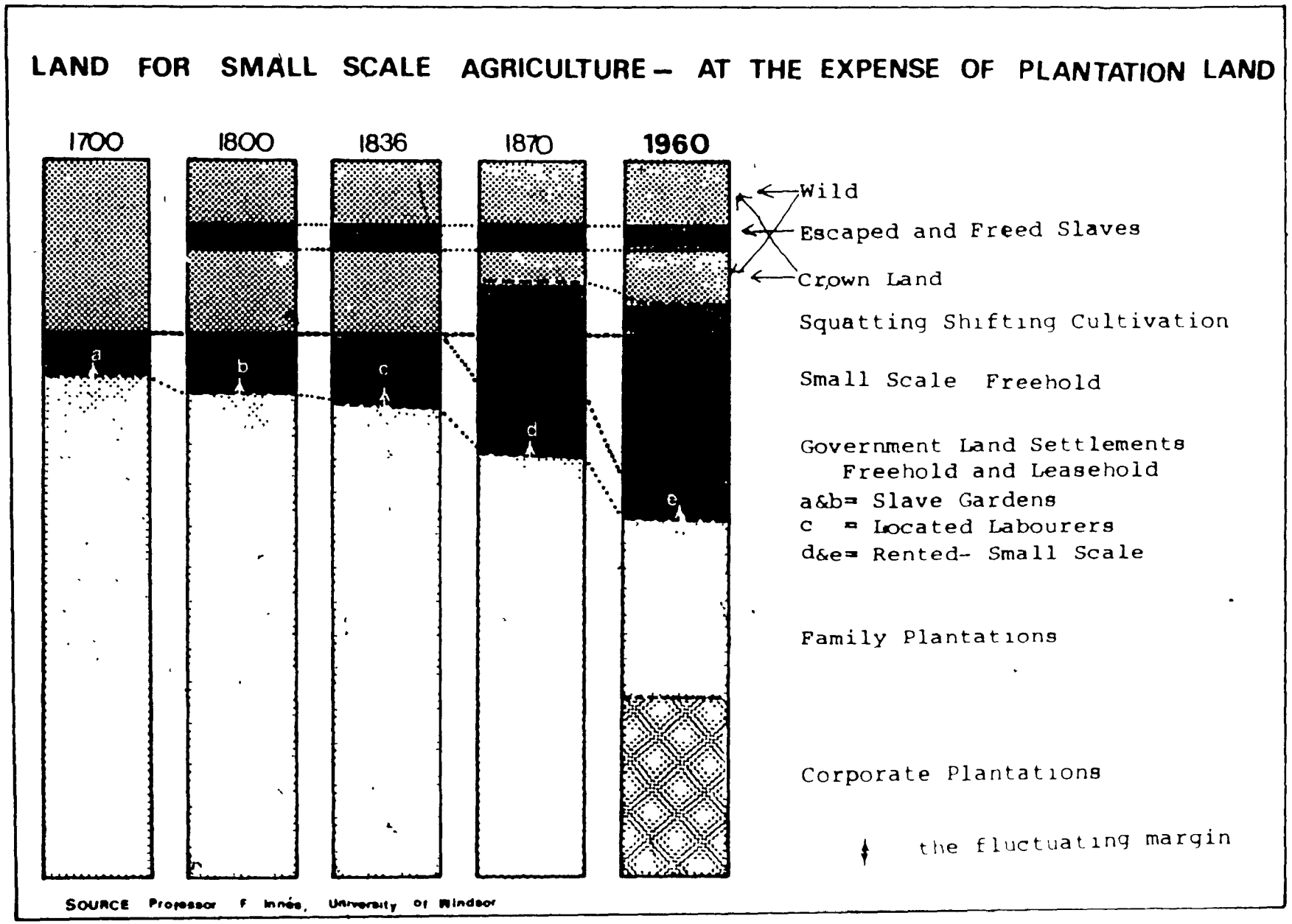

LAND FOR SMALL SCALE AGRICULTURE – AT THE EXPENSE OF PLANTATION LAND
1700
1800
1836
1870
1960
a
b
c
d
e
Wild
Escaped and Freed Slaves
Crown Land
Squatting Shifting Cultivation
Small Scale Freehold
Government Land Settlements
Freehold and Leasehold
a&b= Slave Gardens
c = Located Labourers
d&e= Rented- Small Scale
Family Plantations
Corporate Plantations
the fluctuating margin
SOURCE Professor F Innes, University of Windsor

Figure 1.1

It was not until the 1900's that a number of islands inaugurated the land settlement scheme on a large scale (Hills, 1965: 67-82).

The planters were reluctant to establish viable settlements on plantation land because of sugar's vulnerability following the Brussels Convention of 1903, that altered the status of beet sugar. A large surplus of sugar was then created which caused diminishing returns in the sugar industry. During the period that followed (1911-1941) a large proportion of family-owned estates were sold to foreign-owned corporations such as the United Fruit Company of America and the West Indies Sugar Company of England (Stone, 1974: 150). The change of ownership was a set back to the small scale sector because it involved the amalgamation and consolidation of scarce resources in the hands of the corporations; 1938 was a climax in the growing tension that was identified with the Caribbean. The British Parliament again intervened only to discover that the economic structure of the region was similar to that of 1838. The recommendation of the Moyne Report (1939) largely reiterated those of the Royal Commission (1897). "The provision of some alternative means of subsistence other than the plantation should be provided for the partially unemployed. This can be achieved by the establishment of these people as independent peasant proprietors owning a few acres" (Moyne Report, West Indies Royal Commission 1939: 81).

Since 1938 successive governments have expanded the land settlement schemes to incorporate more of the landless proletariat. However, there have been contradictions and weakness in the role of governments in simultaneously advocating economies of scale in the export sector and welfare and work spreading for the small scale sector. The confusion of social and

economic development policies has thwarted the effectiveness of the land settlement schemes (Seers, 1968). According to Waterston (1966) the need for a rational system of choices among feasible development possibilities, based on a consideration of economic and social costs and benefits was lacking in governments' planning.

During the 1960's, many of the islands gained political independence. The economic planners now began to give more attention to the needs of the small scale sector, and in the face of the Cuban revolution there was much talk of agrarian reform. However, results were meagre. There were several reasons for the lack of results. The financing of agrarian reform was to be achieved by means of transfers from the mining, manufacturing and tourism sectors, but large revenues for the stated purpose did not materialise until increased bauxite royalties became available in the mid-1970's. The lack of any significant contribution by tourism was particularly disappointing.

While budget allocations to research in the plantation sector continued to be considerable, insufficient research was conducted into the nature and problems of the small scale sector. Agricultural planning groups and committees grossly under-represented the small scale sector, and such committees tended to be dominated by the planters and political and bureaucratic élite. Jamaica stood out as a fine example of such under representation (see page 9). While all or most of the committee members would probably have some understanding of the problems and needs of the small farmer, very few if any would have had any first hand experience with small farming, especially under the conditions prevailing in the rugged interior of Jamaica. Thus by the early 1960's many problems of the small

Table 1.1

GROUP AFFILIATION AND CLASS COMPOSITION OF MEMBERS OF THE AGRICULTURAL POLICY COMMITTEE JAMAICA, 1962

NAME	ORGANIZATION	CLASS AND IDENTITY
A.J. Wakefield		Civil Servant
O.K. Henriques	Legislative Council Privy Council	Industrialist and Planter
A.B. Lowe	Legislative Council	Planter
R.O. Terrier	Legislative Council	Small Businessman
R.A. Burke	Jamaica Agricultural Society	Planter
G. Seymour-Seymour	Jamaica Agricultural Society	Planter
R.D. Lindo	Jamaica Imperial Association	Industrialist and Planter
P.A. George	Jamaica Chamber of Commerce	Merchant
R.L.M. Kirwood	Sugar Manufacturers' Association	Planter
R.F. Williams	Jamaica Livestock Association	Planter
N.W. Manley	Jamaica Welfare Ltd.	Lawyer and Party Leader
W.A. Bustamante	Bustamante Industrial Trade Union (B.I.T.U.)	Trade Union and Party Leader

SOURCE: Carl Stone, 1974: 161.

scale sector, both in Jamaica and the other islands remained unresolved.

Some of the major characteristics and problems of the small farmer that remained unresolved at the beginning of the 1960's were:

Spatial:

i) The location of a large number of small farmers on marginal land that was low in potential productivity, and highly susceptible to general deterioration;

ii) limited access to good arable land, the small size of farms and excessive fragmentation;

iii) difficulty of access in rugged, hilly terrain.

Agronomic:

i) failure of authorities to identify advantageous features of traditional agronomic practice and too great an emphasis on the use of inorganic fertilizers, herbicides and pesticides;

ii) inadequate assistance in soil management and conservation practices.

Social:

i) insecurity of tenure due to an inadequate arrangement between tenant and landlord;

ii) inadequate agricultural education at all levels;

iii) inadequate nutrition, especially among the landless proletariat.

Economic:

i) an inadequate marketing system for the distribution of domestic food crops;

ii) inadequate expenditure on farm inputs such as improved seeds and tools;

iii) inadequate credit facilities and subsidies to meet the needs of farmers, and these limit farm inputs.

Political:

i) the lack of farmer participation in the planning and organization of space for production;

ii) the absence of co-operative groups for the bargaining of collective interests.

Those concerned with the development of small scale agriculture in the Caribbean believe that the sector will not make any significant contribution to agricultural production, especially food production, until most of the above problems have been resolved. Government intervention to 1962 had failed to bring about any significant change in the status of small scale agriculture. The presentation that follows in Chapter IV assesses the effectiveness of the role of government in Westmoreland Parish over the period 1960 to 1980. The attention of the reader is now directed to a review of the ideas on the small scale/peasant farmer in the Caribbean as well as the plantation/small scale dichotomy that exists in the region.

1.2 Review of Literature

Introduction

A large percentage of the world's population ekes out a living from the land. Various terms have been used and probably incorrectly, to describe these farmers: "peasant", "rural proletariat", "subsistence" and "smale scale"; however, "peasant" is the most commonly used term (Redfield, 1956; Schultz, 1964; Wagner, 1960; Chayanov, 1966; Thorner, 1966; Wolf, 1966; Wharton, 1969; Shanin, 1971; and Lowenthal, 1972). A great deal of information on "peasant" settlement and agriculture is now available as a result of research carried out by sociologists, anthropologists, historians and, more recently, economists

geographers. The sociologists and anthropologists tend to view peasants as being traditional, adhering to their religion, beliefs, values, and way of life, which prevent them from developing entrepreneurial skills and participating in the market economy of the larger milieu. Neo-classical economists also assert that peasant farmers "are not responsive to economic incentive but instead often respond perversely" (Schultz, 1964: 8). Geographers and political economists, in their effort to understand peasant farmers in the Caribbean, have been engaged in comparative and analytic micro studies, which have led to a broader understanding of the peasantry (Mintz, 1960; Edwards, 1961; Innes, 1961; Blaut, 1967, Brookfield, 1973, Beckford, 1972; Henshall, 1964, Hills, 1965, Brierley, 1974) Unpublished theses and reports arising out of the McGill University Caribbean Project (1956-1970), as well as agricultural censuses, government and private reports have all contributed to a broader understanding of peasant farmers.

The main objective at this point is not to undertake an extensive literature review but to indicate what the contributions have been, especially those that have helped to develop the writer's ideas, as well as provide comparative data on the ecological and geographical aspects of peasant agriculture.

The Peasant Farmer

In *The Human Use of the Earth*, Wagner (1960: 217-218) postulates that the peasant farmer

> strives to grow what his household will consume. . . . He must till the land that is traditionally his to work and grow the crops demanded by the customary diet and crafts. . . . The installation on a peasant farm and the fertility of its fields are usually the fruit of generations of labour in which materials and homemade tools have been used exclusively.

According to Wagner's definition, the peasant farmer is incapable of producing a surplus, although most of his time has been spent tilling "the land that is traditionally his to work". Failure to produce a surplus has led to the notion of the "proverbially indolent peasant" who prefers a life of leisure. Most peasant farmers spend very little on farm inputs, such as improved farm equipment and fertilizer. Such low capitalization on the land is interpreted as being a lack of economic awareness.

As a result of comparative research, Blaut (1967: 214-215) claims that:

> peasant farmers are not technologically ignorant as some authorities suppose; on the contrary, they have, in most cases achieved an extraordinary high level of technology in utilizing available labour and material, given the prevailing constraints of land.

Johnson (1970: 376) also feels that "the trouble is not that the subsistance farmer lacks pecuniary motivation, but that he lives in a spatial land tenure and market system which holds down his scale of operation". The same conclusion has been reached by Innés (1961: 19-29), and Edwards (1961: 282). Although the peasant farmer's technical skill is low, economically he is responding efficiently to "the conditions under which farming is being practiced". As a result of his being "subjected to cultural and political dictates" of the dominant group in the larger milieu, he is unable to produce a large surplus on his own initiative.

Redfield (1956) identifies the larger milieu in which the peasant farmer operates, as being divided into two segments, rural and modern. Peasantsbelong to the rural or traditional sector, which exists in close relationship to the modern sector of which it forms a part, and participates

marginally. The rural sector is linked to the modern sector through the church, landowners, professionals and government agents. Those who form a part of the modern sector identify themselves with the metropolitan world in terms of their cultural, economic and educational traits. Pearse argues that the peasant farmer's marginal

> participation in the general social system has been that of a dependent powerless element, disposed of by decision of others, isolated by illiteracy from the circuit of ideas current in the society, rudimentary transporation system, and cultural difference, and contractually inferior in his market relations.
>
> (Pearse, 1971: 70)

In the Caribbean, the plantation sector is seen as the dominant cultural, economic and political system vis-à-vis the subordinate peasant sector. The Caribbean peasant farmer, because of the circumstances of his origin, does not seem to fit into the traditional definitions of "peasant" (Marshall, 1968). The farmers of this sector are not indigenous to their geographic milieu, but represent the descendants of an alien workforce that evolved into a landed class after 1838 and mainly in this century. "Ties to the land built up over centuries, the lack of knowledge of the outside world, the resistance to innovations" are not typical of the Caribbean peasantry (Momsen, 1969). The term peasantry (Momsen, 1969) is generally used to characterize "that sector of agriculture which tends to be symbiotic with or in opposition to the plantation sector". Therefore, "small scale" is perhaps more accurate in describing non-estate agriculture in the Caribbean. Beckford (1972) feels that the sector represents a proletariat class rather than a peasantry or a small scale class, because of the high percentage of unemployment and disguised underemployment in the sector.

Although the present day small farmers do not seem to fit the

traditional definitions of "peasants", they contrive to produce most of their own food and even surpluses on small units of land. The distribution of land in Jamaica between the small scale sector and the plantation is grossly unequal (Table 1.1) because most of the land had been alienated before the ex-slaves had the right to own land. After studying the problem of land distribution in Jamaica, Lewis (1968: 88) concludes that the "foundation of slavery especially in the general picture of land ownership had remained basically untouched". As a result, the small sector has continued to occupy a subordinate position in the development of agriculture.

Where farm size and other inputs are limited, mixed cropping has continued to be a major land use pattern (Iton, 1970). Researchers (Wood, 1934; Olivier, 1936; Edwards, 1961; Innés, 1961, Found, 1968) seem to have responded positively to multiple land use on small marginal farms. Wood (1934: 44-46) notes that crops grown in combinations tend to "produce higher combined yields than would the same crops grown separately in the same field". Olivier (1936: 312) argues that where the practice has been intelligently developed and improved, annual values are high. According to Innés (1961) this form of cultivation is quite efficient.

> Different species of plants have different nutrient requirements . . . species may also have complementary requirements for shade and moisture; with lessened competition there can be greater total production than if one crop were grown. (*op. cit.*-21)

Edwards (1961) finds that most farmers believe that diversification maximises output where marginality exists. In studying the relationship between diversification and output per acre in Jamaica, Found (1968: 49) notes that "in areas where specialized commercial products can be produced

Table 1.2

PLANTATION AND SMALL FARMERS IN THE CARIBBEAN

TOTAL AREA OF TERRITORY PER HEAD OF POP. (1970)		PERCENT OF ALL FARMS		PERCENT OF FARM LAND	
TERRITORY	TOTAL AREA	SMALL FARM (< 5 acres)	PLANTATION (< 500 acres)	SMALL FARM (< 5 acres)	PLANTATION (< 500 acres)
St. Kitts/Nevis	2.1	94.5	0.4	15.0	56.6
Jamaica	1.5	76.6	0.2	14.9	44.9
Antigua/Barbuda	1.5	91.1	0.3	26.7	42.2
St. Lucia	1.5	82.5	0.2	18.0	33.8
Dominica	2.5	75.2	0.3	13.2	32.2
Barbados	0.4	93.3	0.2	13.4	31.3
Trinidad/Tobago	1.34	46.5	0.3	6.9	31.1
St. Vincent	1.1	89.0	0.1	27.0	24.2
Grenada	0.9	89.7	0.1	23.9	15.0
Montserrat	1.7	92.7	0.7	n.a.	n.a.

SOURCE: Data from the most recent Caribbean Census (up to 1975).

abundantly and where purchased inputs like fertilizer are used, diversification seems to be less necessary for high outputs". He concludes that in marginal areas, greater diversification leads to greater output per acre.

Output per acre on small farms is sometimes negatively affected as a result of short term tenancies. Shepherd (1954: 41) asserts that "the limited financial resources of small farmers has prevented the majority of them from acquiring sufficient land". Blaut (1967) claims that where cash tenancy is contracted very unsatisfactorily, the farmers are reluctant to invest scarce money in improving their farms. This tendency has led to a general deterioration of land in small farms.

Commercial banks are disinclined to extend credit to small food producers. Brossard (1954: 25) feels that the "small scale sector requires an integrated programme of action of which credit and extension education are most important elements". Given that credit and other inputs are available, Jolly (*op. cit.*, 15) asserts that:

> there are some very substantial economic advantages in small scale agriculture; advantages that can result not only in an increase in output per acre but an increase in the overall average output per man and per unit of capital.

Potential output per acre and per man will not be fully realized until the farmers are certain of obtaining good prices. There is a preference for growing export crops because of the certainty of an organized marketing system (Shepherd, *op. cit.*, 42). The marketing system serving the small scale sector has not been formally developed. Most of the farmers have to rely on poor roads and other basic infrastructure to get their produce to market (Blaut, 1967; Mintz, 1960; Norton and Symanski, 1975; Lundgren,

1970).

Despite these handicaps, the output and value of domestic food far exceeds that of export crops (Eisner, 1961, Agricultural Census Reports). The importance of the small farmer as a producer of surplus food for local consumption and capital formation is still to be fully recognized.

Approaches to Development Analysis

It is axiomatic that space, accessibility and land use are major problems in the Caribbean.

> Land is the only source of the material life of a people. It provides food, and shelter. It furnishes work and wealth. It is the basis of all production, of all development, of all security, of all growth. It is in very truth the root of our being.
>
> (Manley, 1971:73)

The location of land use systems and how these function are geographic problems. Geographers can pursue detailed micro studies in "high priority areas where development is a crucial problem" (Wilken, 1973: 7). Studies in land use systems are useful in understanding elements that enhance or thwart the efficient functioning of a system, for example, there may be no road leading out of an area "or that mechanization may be useless in a one acre [farm]; or that soil conservation may not be practised by farmers who have no security of tenure (Blaut, 1967: 203).

Policies designed to improve small scale agriculture in the Caribbean will depend on the study of land use systems within a given geographical milieu, and the identification of elements contributing to the malfunctioning of the systems. This general land use system approach is holistic, since it embraces the physical-biotic, social, economic and political aspects of the functional milieu within a single framework. The proper functioning of the system will depend on the nature of the

interaction between all the elements of the system. The study of land use systems is also useful in providing scientists with the kind of information that is needed to form appropriate and relevant theories of development.

Post-war economic theorists thought that it would be relatively easy to raise the economy of the Caribbean closer to the level of that of the metropole, thus creating new jobs for the landless underemployed and unemployed, and ensuring economic stability. This would reduce the region's dependency on the metropole for capital, technology and entrepreneural skills. These assumptions were based on Richardian and Keynesian economic theories, which had developed out of a different historico-geographic experience (Clarke, 1940; Rostow, 1967).

The recognition that Caribbean agricultural development cannot repeat the same path followed by the present industrialized nations because its historical conditions are different, is now widely accepted. In an attempt to understand the relationship between the subsistence and the export sector in less developed countries, such as in the Caribbean, theorists have formulated the dualistic approach. The aim is to see to what extent economic, political and military colonialism affect this relationship.

Boeke asserts that:

> Where there is a sharp, deep broad cleavage dividing the society into two segments, many social and economic issues take on a quite different appearance and western economic theories lose their relation and hence their values.
>
> (in Hayami *et al.*, 1971: 17)

He feels that the two social systems interact marginally in the labour market. He reveals the fallacy and futility of transferring Western technology to countries that have different experiences in their social,

economic and political development.

Benjamin Higgins (1955-56: 99-115) further asserts that the expansion of the export sector is dependent on foreign demands, which have relatively little impact on internal growth, and that expansion in the subsistence sector is thwarted by a lack of working capital.

H. Myint (1965: 69-84) goes further than Higgins, and identifies an enclaved financial sector that guided the flow of finance capital to the major financial centres.

Arthur Lewis (1954: 139-191) postulates that there is an unlimited supply of labour available at subsistence wage, and "recognizes that behind this . . . lies the sociological problem of the emergence of an accumulating capitalist class" (Best and Levitt, 1968). He further asserts (1955: 279) that:

> when agriculture is in the hands of small farmers the introduction of innovation depends more upon government initiative than upon the initiative of private entrepreneurs.

Schultz (1964: 5) echoes a similar notion:

> Rapid sustaining growth rests heavily on particular investment in farm people, related in new skills and new knowledge that farm people must acquire to succeed at the game of growth from agriculture.

Other dualistic theorists such as Jorgenson (1961) and Renis and Fei (1961) identify the dependent position of the small scale sector on the export sector. The Renis-Fei model also identifies some of the characteristics observed by Lewis.

The models formulated by the dualistic theorists are quite useful; however, they fail to put the Caribbean into a spatial-historical context with regard to the spatial organization of the two major agricultural sectors in the region: plantation and small scale. The concern for a

new Caribbean model has led Best and Levitt (1968), Girvan (1968), Demas (1968, 1973) and Beckford (1972) to formulate and develop the plantation model.

This is a theoretical framework that helps to explain the character of the changing historical relationship between the plantation and small scale sectors, and how this relationship is conditioned by external market forces (Best and Levitt, 1968).

The plantation concept views the plantation as a branch of larger corporations and seeks to measure ways in which it thwarts the development of a domestic sector. In reviewing Charles Kepner (1936: 86-87), Beckford (1972: 167) observes that plantation economies require more land in excess of immediate needs for various reasons:

1. continuity of the plantation tract
2. control of right to other favourable areas
3. marginal land may have profitable future use
4. speculation
5. keeping out competition
6. the fact that bad land goes with good

Beckford (*op. cit.*) concludes that excess land holding may be induced by the fact that:

1. land increases the flexibility of accounting, since its valuation can be used to increase the value of capital stock, thereby adjusting the profit role
2. land ownership increases political power
3. land can be a hedge against the political risk of nationalisation, if going market prices are part of a compensation arrangement.

Both Kepner and Beckford seem to imply that plantations organize land for production, and skewed resource distribution is the result (Table 1.1).

Because land and other resources are chiefly controlled by a few families, the plantation and other foreign corporations, successful small scale agricultural development

> may involve complex patterns of institutional evolution in order to create an economic and social environment conducive to an effective response by firms and individuals to the new technical opportunities.
>
> (Hayami and Ruttan, 1971:26)

In retrospect, one would question whether or not agricultural innovation can solve the problems faced by small-scale farmers unless the political economy adjusts as necessary.

The rate of growth in small-scale agriculture is dynamic; however, agricultural productivity and output are not consistent with population growth, or the rate of growth in other sectors of the economy. This is a major problem in any society where the majority of the population is rural, and domestic agriculture is mainly in the hands of small farmers who are faced with limitations set by small farm size, inadequate credit facilities, traditional equipment, inadequate basic infrastructure, poor agronomic practice, and a lack of knowledge relating to agriculture and other technical skills.

1.3 Objectives, Research Design and Field Research

1.3.1. Objectives

The main objective of this thesis is to analyse, geographically, one major influence upon change in small scale agriculture in Westmoreland Parish, that of government. The time frame chosen is 1962 to 1980. From earlier identification of major spatial, agronomic, social, economic

and political characteristics of small scale agriculture, a selection of some critical factors is made. The impact of governments' policies and measures upon each constraint upon development and improvement is then investigated and assessed. In the course of the thesis, the extent to which changes have occurred in the development of the small scale sector will become more explicit, especially changes in the spatial organization of the plantation and small scale sectors in Westmoreland Parish.

Specifically, the following investigation was carried out in Westmoreland Parish during the summer of 1980, a study of

i) the relationship between the plantation and small scale sectors, especially in regard to the advantages and disadvantages of spatial occupance and organization of each sector;

ii) the effectiveness of governments' programmes and projects in helping to bring about changes and development in the major characteristics of small scale agriculture;

iii) the degree to which changes have occurred in each of the land use elements (Figure 1.2), as a result of the role of governments;

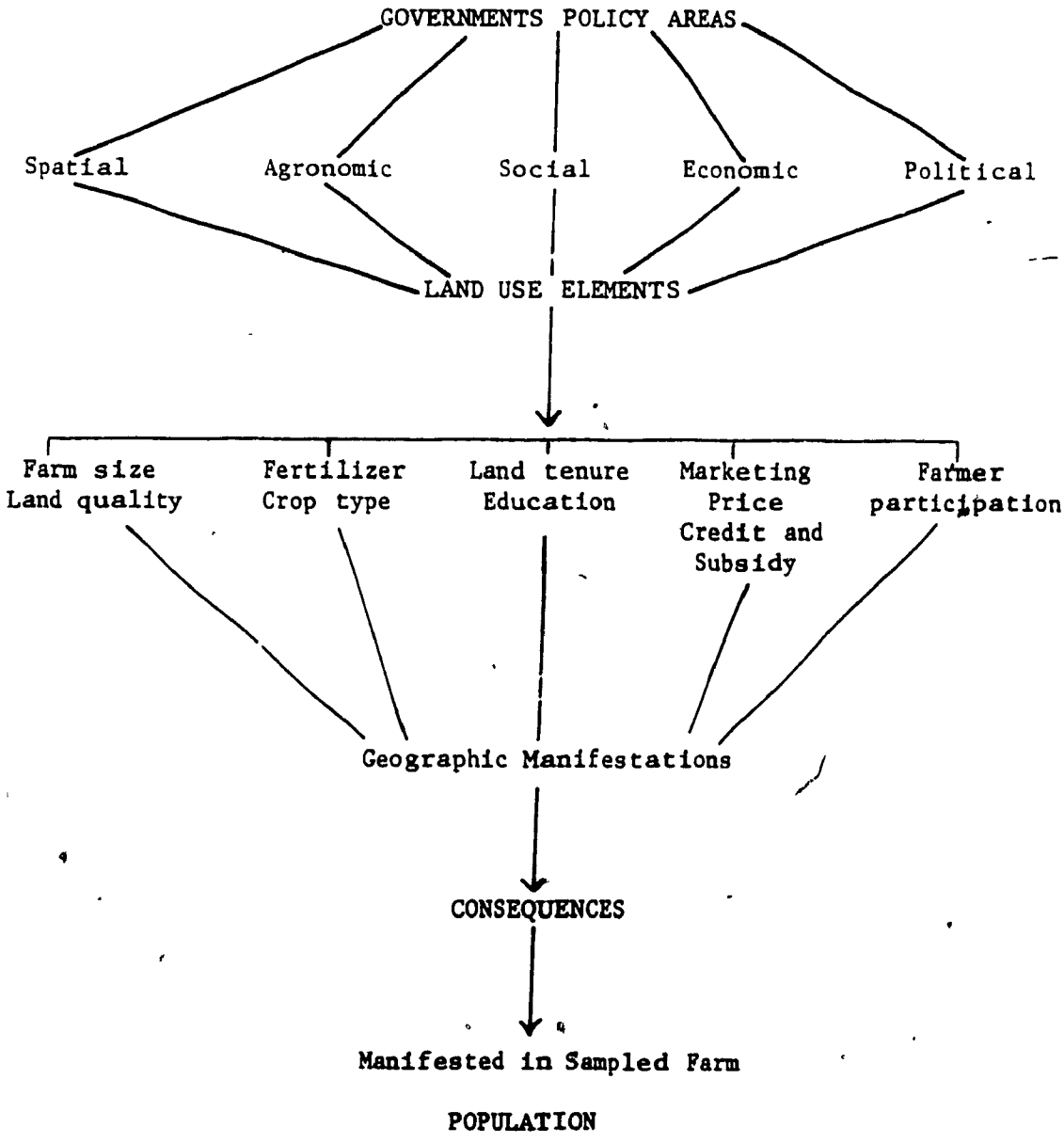
iv) the extent to which the small scale sector is still dependent on the plantation sector in terms of agricultural inputs and source of secondary employment, and how this dependency affects small scale agricultural development;

v) the willingness of potential farmers to work the land *ceteris paribus*.

The results of the above investigation should help the reader in understanding why small scale agriculture in Jamaica and elsewhere in the

Figure 1.2

RESEARCH DESIGN



Caribbean continues to be a relatively disadvantaged sector in the economy and society. It will then be useful to hypothesize that:

i) the status of small scale farmers has not improved significantly since 1962;

ii) the traditional quality of the relationship between the plantation and a considerable portion of the small-sector survives in Westmoreland Parish;

iii) agrarian policies directed at changing the above relationship have been less than effective, due to the following causes:

a) a lack of coordination between government policies and agricultural practice;

b) an inadequate market distribution system beyond the level of standard markets;

c) a misunderstanding on the part of the non-farm population as to the real needs of the small scale farmer.

In order to test the above hypotheses, specific land use elements were identified and isolated for specific study. The selection of these elements was based on their importance within the land use system of small farms: they were the most vital parameters in small scale agriculture in relation to the impact of government policies.

Changes in these elements as a result of policy impact appear to be feasible. For the purpose of this research, "effectiveness" is taken to mean "efficiency" in the implementation of government programmes and projects. "Change" is measured in terms of access to resources and services, improvement in agricultural productivity and output, and the quality of the production. The rationale, therefore, is that greater

access to resources and efficient services will alleviate farm limitations and lead to farm viability and major increase in productivity and output per farmer.

1.3.2 Collection of Data

A general approach was adopted in order to achieve the objectives of the research. This experiment farm approach was concerned with investigating "what should be". Westmoreland Parish was selected as the study area, because it offered a good opportunity in terms of environmental preferences, to study the changing relationship between plantation and small scale agriculture.

Within this area, appropriate farming communities were selected on the basis of physical conditions, land use and type of farmers (Maps 2.3 and 4.1). Extension workers were helpful in offering their comments on the representativeness of the farming communities selected, as well as providing transportation. The full co-operation of the Ministry of Agriculture was given before any attempt was made to collect data.

Method of Sampling

The method of surveying included:

1) sampling technique;
2) the objective and design of the questionnaire;
3) the manner of interviewing.

A stratified sample of 100 farmers was selected on the basis of acreage farmed, land tenure, and type of farmers. The two categories of acreage were less than five acres and from five to 14 acres; the categories of tenure were: owned, rented, leased, and squatted; and the types of farmers: non-commercial, semi-commercial and commercial.

Within each stratum, a systematic random sample was chosen. A stratified systematic random sample is quicker, easier and tends to give a more uniform cover of the population (Hammond and McCullagh, 1974).

Objective and Design of the Questionnaire

The main objective of the questionnaire (Appendix D), was to elicit from each farmer information about the farm unit. The information would help to determine the effectiveness of government planning on the development of the small scale sector in Westmoreland Parish.

The actual interviewing was carried out on the farms wherever possible. Efforts were made to visit the homes to examine the social and economic conditions under which the farmer lived. The actual field work started on June 1, 1980, and ended ten weeks later, on August 9, 1980.

Interviewing was not confined to Westmoreland Parish farmers. Agricultural extension workers, personnel in the Department of Agriculture and other statutory agencies, agricultural schools and other associations and institutions that have direct influence on the small scale sector were consulted.

This responsive technique is supplemented by information from maps, aerial photographs, census data, annual agricultural reports, agricultural surveys, manuscripts, newspapers, textbooks, theses, and other authentic sources. The method employed should provide an understanding of small farmers and their changing relationship with the physical, socio-economic and political milieu. The reliability of the questionnaire depended on the integrity of the writer, who was responsible for the interviewing and

the standardization of the sampling technique.

1.3.3 The Organization of Empirical Findings

The first chapter of this thesis provided the historical and theoretical background, whereby changes in the development of small scale agriculture in Westmoreland Parish can be assessed. Specifically, it traced the role of the planter class and governments in the development of the small scale sector in the Caribbean, as well as presented various views on the "peasantry" in order to differentiate between "peasant" farmers in the Caribbean and those found in areas to which they are indigenous: Africa, Asia and South America.

Chapter II discusses the spatial organization of agriculture in Westmoreland Parish with regard to the physical resources that are available to the plantation and small scale sectors. Some consideration is given to settlement pattern and how this pattern influenced land use.

Chapter III briefly introduces the role of government in responding to the needs of the small scale sector in Jamaica prior to 1962, and provides a detailed descriptive analysis of some of the major programmes and projects proposed by governments in order to alleviate the limitations faced by small farmers. This information is necessary since it provides a basis, whereby the implementation of programmes and projects can be analysed and assessed.

Chapter IV is divided into three sections, A, B and C, and is primarily concerned with the analysis of the sampled data. Section A presents a detailed analysis of the socio-economic background of the sampled households, then discusses major findings with regard to the land use elements selected for specific study. Section B is a presentation of

supplementary supportive data and is closely related to Section A. Section C briefly discusses the relationship between the plantation sector and a portion of the small scale sector, the farm workers, and structural changes that have occurred in the sector as a result of government action.

Chapter V draws conclusions on the extent to which major constraints on the contribution of the small scale sector have been alleviated or removed by governments' intervention. In addition the overall contribution of the Jamaican small scale agriculture to total food production and nutrition is examined.

CHAPTER II

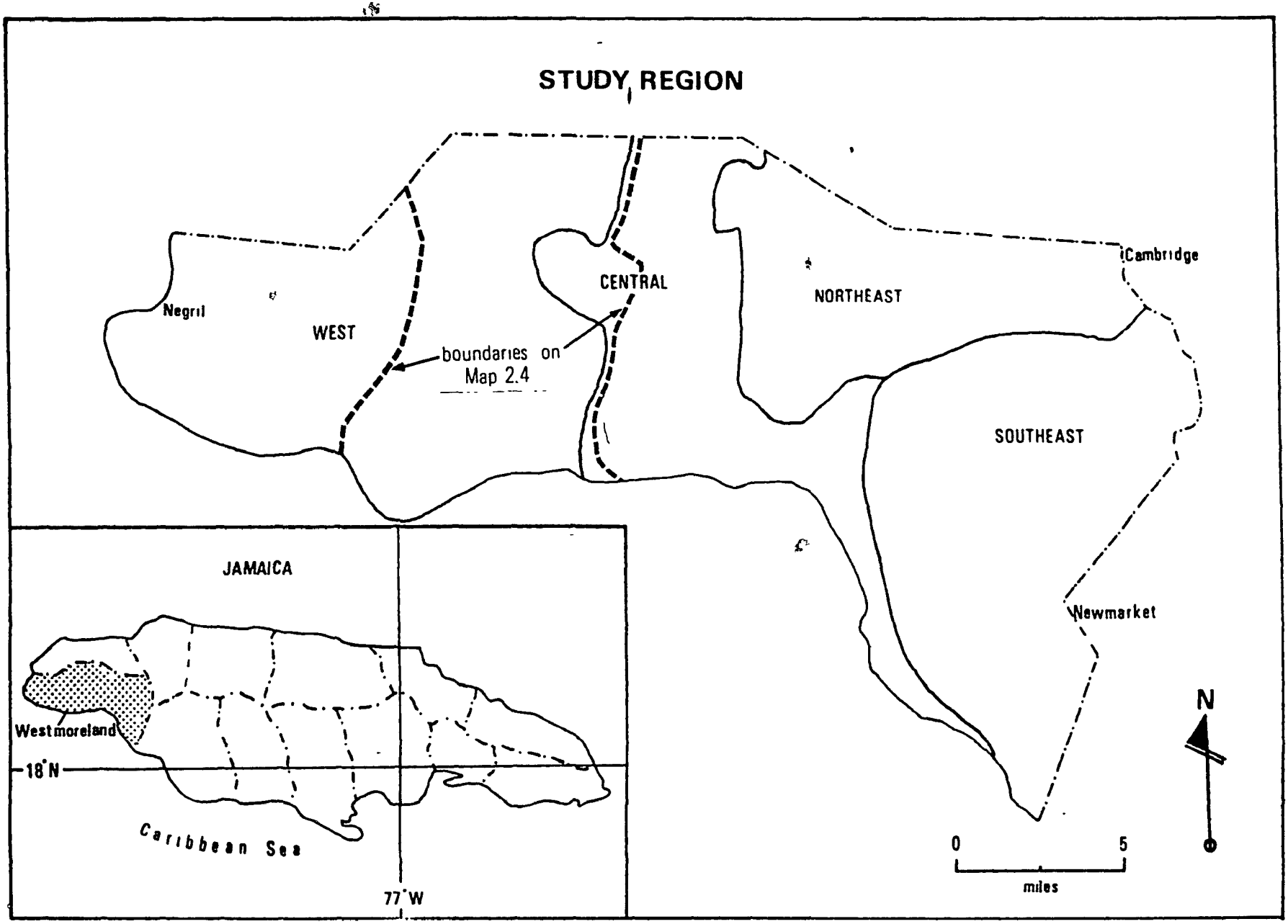
THE GEOGRAPHIC SETTING

2.1 Agricultural Possibilities and Constraints

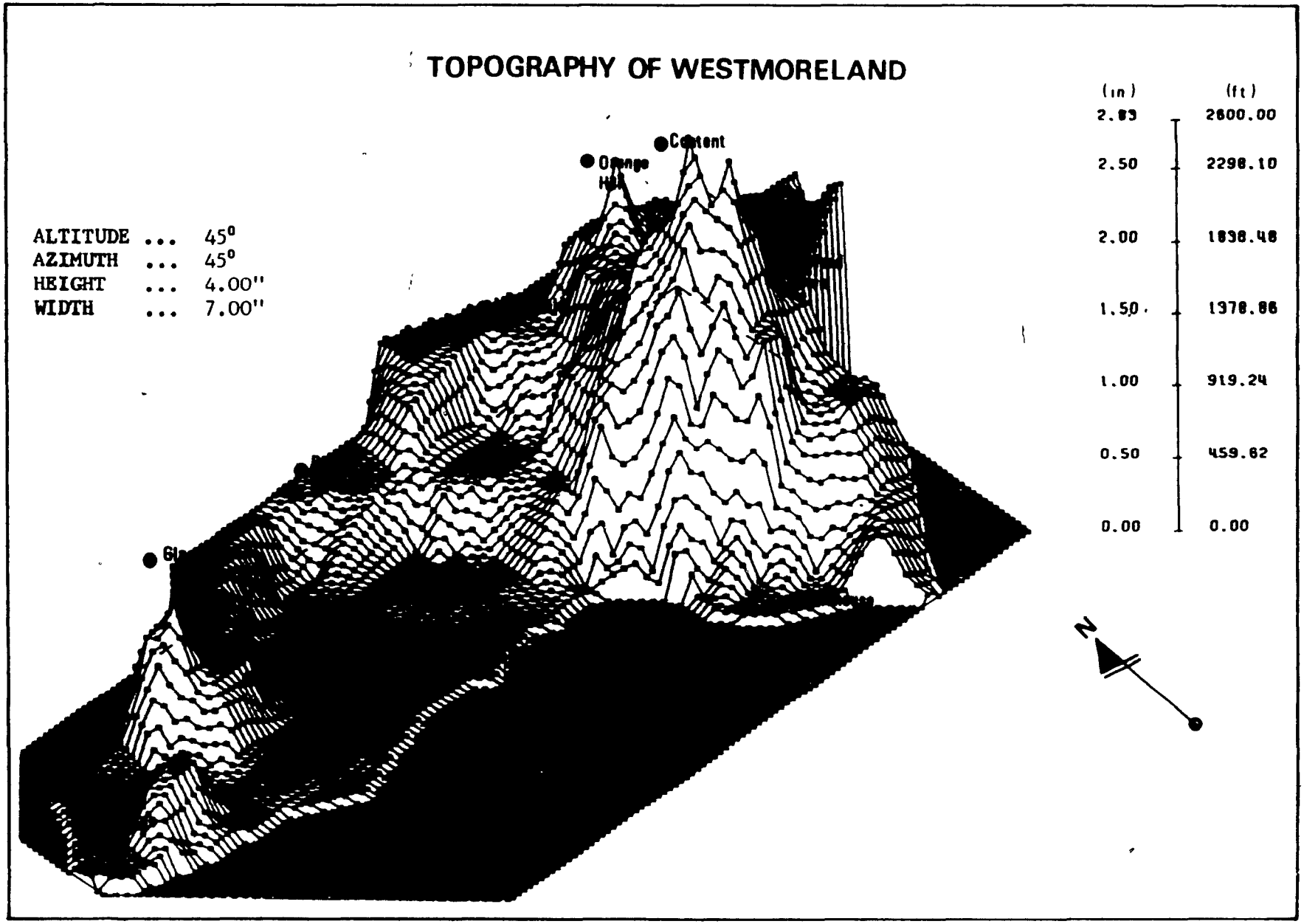
Westmoreland Parish has been chosen as the study area of the stated geographic enquiry because it offers possibilities for agricultural change and development. The plantation system in the Parish represents a microcosm of that which prevails in a typical sugar cane island. The Parish has a higher proportion of total land area devoted to sugar cane than any other parish in Jamaica. The dichotomy between sugar cane production in the alluvial lowlands and small scale farming in the hilly uplands is very striking to the casual observer. As a result the Parish provides a suitable setting whereby changes in small scale agriculture at the expense of the plantation sector can be studied.

The Parish is one of the fourteen parochial divisions of Jamaica. It is located on the extreme southwestern region of the island, and has an area of 320.39 square miles. On the north it is bounded by Hanover, on the northeast by Saint James, and on the southeast by Saint Elizabeth. The south and west are opened to the Caribbean Sea and the mainland of South America. Longitude 78°15' lies west of Savanna-la-Mar, the seat of local government and market town. Latitude 18°15' skirts the southern portion of the Parish (Map 2.1).

The Parish is considered to be of gently rolling to moderately steep topography, when compared to the more rugged terrain that characterizes the rest of the island. Only 76 square miles of the total land area exceed 1000 feet, and this consists mainly of limestone uplands and plateaux (Map 2.2).


STUDY REGION
Negril
WEST
CENTRAL
NORTHEAST
Cambridge
boundaries on Map 2.4
SOUTHEAST
Newmarket
JAMAICA
Westmoreland
18°N
Caribbean Sea
77°W
N
0
5
miles

Map 2.1


TOPOGRAPHY OF WESTMORELAND
ALTITUDE ... 45°
AZIMUTH ... 45°
HEIGHT ... 4.00"
WIDTH ... 7.00"
(in)
(ft)
2.83
2600.00
2.50
2298.10
2.00
1838.48
1.50
1378.86
1.00
919.24
0.50
459.62
0.00
0.00
N

The Parish lies on the lee side of the mountain divide that extends as far as the Blue Mountains in the extreme east of the island, and is not directly affected by the North East Trade Winds. However, average annual rainfall for the Parish is 85 inches. In upland areas precipitation usually exceeds 120 inches during the rainy season which lasts from May to October. There is a tendency towards dryness between December and March, which is a major problem for small farmers who lack irrigation facilities in the hilly interior. Overhead irrigation is usually employed on the sugar estates.

The temperature regime is fairly typical of a trade wind island, with the lowest monthly temperatures between 60°F (15°C) and 75°F (24°C) from December to February, and rising to between 70°F and 90°F (21°C and 32°C) in July, August and September. Everywhere there is slight modification with increasing elevation. When temperature is combined with high relative humidity and high rainfall, especially in July and August, most crops become susceptible to disease. During these months the small farmer usually experiences drudgery in harnessing traditional tools to labour power in an effort to eke out a living from marginal land.

Physiographic diversity usually gives rise to a variety of soil types. Most of the central and coastal lowlands possess alluvial soils of medium to high fertility. As perceived by the planter, alluvial soils such as those occurring on slopes no more than 5°, and being well drained, are excellent for the production of sugar cane, as well as for the support of the best improved pastures. Soils such as Roaring River Clay (8,700 acres), Wallen (3,500 acres), Aqualta Silty Clay (2,300 acres) and Frontier Clay (2,000 acres) are considered most favourable for the production of

rice, vegetables, legumes and sugar cane, unfortunately, sugar cane and pasture grasses dominate the entire central lowlands at the expense of the recommended food crops.

Soils occurring over Calcareous Shale in the north and extreme north-east such as Shoothill (5,200 acres) and Highgate Clay (2,200 acres) are also considered quite suitable for cultivation, except where gradients exceed 10°. Natural fertility is medium to high; and although these soils are adequately drained they do tend to be acidic. Where gradient exceeds 10°, it is recommended that erosion control measures be taken. Although food crops are highly recommended for the Shale Hills, bananas are the typical crop grown in these locations.

Soils associated with the limestone upland and plateau are less fertile and often occur on slopes greater than 10°. Chief among these soils are the Bonny Gate Stony Loam (79,000 acres), Carron Hall Clay (37,000 acres) and the Windsor Stony Clay (8,000 acres). Stoniness and shallowness often act as an impediment to root penetration, especially on the Bonny Gate Stony Loam, where bedrock lies at a depth of 1-12 inches.

Drainage is usually rapid and erodibility high where gradient exceeds 20°. Where agriculture is possible, food trees, timber and improved pasture are recommended. Unfortunately, soils associated with the limestone uplands support most of the small farmers in the Parish (see Map 2.3).

Exotic vegetation such as sugar cane covers most of the central lowlands except where abutted by small isolated limestone hills. Lowland areas not dominated by sugar cane are given over to pasture grasses such as pangola, guinea, piano and shamebush. Dense woodlands still exist

along the Hanover border while mixed woodlands, cultivated tree crops, ruinate and grass, cover most of the limestone upland and plateau, except where cleared for domestic production and settlement.

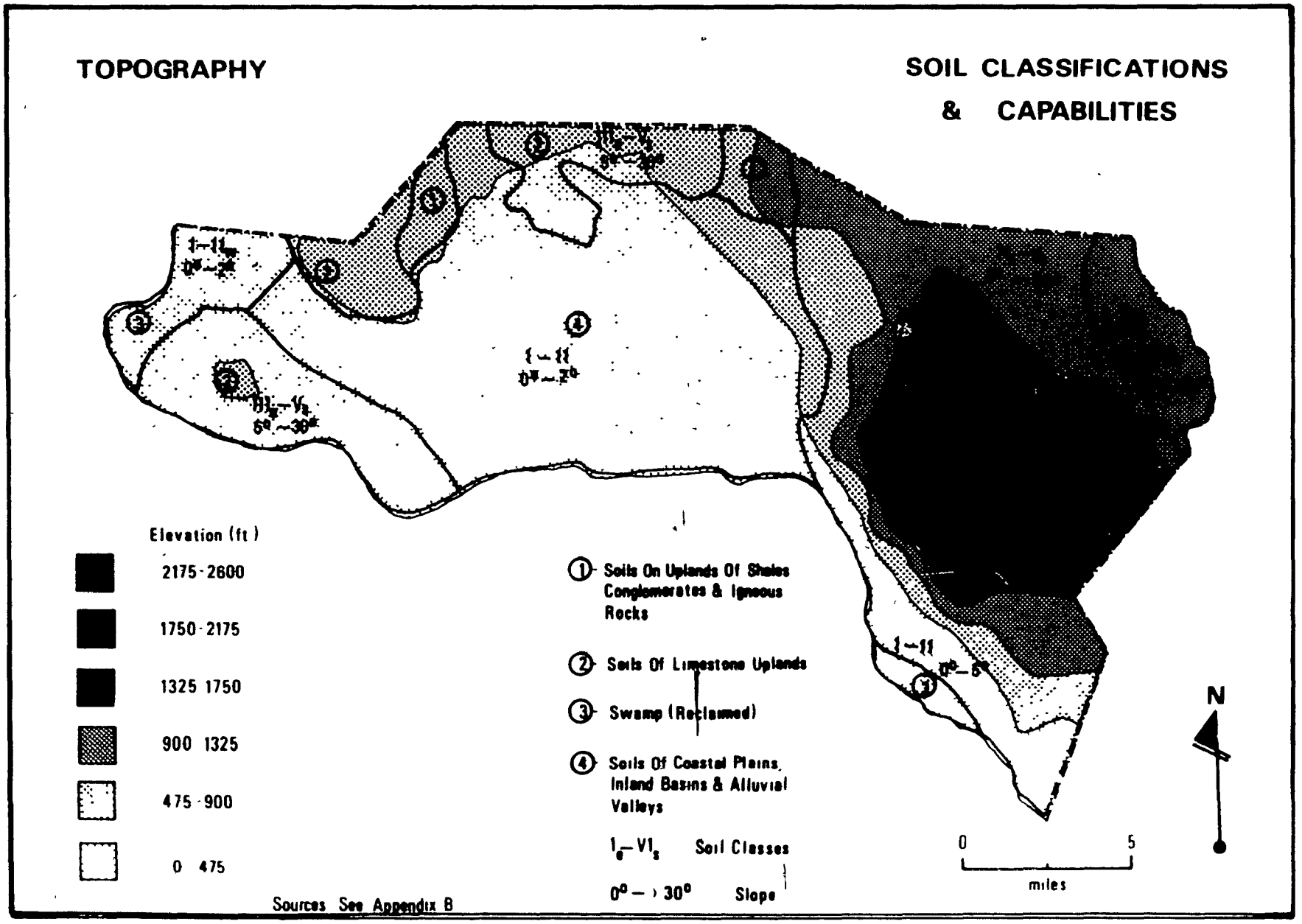
Map 2.3 provides a summary of the relationship between topography, land use and soil capabilities. Judging from the map, the plantation sector benefits most from the spatial organization of agriculture in the Parish. Conditions which may have encouraged the dominance of plantation agriculture on the alluvial lowlands can be summarized as:

1) a favourable climate
2) suitable relief -- remoteness from mountai- land
3) access to a convenient port
4) proven soil productivity for a marketable crop
5) the dominance of the planter class in the Parish backed by a colonial government up to 1962
6) the ability of the plantation system to adjust to social, economic and political changes

2.2 Settlement

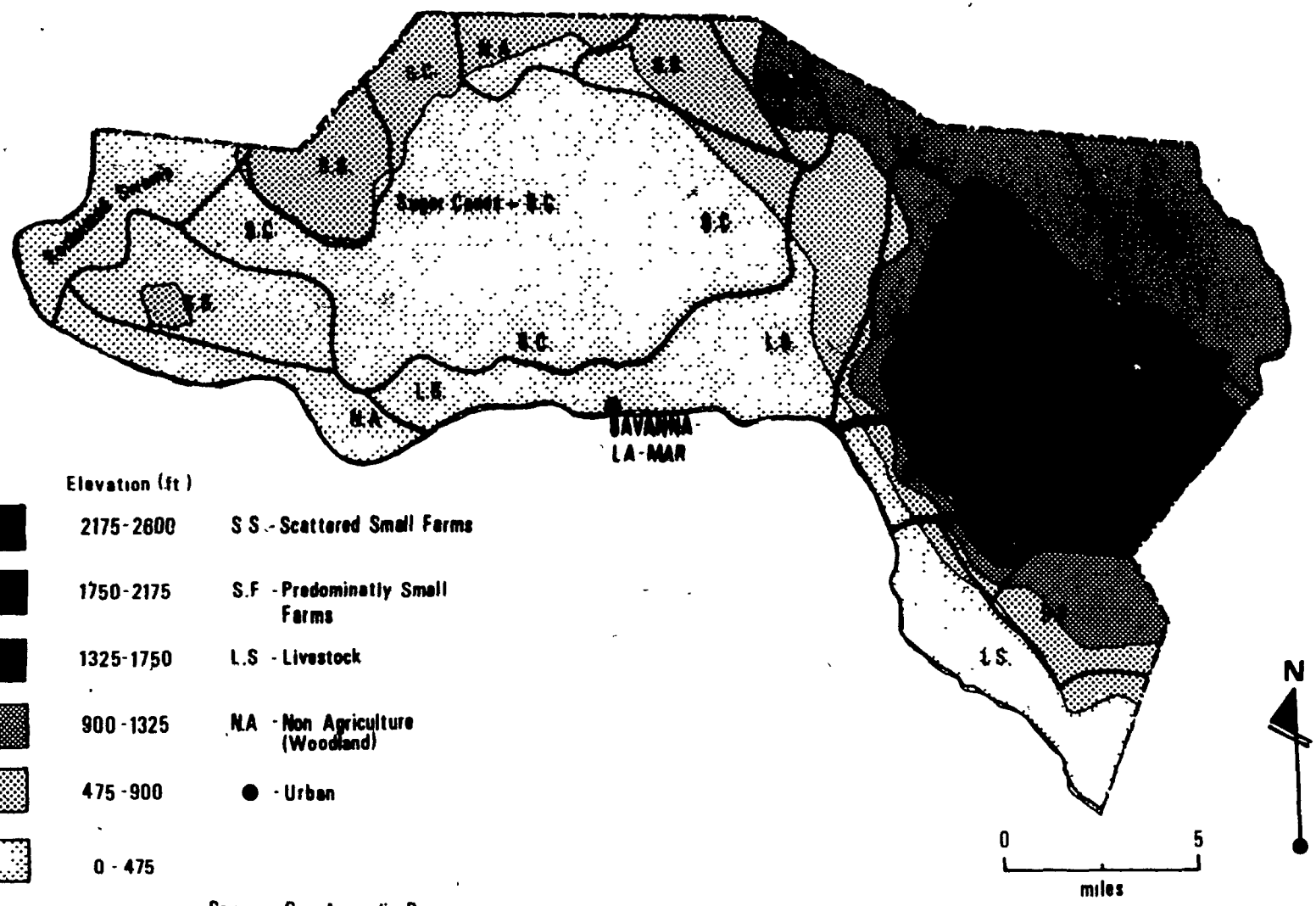
The Arawaks, a sedentary agricultural people, and the Caribs were the first to utilize the alluvial lowlands. They were chiefly engaged in the planting of cassava, corn, squash, sweet potato, and cotton, as well as fishing on the nearby coast. According to Sauer (1954: 21-22, in Mintz, 1960:8),

> The food potential of the traditional conuco planting, or provision ground, is hardly appreciated by ourselves, be we agricultural scientists, economists, or planners, because its tradition as well as its content are so different from what we know and practice. Yields are much higher than from grains, production is continuous the year round, storage is hardly needed, individual kinds


TOPOGRAPHY
SOIL CLASSIFICATIONS
& CAPABILITIES
Elevation (ft)
2175-2600
1750-2175
1325 1750
900 1325
475-900
0 475
Sources See Appendix B
1 Soils On Uplands Of Shales Conglomerates & Igneous Rocks
2 Soils Of Limestone Uplands
3 Swamp (Reclaimed)
4 Soils Of Coastal Plains, Inland Basins & Alluvial Valleys
$I_e - VI_s$ Soil Classes
$0^0 - > 30^0$ Slope
I-II
$0^0 - 2^0$
$III_e - VI_s$
$6^0 - 30^0$
I-II
$0^0 - 2^0$
I-II
$0^0 - 5^0$
N
0
5
miles

TOPOGRAPHY

LAND USE CLASSIFICATIONS



Sources: See Appendix B

Table 2.1 Key to Map 2.3: Land Capability Classes, the Most Suitable Uses for Land in Westmoreland Parish.

Slopes of Gradients	Approximate Acreage of Soil	Classes	Approximate Acreage of Soil	Description
A 0°-2°	3,609	I	5,392	Level land, fertile, no limitation to cultivation.
B 2°-5°	36,541	II	47,009	Suitable for cultivation (tillage) with moderate limitations.
C 5°-10°	29,659	III	24,712	Suitable for cultivation (tillage) with strong limitations.
D 10°-20°	24,462	IV	22,934	Suitable for tree food crops, grasses and very limited cultivation (tillage).
E 20°-30°	43,244	V	19,527	Not suitable for cultivation, but suitable for forest, tree crops and improved grasses.
F > 30°	48,289	VI	66,227	Not suitable for cultivation. Suitable for poor forest.

e = erosion hazard

c = climate factors limit productivity

w = mainly wet land

s = limitation due to soil factor including stones, infertility and shallowness

SOURCES: Stark, J., Soil and Land Use Surveys, No. 15, 1964.

> are not grown separately in fields but are assembled together in one planted ground, to which our habits of order would apply neither the name field or garden. And so we are likely to miss the merit of the system.

Sauer (1966: 68-69) later states that:

> The physical and cultural conditions were highly favourable. . . . The mixed planting system gave the highest range of terrain usable without regard to steepness or regularity of slope. The plants grown were neither demanding or exhaustive of soil fertility. . . . The economy worked because production of the land was in balance with food taken from the water.

Their population is believed to have been 600,000 for the island as a whole, at the time of the arrival of the Spaniards in 1494 (Paget, 1956: 197). Unfortunately, within fifty years, the Amerindians became completely extinct as a result of exhaustion, brought on by overwork, and diseases to which they were unable to develop immunity. African slaves, therefore, were imported as early 1517 to work on the haciendas in order to provide increasing supplies of foods destined for the mainland of South America.

Apart from maintaining sugar cane, indigo and cacao haciendas, the Spaniards based troops on the lowlands of Westmoreland Parish from whence they were dispatched to the mainland Empire.

Inscribed upon the landscape today are place names such as Savanna-la-Mar, Negril and Cabaritta, which marked the Spanish appreciation of the opportunities afforded by fertile alluvial soils. Although their occupance was short-lived, they managed to introduce numerous crops upon which the economy of the Parish now depends. Crops such as sugar cane, ackee, breadfruit, coconut, mangoes, banana, rice, citrus and Castillian vegetables. Livestock, such as horses, cattle, hogs, asses, poultry and goats were also introduced to the island.

With the arrival of the English in 1655, land use became more permanent and effective, as haciendas transformed into plantations. The English occupied and manned former Spanish ranches and sugar mills. During the 1650's, military colonization was conducted by means of grants of land to planters. Each planter operated his own estate in juxtaposition to the estates of other planters. The planters employed slave labour from Africa, and expatriate managers and overseers.

> The estates were the unit of nucleated population, with a 'morphology' of great-house, sugar mill and barns, slave quarters, artisans and overseers' quarters analogous to the European ensconced within the surrounding fields.*
> (Paget, 1956:205)

> Where an estate had land not wanted for cane, the slaves were usually allowed to cultivate provisions on it in their spare time. . . . Market day, customarily held on Sunday so as not to interfere with the estate cultivation became an important social and economic institution.
> (Mintz, 1960: 4-5)

The general practice for allowing each slave provision grounds was guaranteed by law in order to save expenditure of money on imported foodstuffs. The provision grounds not only furnished them with sufficient food but provided a surplus. The surplus was traded at the Sunday markets and the money accrued was used to procure salted meat, cod and mackerel, and other necessities of life. Thus the slaves were self-sufficient in providing for their own consumption.

> In my evening drive I met the negroes returning from the mountain, with baskets of provisions sufficient to last for a week. By law they are only allowed every other Saturday for the purpose of cultivating their grounds. . . . It is also advisable for them to bring home only a week's provision at a time . . . when they find themselves in possession of a larger supply than is requisite for their immediate occasions *they will sell half to the wandering*

*Map 4.3 (page 126) shows the survival of a typical sugar estate.

higglers or at Savanna-la-Mar. (Emphasis added)
(Lewis, 1861: 41, in *op. cit.* 18)

Most of the marketing was done by women who carried about and sold "all manner of provisions . . . having a ticket" from their owners (Long, 1773, 2: 492 in *op. cit.*, 15). The subsistence economy that developed as a result of the provision grounds was the main source of domestic consumption and gave the higglers (intermediaries) access to market. Access to trade food surplus provided the basis for the open marketing system which exists today.

After the emancipation, the production of food crops was no longer confined to the estates but was dispersed in the hilly interior. The mobility of the higglers was also increased as they sought, gathered, transported and marketed whatever surplus was generated. The majority of freemen, with the assistance of religious leaders, were settled on marginal land outside the boundaries of the estate. These new villages that sprang up in the interior uplands were serviced by those who went into independent petite trading, carpentry, shoemaking, dressmaking, and other related activities.

During the mid-nineteenth century, indentured labourers, especially from the East Indies, arrived in the Parish to relieve the labour shortage brought about by the Emancipation Act. Apart from the East Indians, Chinese, Syrians, Lebanese and Germans were also settled in the Parish. The East Indians worked on the sugar estates, the Chinese engaged themselves in wholesaling and retailing, while the Lebanese and Syrians confined themselves to banking and other related activities in the Savanna-la-Mar area. Lord Seafords was responsible for settling the German immigrants in the Seaford Town area (NE) where they grew bananas and reared livestock.

Today, the heaviest concentration of population is in the Savanna-la-Mar area. The population extends northward as far as Grange Hill, westward to Little London, and northeastward to Petersfield. The population for the Parish was 109,600 in 1960 as against 115,800 in 1970, showing an increase of 6.0 percent. However, the natural increase was actually 27 percent, 41 percent of which migrated to other parishes and 38 percent migrated abroad. Therefore, 79 percent of the actual increase left the Parish. It is for this reason that the population between 1960 and 1970 showed a slight increase. Based on the 1970 population census, Grange Hill is considered to be urbanized with a population of 2,405. However, Grange Hill is quite rural in the true sense of the word, since the majority of the people depend on agriculture for a living.

Of the total working population in the Parish, 47 percent were engaged in agriculture in 1970, 17 percent above the figure for Jamaica. Table 2.2 shows how the percentage of people engaged in agriculture is distributed among the four census divisions in the Parish, while Table 2.3 shows the relationship between rural and urban populations.

Table 2.2 Total Working Population and Workers in Agriculture, Westmoreland Parish, 1970.

Census Division	Total Working Population	Workers in Agriculture	Workers in Agriculture as % of Total
Northeast	4,866	4,341	89
Southeast	6,664	2,475	37
Central	8,185	2,162	26
West	6,917	3,429	50
Total	26,632	12,407	47

SOURCE: Agricultural Census, 1970.

Table 2.3 Total Urban and Rural Population, Westmoreland Parish, 1970.

Census Division	Urban	Rural	Total	% Rural
Northeast	0	23,425.	23,425	100.0
Southeast	0	28,097	28,097	100.0
Central	13,784	19,497	33,277	58.5
West	2,646	24,122	26,768	91.1

SOURCE: Agricultural Census, 1970.

A high percentage of people in agriculture is usually viewed as an indication of the level of development of a region. The Northeast and Southeast are 100 percent rural, followed by the West with 91 percent. These are the areas in which small farmers are located. On the whole, the Parish ranks fourth among the parishes with rural population.

2.3 Access to Services and Other Amenities

Judged by international standards, Jamaica has a high degree of accessibility which amounts to 1.6 miles of road per square mile. However, the road system in the study area primarily maintains a dendritic network (Jamaica/USAID, 1978), allowing for the free flow of export goods to the port of Savanna-la-Mar and other coastal towns. Hard surface roads are concentrated on the coast. With the development of tourism in the Negril area, the road from Negril to Savanna-la-Mar via Little London has been greatly improved. A new road system linking Green Island to Negril via the coast has also been constructed, roads serving the rural communities continue to be less than adequate.

One of the greatest problems in the Parish is crisscrossing the

rural landscape in a west-east direction. Roads serving the farming communities are chiefly unpaved and much time is wasted getting from point X to Y.

> Human and animal porterage is slow and very expensive and a two mile map distance could be somewhat further by actual route
>
> (*op. cit.*, 1978: 113)

The town/village ratio for Jamaica is 1:44 compared with 1:16 for European countries and 1:157 for the Middle East. The ratio of the typical traditional economy is between 1:1000 and 1:100,000. This places Jamaica in a middling position. The figure for Jamaica can be viewed as misleading since market towns were established to serve colonial administration rather than the rural communities; as a result they are located along tap routes destined for the ports (*op. cit.*)

Service centres in Westmoreland Parish, such as Grange Hill, Little London, Darliston and Bethel Town are multifunctional and provide daily services to a limited extent for the farming communities. Farmers usually travel on an average of 2-4 miles, depending on location, to visit these centres. A police station, post office, clinic, schools, retail shops, churches and dwelling houses are the main structures. Darliston appears progressive, while Bethel Town seems to be declining, with regard to services that are available to the population.

Communities that grew up along dendritic road systems are adequately served by some form of private or public transportation system, however, for those served by unpaved roads and bridle tracks, farmers have to travel an average distance of 2-4 miles in order to have access to transportation services.

Since 1970, telephone services have been extended to almost all

service centres. Call boxes are conveniently located in juxtaposition to post offices or police stations. It is possible for an individual in Darliston, Bethel Town, or any other service area to telephone someone in Savanna-la-Mar for 20 cents. It is therefore fair to say that the rural population has access to telephone services, even if it means travelling two or three miles in order to utilize the telephone.

The electrification, which was extended to most rural areas after 1967, was expanded even more rapidly after 1974. This was made possible by a loan from the Inter-American Development Bank (IADB), which facilitated the carrying out of a survey for the extension of electric services to all rural communities. Lower income families are reluctant to connect their homes because (1) they are located some distance from the road, and (2) the houses are in need of repair. Those-who utilize the service pay a minimal rate every three months for installation and usage. The rate per family depends on installation cost and daily usage.

During the 1970's, the National Water Authority began to increase the supply of water to the Parish. Standpipes are positioned a few chains apart along the roadside in the rural areas. Those who can afford to extend piped water into their homes usually do so. Families who are living in the dry upland areas (SW) are given subsidy for the building of tanks. A limited number of the population still relies on roof catchment, rivers and streams for their water supply, such as those living on the periphery of the sugar cane belt. A new study carried out by the National Water Authority in 1978 proposes that all communities will eventually have access to an adequate water supply.

On the whole, the central lowlands appear more favourable than the

eastern uplands in terms of environmental preferences. Outline in the summary below is a generalized evaluation of the two major areas of the Parish with regard to land use pattern,

	CHARACTERISTICS	CENTRAL LOWLANDS	EASTERN UPLANDS
1.	Location	near urban core and primary markets	remote from urban core and primary markets
2.	Rainfall	adequate for 9 months	adequate to generally excessive for 9 months
3.	Erosion risk	low to medium	medium to high
4.	Soil fertility	medium to high	low to medium
5.	Land use	mono-culture with none to moderate limitations	mixed cropping with strong limitations
6.	Infrastructure	reasonable	inadequate
7.	Transportation and accessibility	reasonable	inadequate and expensive
8.	Communications	reasonable	difficult
9.	Electric supply	widely available	available in some areas
10.	Social services	reasonable	inadequate

2.4 The Plantation and Small Scale Relations

The suitability of the central lowlands for agriculture provides an explanation for the continuity of sugar cane production as the focus of economic activity in the Parish; and the high percentage of hill-dwelling rural population (Table 2.3), the majority of whom are engaged in small scale agriculture. Since the 1930's population movement has been in favour of the lowland areas due to the consolidation of the sugar industry, the inability of the small scale areas to absorb the population (Eyrie, University of the

West Indies), and the demand for cheap labour created by the expansion of sugar cane acreage. According to Cumper (1954: 119), "the population of the canefields is increasing faster than that of the rest of the Parish". Macmillan (1957: 133) has also noted that "the population in Westmoreland is gathering once more on the estates and in the villages of the plain".

The sugar estates were consolidated after they had been purchased by the West Indies Sugar Company. During the consolidation period, workers of previous owners lost their jobs and the right to provision grounds, and small scale tenant farmers and squatters were evicted from the land. This added fuel to the growing tension between landlords and tenants, which resulted in the 1938 riot at Frome. Despite the riot, more land was brought under sugar cane production. Small scale farmers beyond the plantation limit were encouraged to grow sugar cane for the expanding company that was now in demand for raw sugar. Credit, better sugar cane varieties, technical assistance and other facilities were made accessible to the sugar cane farmers.

Between 1941 and 1961 (Map 2.4) the percentage of total land area devoted to sugar cane in the central lowlands increased from 26.2 to 47.4, while that devoted to small scale farming decreased from 10.6 to 7.0. In other words, plantation acreage increased by 80.5 percent at the expense of small scale agriculture. This trend continued up to 1967, as will be seen in Chapter IV, Section C.

The fact that plantation agriculture was expanding at the expense of small scale agriculture, in areas such as Westmoreland, has escaped many geographers. It is the hope of the writer that this thesis will provide pertinent information on the status of small scale agriculture in a

WESTMORELAND LAND USE

(for location see Map 2.1.)

1941 1961

Source: See Appendix B

WESTMORELAND LAND USE

(for location see Map 2.1.) **1961**

Parish Boundary

P Pasture

S Small Scale Farming

Settlement

Sugar Cane

0 1 2 3

MILES

Source: See Appendix B

typical plantation area.

CHAPTER III

PLAN FOR CHANGES: DOMESTIC AGRICULTURAL DEVELOPMENT PLANNING IN JAMAICA, 1962 - 1980

3.1 The Pre-1962 Situation

During the seventeenth century, owners and managers of estates and the Colonial government were faced with the problem of feeding the slaves, which gave rise to the granting of "slave provision grounds" on marginal estate land. The standard allotment to each cultivator was 0.25 acres for the production of Amerindian crops, "and added thereto such African things as the greater yam, the pigeon pea . . . okra" (Sauer, 1954: 21-22), and a great variety of European vegetables (Mintz, 1960: 8). The slaves' right to provision grounds was later secured by law. Thus the estates and the Colonial government were unanimous in their effort to save expenditure of money on imported foodstuffs. The slaves were not only producing export crops but were also producing essentially for local consumption.

As the non-farming population of the port towns and interior barracks increased, so did the demand for food. "At the bottom of the town, near the water side, is the market place, which is plentifully supplied with [food crops] . . . such as pease, beans, cabbages, lettuces, cucumbers . . . potatoes, carrots, turnips, radishes, celery, onions etc." (Long, 1774, 2: 105, *op. cit.*: 16). In the early post-emancipation period, domestic food crops increased rapidly as the ex-slaves established themselves as independent, small-scale producers. However, by the 1890's, the farming population was in need of more land due to a rapid increase in the number of potential farmers. Upon the recommendation of the Royal

Commission (1897), the Land Settlement Scheme was inaugurated to give greater security of tenure to landless farmers operating on heavily tenanted estates. The Land Settlement Scheme, though welcome in principle, was not very effective in increasing the farmers' contribution to food production for the following reasons:

i) allotments of land were too small;

ii) the majority of small farmers did not always have the means to acquire land and therefore much of the land ended up in the hands of speculators;

iii) only very limited extension services were provided for domestic food producers;

iv) housing, roads and other amenities were inadequate.

The first systematic analysis of the small scale sector and its needs were made in 1941 when A.W. Wakefield prepared a memorandum of Agricultural Development in the island (McFarlane *et al.*, 1968: 9), followed by a national census in 1943 and Universal Adult Suffrage in 1944. In 1945 a development committee was formed to make plans to alleviate the social and economic constraints faced by small farmers and the labouring class as a whole. A Food Production campaign was also launched as well as the establishment of a Land Authority (1951), which was later responsible for the Yallahs Valley Authority (1951) and the Christian Area Authority (1953). Planning in this respect was mainly concerned with soil conservation, afforestation, land reclamation, water supply, credit facilities and housing development (*op. cit.*).

Between 1955 and 1962 effort was also made to establish an

Agricultural Development Programme. The programme was later evaluated by Kruijer and Nuis (1955-1960), who recommended that an evaluation and planning sector be established in the Division of Economics and Statistics. Another recommendation was made by Finner, an FAO expert, concerning the marketing of domestic food crops.

The confusion of social and economic development policies severely thwarted the effectiveness of the Land Settlement Scheme as well as subsequent plans aimed at improving the contribution of the small scale sector in increasing domestic food supply. Seers (1968) has directed the attention of his readers to the "dilemma" of planning in a small open economy that is based on the production of export crops. Pect (*op. cit.*) has also pointed out the contradictions and weaknesses of the role of governments in advocating economies of scale in the export sector, and social welfare goals in the small sector. According to Waterston (1966), the need for a rational system of choices among feasible development possibilities based on a consideration of economic and social costs and benefits was lacking in governments' policies. A lack of adequate data and statistics (Seers, 1962) prevented a rational system of "choices among feasible development possibilities". Moreover, Lewis (1966) asserts that development plans should "win the co-operation of the very people who are expected to carry it out at the grassroot level".

Prior to the 1962 plan, a large number of small farmers in Jamaica was sharing a small portion of land in farms, while a small group of large farmers and estate owners controlled more than 50 percent of the total farm acreage (Table 3.1).

Table 3.1 Jamaica: Percent Distribution of the Number of Farms, Acreage and Average Farm Size by Size Group, 1954 and 1961.

Size Group (Acres)	1954 Acreage in Farms	1954 % Distribution	1954 Mean Farm Size	1961 Acreage in Farms	1961 % Distribution	1961 Mean Farm Size
0 - < 5	249,074	13.9	1.8	198,000	11.6	1.8
5 - < 25	426,976	23.9	9.5	389,441	22.8	9.6
25 - <100	192,411	10.8	41.4	167,607	9.8	42.1
100 - <500	204,131	11.4	231.7	185,596	10.8	232.8
500+	716,068	40.0	2,156.8	770,786	45.0	2,204.4
All Farms	1,788,660	100.0	9.4	1,711,430	100.0	10.7

SOURCE: 1961-1962 Agricultural Census.

The data (Table 3.1) show that 0.2 percent of all farmers were controlling 45 percent of the total land in farms in 1961, while 71 percent of all farmers were sharing 11.6 percent of the total land in farms. Between 1954 and 1961 average farm size had increased except for small farms under five acres. The data for Westmoreland Parish reflect those for the island as a whole (Table 3.2).

Table 3.2 Number of Farms, Average Acreage and Farm Size, Westmoreland Parish, 1961

Size Group (Acres)	Acreage in Farms	Number of Farms	Average Farm Size
0 - < 5	14,480	8,447	1.7
5 - < 25	28,143	2,940	9.57
25 - <100	13,834	306	45.21
100 - <500	19,900	60	331.67
500+	75,186	34	2,211.35
All Farms	151,543	11,787	12.86

SOURCE: Agricultural Census, 1961.

In 1961, the average farm size for small farms in the Parish was slightly below the average for the island as a whole, while farms in the 25 to 500+ category were higher than the average. It was against this background that the government proposed a major plan for agricultural development in 1962. In responding to the needs of the small scale sector for land and other agronomic and economic inputs, the government had hoped to increase the quantity and quality of local food crops (Appendix A).

3.2 Agricultural Planning in the First Phase, 1962-1972

Agricultural planning between 1962 and 1972 was centered around the Farmers' Production Programme (FPP). The FPP, which was approved in 1963, aimed at increasing agricultural productivity and output as well as improving the level of living in rural communities. The main objectives

of the programme were:

i) to provide enough food to meet the needs of the population;

ii) to ensure the optimum use of all physical and human resources;

iii) to improve the economy and raise the level of living of all the people.

The programme proposed to achieve these objectives by:

i) assisting farmers in developing their farms through subsidies and extension services;

ii) establishing an adequate marketing system to:

a. provide an outlet for local food crops,

b. ensure a secured market both at home and abroad for domestic food crops at guaranteed prices,

c. introduce and intensify agricultural education in all schools,

d. guide the flow of capital from individual savings and the private sector into agriculture,

e. intensify research, with emphasis on crops produced for local consumption,

f. improve the organization and efficiency of extension services in order to effectively execute the programme.

The programme emphasized the development of viable farms and provision of facilities such as loans. Loans were to be extended for:

i) the improvement and establishment of farm water supplies: the building of tanks, entombment of springs and the provision of piped water supplies;

ii) the provision of farm buildings;

iii) the establishment of co-operatives that would facilitate bulk

buying, storage of farm supplies, grading, packing and the storage of farm produce.

The major projects that were implemented under the FPP were the Fertilizer Demonstration Scheme, Agricultural Credit Scheme, Farmers' Training Scheme, the Agricultural Marketing Corporation, Agricultural Education and Irrigation and Drainage.

3.2.1 The Fertilizer Demonstration Scheme

The main objective of this scheme was to educate farmers. Experimental plots were to be established on their farm to encourage the use of fertilizer and good agronomic practices. The Agricultural Extension workers were responsible for supplying farmers with farm inputs in order to increase yields in food crops. Farmers were encouraged to produce specific crops: negro yams, white yams, yampies, plantains, onions, garlic, carrots, gungo peas, red peas, melons and pumpkins.

3.2.2 The Agricultural Credit Scheme

Government had pledged full support to the small scale sector in providing *bona fide* farmers with loans. Efforts were being made to encourage the flow of credit from the private sector into agriculture. The Agricultural Credit Board (ACB) pledged to increase the volume of credit going to farmers in order to strengthen the credit services.

3.2.3 Farmers' Training Scheme

The government recognized that a large percentage of the farming population lacked technical training and had a low level of education. The Farmers' Training Scheme (FTS) aimed at providing extension services to farmers in order to provide them with adequate skills and knowledge

relating to agriculture. The scheme was to be responsible for the dissemination of agricultural knowledge throughout the local communities by assisting farmers in analysing and solving their problems.

3.2.4 The Agricultural Marketing Corporation (AMC)

The Corporation, established in 1963, aimed at providing an efficient internal marketing system, whereby an outlet for farm produce both at home and abroad would be secured. The AMC was to be responsible for the establishment of:

i) contracts at stipulated prices. Contracts were being made with farmers, co-operatives and other agricultural organizations on the basis of stipulated prices. The Corporation would thereby be able to supply hotels, supermarkets and retail institutions with food as well as entering into contracts with buyers overseas, should there be a surplus of good quality products

ii) a secured market for selected crops at guaranteed prices

iii) open market trading in order to meet short-falls in contracts or supply demand in excess of contracts.

The Marketing Intelligence Service was to be responsible for the coordination of production and marketing of food as well as keeping the Ministry of Agriculture informed on

i) current prices and supplies;

ii) storage stocks for major commodities;

iii) seasonal and annual changes in acreage, yields, production and prices.

3.2.5 Agricultural Education

It was recognized that the education system was not meeting the needs of the local *ecumené*, since it has always been biased towards a European

type of education. The government, therefore, proposed to raise the level of agricultural education at all levels in order to improve agronomic practices. The Extension Service was to be responsible for providing agricultural training for farmers while educational institutions such as schools would provide formal training to those who were still in school. It has been acknowledged that the farmers' educational problems should be tackled before they are expected to absorb knowledge relating to agricultural development.

3.2.6 The Negril Project

The Negril (Agricultural) Development Project involved the reclamation of approximately 4,500 acres of Morass land in the Negril area of Westmoreland Parish. The land was to be reclaimed for agricultural purposes. The reclamation of the morass involved the construction of an interior drainage system with tidal sluices and pumping station. The area to be developed lies between Orange River-Pass to the north, the south Negril River to the south, the high strip of beach land to the west and the cut-off drainage to the east.

3.2.7 Land Reform Programme (LRP)

The government proposed to phase out the Land Settlement Scheme and to replace it with the Land Reform Programme. The main objective of the LRP was to ensure that all arable land would be put to productive use. The multiplicity of existing holdings prevented each from sustaining an average farm family with income above the pure subsistence level. It was estimated that between 150,000 and 200,000 acres of land were being identified on farms over 100 acres in size as being idle or underutilized out of a total of 1,711,430 acres in farms on the island.

The Land Development and Utilization Commission was responsible for issuing Idle Land Orders to those who were affected under the new law:

> An Idle Land Order tells the person who receives it that land held by him/her has been declared idle or underutilized by the Commission, and that plans must be submitted for suitable development and utilization of these lands.
>
> (Scott, 1968: 223)

Owners of underutilized land were affected by the valuation of properties based on their unimproved values and the imposition of taxes on this basis. It was the hope of the government that taxation would provide a stimulus to landowners to put their land into full production. Where this was not done and owners showed unwillingness to lease or rent, the government would consider complusory acquisition of such lands. Government was willing to give incentives for the development of "idle" land.

The LRP aimed at reducing inequalities in the distribution of land and promoting economic development through the proper use of all physical resources. The programme involved:

i) the acquisition and distribution of land owned by government;

ii) the acquisition or leasing of underutilized land, 50 acres and over, occurring on large private properties, unless owners undertook the necessary steps to develop such lands;

iii) the subdivision of land acquired under (ii) above, and the sale of such subunits to farmers.

The government proposed to sell good quality land on a freehold basis.

Farmers were being selected on the basis of competence and ability to farm land. Successful farm management guaranteed each farmer the right to possess the land. In order to provide farmers with adequate income "holdings should not be less than 5 acres and more than 14 acres depending

on location, type and quality of land" (Ministry of Agriculture, 1978).

Before any attempt was made to acquire underutilized land, a complete Land Survey of all lands was carried out. The objectives of the survey were:

i) to determine the areal extent of all lands;

ii) to classify the soil and its capability;

iii) to determine the minimum capital requirement to develop the land;

iv) to determine product capacity of the land.

Landowners were given the opportunity to decide on the action they proposed to take in developing their lands by a choice of any of the following procedures:

i) preparing and submitting a plan for developing underutilized lands;

ii) developing the land along approved guidelines within a specific time period;

iii) leasing the land to tenants under adequate security of tenure at approved rates;

iv) selling the land for agricultural purposes.

If any of the above steps were not taken, the government would have the right to acquire the lands under the law for public purposes by:

i) compulsory leasing with or without option to purchase;

ii) outright purchase with Land Bonds;

iii) cash purchase in the case of small plots;

iv) a combination of any of the above actions.

Two types of Bonds were being issued. The first type was redeemable in 20 years at the option of the vendor. The second type had a full redeemable period of 40 years, but a proportion could be redeemed after five

years. Before settlement began on land acquired under the programme, the government proposed to finance its subdivision, construct roads and provide water facilities and other amenities. Settling small farmers on lands acquired by the government was the function of the Lands Department in collaboration with the Ministry of Agriculture.

The Land Reform Programme was criticized since it was not meeting the needs of small farmers who were unable to buy land. According to Scott (1968: 222), the cost of an acre of land in Westmoreland Parish at that time ranged from $132 to $184.80 (Canadian). Farmers who were fortunate enough to purchase land through the government made a 5 percent deposit and subsequent payments in installments over a period of 25 years. In many cases, farmers found themselves with land without the necessary agronomic and economic inputs to develop it. Consequently, the proper use of the land was often neglected, especially where land was located in hilly terrain and required a high input of finance capital. A marginal location reduced the farmers' effort to increase production.

After the Manley government came to power in 1972, efforts were made to improve the Land Reform Programme because it was the general feeling that the LRP was not meeting the needs of the less privileged farmers who were not able to buy land, or those who had acquired land but were unable to develop it. New proposals were therefore made to strengthen the Land Reform Programme.

3.3 Agricultural Planning in the Second Phase, 1973-1983

Agricultural Planning between 1973 and 1983 is being focussed on Project Land Lease (PLL). PLL, developed by Ted Tatham and patterned on the Alcan plan of supplemental tenancies (Stone, 1977: 117), was launched in 1973:

> Alcan has 4,600 tenants on its leased lands farming some 17,000 acres (3.7 acres per tenant) and the length of lease averages 5-7 years. . . . The leasing to small farmers occurs on land acquired but not yet scheduled for mining. The success of the Alcan experience became the inspiration for the Ministry of Agriculture Project Land Lease. Alcan provides farmers with an active and dedicated extension service which facilitates the farmers' access to fertilizer marketing services, credit and export advice.
>
> (Jamaica/USAID, 1978: 74)

The acquisition of land for PLL follows the guidelines set by the previous government regarding idle or underutilized lands. Properties with over 50 acres are the chief sources of land for the programme. PLL falls under three phases:

PLL I - Tenancy is provided for a five year period for farmers living within a two mile radius from the property with provision for extension for a further five years. Under PLL I, the Government leases land from landowners for six years. Potential farmers and practicing farmers with less than one acre of land are being given the opportunity to increase their farm size within the less-than-five-acre category.

PLL II - Farmers are provided with supplementary land on a leasehold basis for a 49 year period, in the first instance with inheritance rights. Minimal infrastructure and credit in kind are being provided in order to develop the farm.

PLL III - Provision follows that of PLL II except that roads, housing, water supply, electricity and other amenities are provided.

PLL II and III are focussed on practicing farmers, while PLL I aims at getting new farmers on the land, and raising the farm size of those in the less-than-one-acre category. This may be seen as a move to change the

power relationship between the small scale sector and the more powerful landowners. How effective have these programmes and projects been in improving the small scale sector's effort to increase agricultural production?

Table 3.3 gives a summary of the principal programmes and projects proposed, while Table 3.4 briefly describes the state of small scale agriculture in 1962. In Chapters IV and V, the reader will discover the extent to which governments' objectives (Table 3.4) have been upheld.

Table 3.3 Jamaica: Summary Table of Principal Programmes and Projects Proposed, 1962-1980.

Land Use Elements (Parameters)	Proposed Programmes and Projects 1962-1980								
	Fertilizer Demonstration Scheme	Agricultural Credit Scheme	Farmers' Training Scheme	Agricultural Marketing Corporation	Agricultural Education	The Negril Project	Land Reform	Project Land Lease
Access to Land						✓	✓	✓
Quality of Land						✓	✓	✓
Farm Size							✓	✓
Use of Fertilizer	✓							
Crop Type	✓			✓				
Land Tenure							✓	✓
Agriculture in Schools					✓			
Extension Service			✓					
Marketing of Domestic Food Crops				✓				
Credit Facilities and Subsidies		✓						

Table 3.4 Jamaica: Summary of State of Small Scale Agriculture in 1962

Land Use Elements (Parameters)	Major Characteristics	Remarks	Governemnts' Objectives 1962-1980
Access to land	Limited	Farms geographically fragmented (2-3 fragments per farm).	To reduce the inequalities in the distribution of the land.
Farm size	Small. Farmer lacked means to acquire sufficient land.	78% of all farms fell in the <5 acre category. Mean farm size = 1.8 acres (1.7 acres for Westmoreland).	To increase farm size in the <5 acre category.
Quality of land	Farmers confined to marginal land.	Farms not well served by roads and other basic infrastructure. Cost of transporting input and output high.	To improve the quality of the land going to small farmers.
Use of fertilizer	Limited use of fertilizer (inorganic).	Farmers preferred to use organic fertilizer for food crops on marginal land.	To encourage the use of fertilizer and increase farm input.
Crop type	Preference for export crops. Agricultural service devoted attention largely to export market.	Domestic food crops predominated in marginal areas.	To encourage and accelerate domestic food production.
Land tenure	Insecurity of tenure.	Short term tenancies (12 months). No incentive to invest in farm improvement.	To provide security of tenure for farmers operating on heavily tenanted properties.

Table 3.4 continued

Land Use Elements (Parameters)	Major Characteristics	Remarks	Governments' Objectives 1962-1980
Agricultural education a) Formal b) Informal	Lack of knowledge and technical skills at all levels. Inadequate training facilities.	Farmers depended on traditional farming practice. Some elementary schools kept "gardens".	To raise the level of agricultural education at all levels. To reinforce extension service.
Marketing of domestic food Crops	Inefficient and disorganized.	Farmers depended largely on the higgler system which originated within the physical bounds of the plantation.	To regulate and formalize the marketing system.
Credit facilities and subsidies	Lacked adequate finance and credit facilities.	The Peoples' Co-operative Bank was the main source of credit. Commercial banks were reluctant to extend credit to food farmers, due to lack of satisfactory security and difficulty in supervising inadequately secured loans.	To increase the volume of credit going to small farmers.

CHAPTER IV

CHANGES IN THE WESTMORELAND SMALL SCALE AGRICULTURAL SECTOR 1962-1980

This chapter is primarily concerned with an analysis of data based on the field survey carried out in Westmoreland Parish during the summer of 1980. The main thrust of the survey was to find out how effective the role of governments had been in implementing the programmes and projects outlined in Chapter III. The analysis of the data is divided into three sections, A, B and C. Section A analyses data obtained from the questionnaire, which deal with the socio-economic background of the sampled households, and changes in the major characteristics of small scale agriculture. The information that will be given in sections B and C is supportive secondary findings of a more general nature derived from census reports, government documents and other related authentic sources.

A. FINDINGS BASED ON SAMPLED DATA

4.1 The Socio-economic Background of the Sampled Households, Westmoreland Parish, 1980

The survey was chiefly concerned with small scale food producers. Due to differences in the type of location of the farming communities (Chapter II) and the number of farmers directly involved in producing food staples, the sample size was broken down according to the four census divisions in order to give a better indication of the spatial variation of the sampled farm units. The sample size of each division varied from 10 in the Central, 18 in the Northeast (plantation areas), to 34 in the South-east and 38 in the West, giving a total of 100 farms. Due to a scarcity of land in the sugar cane belt (Central), 10 of the 38 farmers interviewed in

the West actually lived in the Central. The 10 farmers had to travel to and from their farms. In addition there was a reduction in man-hours spent on the farm, and an increase in travelling expenditure for these farmers.

The selection of the farming communities was made from the Westmoreland 1:500,000 map sheet, 1959, revised 1972. After the communities were selected, upon consultation with revenue field officers and extension workers, a list of full-time farmers with less than 14 acres of land was drawn up. A systematic random sample was then taken for each community within a given census division.

4.1.1 The Farm Family

The farm is a land use system, and so the success of the farm is invariably reflected in the functioning of the family as a social and economic unit. Data relating to the farmers, household characteristics and levels of living will help to facilitate objective interpretations and analyses regarding the operation of the farm. The farm family includes the farmer, his spouse, and other members of the household who depend on the farmer. The total population in all sampled households was 561 (Table 4.1).

Table 4.1 The Sampled Households

Census Division	No. of Households	Total Persons in Households
Northeast	18	114
Southeast	34	214
Central	10	48
West	38	185
TOTAL	100	561

More than 95 percent of the farmers interviewed had parents who were farmers. However, their levels of living showed much improvement over that of their parents, with regards to housing, household facilities and mobility. Most of the farmers, like their parents, started farming at an average age of 15, after attending school from ages seven to 14. Table 4.2 shows that 57 percent of the farmers went as far as Grade 5, while 39 percent went beyond Grade 5.

Table 4.2 Education Attainment of Sampled Farmers

Census Division	Sample Size	Mean Educational Level (Grade)	Grade Level Attained			
			Nil	1-5	6	7 and over
Northeast	18	2.77	1	16	1	0
Southeast	34	5.67	0	16	6	12
Central	10	3.90	1	7	1	1
West	38	4.92	2	18	9	9
TOTAL	100	4.31	4	57	17	22

Farmers in the Southeast had a mean educational level of 5.67 compared to farmers in the Northeast with a mean educational level of 2.77. Thirty-five percent of the farmers in the Southeast went beyond Grade 6 followed by the West with 24 percent. Farmers in the Southeast and West were more detached from the plantation system and this may have caused them to depend more on the church for whatever education it had to offer. School attendance was most irregular, probably due to abject poverty. Teachers reported that truants had to stay away from school because their

parents could not afford to send them regularly.

Farmers in the Northeast tended to be older than those in other divisions, probably due to a lack of agricultural opportunities for younger farmers.

Table 4.3 Mean Age of Sampled Farmers and Age Distribution

Census Division	Mean Age	Age Distribution 20-34	35-44	45-65	65+	Total
Northeast	50.9	1(6)	4(22)	10(56)	3(17)	18
Southeast	48.6	6(18)	5(15)	21(62)	2(6)	34
Central	46.5	2(20)	2(20)	6(60)	0	10
West	47.1	9(24)	7(18)	19(50)	3(8)	38
Total	48.2	18	18	56	8	100

Percentages in parentheses.

Of the total farmers, 36 percent were under 45 years of age, which was relatively small compared to 64 percent of the farmers who were 45 years of age and over. Farmers under 44 years of age showed more interest in adapting to new agronomic practices such as the use of inorganic fertilizer. Age is important since it reflects attitude to change and agricultural development.

Not all farmers are bonded by the legality of marital status. Only 49 percent were married, while 27 percent were single, and 11 percent shared a "common law" relationship. A "common law" relationship applies to those who exist together without the legality of marriage. The remaining 13 percent represented those who were divorced, separated, and

widowed (Table 4.4).

Table 4.4 Marital Status of Sampled Farmers

Census Division	Single	Married	Widowed	Divorced, Separated	"Common Law"	Total
Northeast	2(11)	11(61)	0	2(11)	3(17)	18
Southeast	13(38)	15(44)	2(6)	3(9)	1(3)	34
Central	3(30)	6(60)	0	0	1(10)	10
West	9(24)	17(45)	1(3)	5(13)	6(16)	38
Total	27	49	3	10	11	100

Percentages in parentheses.

Farmers who were single had less commitment than those who were married and so were free to accept periodic job offers on North American farms.

A considerable number of sampled farmers have received informal training in agronomic practice through experience abroad. This is true for farmers in the Southeast, 56 percent of whom worked on farms abroad; the highest percentage went to the United States of America. The main reason for working abroad was to accrue money for the purpose of purchasing farm land and materials for home improvement. This may be a reflection of the need of farmers to establish themselves independently wherever land was made available outside of the sugar cane areas.

That there is a relationship between education and mobility, is debatable. Brierley (1974: 44) postulates that "the more educated the population, the greater its mobility, for it is attracted by greater opportunity and remuneration in more developed areas".

Travelling and working abroad, no doubt, have had an influence on farmers' attitude to farming. They have learnt that farming is more than satifying the immediate needs of the family. "In such places the labourer experienced higher levels of living than those to which he was accustomed and invariably this served to whet his appetite for material gains and well-being" (*op. cit.*: 65). More than 80 percent of the sampled farmers have also been to more than five other parishes in Jamaica.

Table 4.5 Number of Sampled Farmers Worked Abroad

Census Division	Sample Size	Caribbean	Canada	USA	UK	Total	% Worked Abroad
Northeast	18	0	0	7(21)	0	7	39
Southeast	34	0	7(21)	10(29)	2(6)	19	56
Central	10	0	0	1(10)	0	1	10
West	38	2(5)	0	10(26)	0	12	31
Total	100	2	7	28	2	39	78

Percentages in parentheses

Many talked of the way farming is done in North America and other parishes in Jamaica, and admitted that if they had the necessary agronomic and

economic inputs life would be better for their families. One farmer in the Southeast related how he applied fertilizer, as observed abroad, to a small area of his farm and harvested carrots each weighing as much as 2.5 pounds.

Experience on sugar estates also played a role in the history of the farmers. Thirty-one percent of the sampled farmers, the majority of whom were recorded in the West, had worked on sugar estates before establishing themselves as small farmers. Those who were farming in the sugar cane belt (Central) still depended on the estate for odd jobs.

The two major associations which the farmers and their households were affiliated were the Jamaica Agricultural Society (JAS) and the 4-H Club. The JAS functions as an educational and social agency, catering more to the needs of small farmers engaged in the production of export crops. Domestic food producers would not therefore benefit from marketing and distributing functions provided by the commodity association. The association journal, *The Farmer* and the book *The Farmer's Guide* are excellent publications; however, the vocabulary is far beyond the level of the small farmers, taking into consideration that 57 percent of them never went beyond Grade 5, furthermore, sporadic school attendance had a deleterious effect on their ability to read. Only one sampled farmer had *The Farmer's Guide* in his possession.

The 4-H Clubs cater to the younger population, 10-21 years of age. The clubs provide training in agriculture and home economics as well as leadership. Clubites are usually engaged in activities such as budding and grafting, banana spraying, plant husbandry, cooking and preservation of food, handicrafts and sports. Here again the emphasis seems to be

placed on plantation agriculture.

4.1.2 Household Characteristics

The questionnaire was directed to the head of the household, over 80 percent of whom were males in all regions.

Table 4.6 Mean Size of Sampled Households

Census Division	No. of Households	Total No. in Households	Mean No. of Head/Spouse	Mean No. of Dependents	Mean Size of Households
Northeast	18	114	1.80	4.54	6.34
Southeast	34	214	1.47	4.82	6.29
Central	10	48	1.60	3.20	4.80
West	38	185	1.60	3.27	4.87
Total	100	561	1.62	3.99	5.61

The average number of persons per household was 5.61 (Table 4.6). The Northeast and Southeast had larger families than did the other divisions. Table 4.6 shows the mean number of dependents per household. The average number per household corresponded with the figures given by other studies: Jamaica: 'almost six' (Edwards, 1961: 72); Grenada: 5.66 (Brierley, 1974: 77); Martinique: 5.26 (Brierley, 1974: 74). The farm units in the Northeast and Southeast included not only parents and their children but also other dependents such as grandchildren.

Family participation in the activities of the farm is of importance since it reduces the incidence of hired labour and of cash

flowing outside of the social unit. A reliable source of labour at home may also enable the farmer to decide on long term projects he would not otherwise normally implement. Only 40 percent of the farmers reported that their children assisted them on the farm. Children of the interviewed farmers were disenchanted with the poor conditions under which they would have to farm. Some of the poor conditions were limited land, inadequate credit facilities, and the traditional farm equipment used. As a result there was much unemployment among these young adults.

4.1.3 Levels of Living

Table 4.7 shows the difference in the levels of social well-being for the four census divisions. The differences were obtained by assigning a rank between one and four to each variable under consideration; for example, the division with the highest mean educational level was ranked first, while that with the lowest ranged fourth (Hammon and McCullagh, 1975; United Nations, 1951; Brierley, 1974). An average rank was assigned to two divisions with the same values. The sum of rankings for each division would therefore give an indication of the social differences that exist between the farmers in the four divisions. Farmers in the divisions with the lowest sum of rankings were socially better off than those with the highest sum of rankings.

The economic well-being of the farmers was also taken into account (Table 4.8). Household goods and conveniences as well as housing and household facilities may be used as an indice of Per Capita income. Based on the sampled data, 88 percent of the farmers own their own homes; however, most of these homes needed repairs, 71 percent of which were made of wood with an average age of 17 years. The age of the houses ranged

Table 4.7 Ranking of Social Variables by Census Divisions

Census Division	Size	Demographic					Farmer Education	Mobility External	Mobility Internal	
		% of Farmers 20-44 Years Old	Mean Size of Household	Mean Number of Juveniles Under 12	Mean Number of Juveniles 12-18	Sum of Rankings	Mean Educational Level	% Worked Abroad in Agriculture	% Travelled to >5 Parishes	Sum of Rankings
						Rj				Rj
Northeast	18	28(4)	6.34(4)	3.38(1)	2.30(4)	13	2.77(4)	39(2)	80(3)	9
Southeast	34	33(3)	6.29(3)	4.07(3)	2.23(3)	12	5.67(1)	56(1)	90(2)	4
Central	10	40(2)	4.80(1)	4.50(4)	2.0 (1)	8	3.90(3)	10(4)	50(4)	11
West	38	42(1)	4.87(2)	3.45(2)	2.0 (1)	6	4.92(2)	32(3)	95(1)	6

Rank in parentheses.

SOURCE: Based on sampled data.

from 1-50 years. Of the total houses, 18 percent were concrete; these were newer than average and were built by older farmers who had been saving for many years. The remaining 11 percent were made of both wood and conrete. In the Southeast, 53 percent of the homes were made of wood compared to 100 percent in the Central division. The Central also had the highest percentage of homes with leaking roofs. The number of persons per room for the Central was 3.0 compared to 1.92 for the West (Table 4.8).

Regarding toilet facilities, 82 percent of the homes had pit latrines, 6 percent sewerage and 12 percent had no toilet facilities. Most of the homes without toilet facilities were in the sugar cane belt (Central).

A high percentage of the homes had access to an adequate supply of water. Only 21 percent had to depend on roof catchment, ponds and streams. Most areas were served by public stand-pipes located along the roadside. Farmers in the Darliston area were experiencing difficulty with their water supply due to the presence of impurities.

The radio is the most ubitquitous item, 71 percent of the households possessed a radio, the majority of which was powered by batteries. Table 4.8 gives an indication of the economic well-being of the farmers. Based on this data, the economic levels of the four census divisions ranged from the Northeast, which was the highest to the Central, the lowest in rank. The highest average net income (farmers' estimate) was recorded in the West (J$1,250), followed by the Southeast (J$400), Northeast (J$375), and Central (J$200) per year.

Food ranked highest in the budget of most farmers during the growing

Table 4.8 Ranking of Economic Variable by Census Divisions

Census Division	Size	Household Conveniences and Goods						
		Electricity	Radio	Television	Motor Vehicle	Gas Stove	Refrigerator	Sum of Rankings
		%						
Northeast	18	11(3)	89(1)	6(1.5)	0(3)	28(1)	6(2.5)	12
Southeast	34	26(2)	76(2)	6(1.5)	0(3)	6(4)	6(2.5)	15
Central	10	10(4)	50(4)	0(4)	0(3)	10(3)	0(4)	22
West	38	39(1)	63(3)	5(3)	3(1)	18(2)	16(1)	11

Rank in parentheses.

SOURCE: Based on sampled data.

Table 4.8 continued

Census Division	Size	Housing and Other Facilities								
		% of Wooden Dwellings	% of Concrete Dwellings	No. of Persons Per Room	% of Dwellings with Leaking Roof	% of Dwellings with Sewerage	% of Dwellings with no Toilet	% of Households with Access to Piped/Tank Water	% of Households Relying on Ponds and Streams	Sum of Rankings
										Rj
Northeast	18	72(2)	17(2)	2.38(3)	28(1)	6(2)	6(2)	84(1)	16(1)	14
Southeast	34	53(1)	35(1)	2.33(2)	38(2)	9(1)	3(1)	74(4)	26(4)	16
Central	10	100(4)	0(4)	3.00(4)	40(4)	0(4)	20(3)	80(3)	20(3)	29
West	38	79(3)	8(3)	1.92(1)	39(3)	5(3)	21(4)	81(2)	19(2)	21

Rank in parentheses.

SOURCE: Based on sampled data.

season It was difficult to collect specific data on household consumption, however a general estimation shows that carbohydrate, such as rice and flour, represents about 45 percent of the total cost of food purchased The cost of animal protein was beyond the income of those with low purchasing power Prices for animal protein and other foodstuffs most commonly eaten are quoted in Jamaican dollars below

Table 4.9 Food Prices, Westmoreland Parish, 1980

Item	Open Markets	Supermarkets/ Grocery Shops	Agricultural Marketing Outlets
Chicken	$1.75 lb	$1 60 lb	$1 60 lb
Salted Fish (imported)	5 00 lb	3 50 lb	Not stocked
Pork	2.60/3.50 lb	2 60 lb	Not stocked
Mackerel (imported)	3.00/50 lb	2.60 lb	Not stocked
Rice	1.00 lb	0.59 lb	0 59 lb
Counter flour	0.60 lb	0.36 lb	0.36/50 lb

SOURCE Field survey, summer 1980

Where diet is concerned, the most common mixtures for the sampled households were:

chicken, and rice and peas boiled in seasoned coconut juice,

curried goat and rice;

mackerel and banana;

ackee, salted fish and roasted breadfruit;

pepper pot soup made from a variety of mixtures,

fried fresh fish and cassava bread;

fried pork and roasted breadfruit

Most of the farmers reported that they and members of their households were in fairly good health. Clinics are located in service centres throughout the Parish Bethel Town, Darliston, Little London, Grange Hill and Frome. Savanna-la-Mar has a hospital and other health facilities. Community Health Aides travel throughout most of the rural areas assisting mothers with child care and nutrition.

Young farmers were planning their families as a result of the rapid dissemination of family planning methods. The most commonly used contraceptives were condoms and Depo Provera.*

Time set aside for leisure is a luxury that many small farmers cannot afford. Recreation expenses were centered around holiday merry-making, church going, and meeting with friends at the local shops. For most of the women market day performed an important social function; here they met and talked with friends. And, of course, visiting friends and neighbours was a popular pastime for men and women. Specific data on time allocation were difficult to obtain during the ten-week period the survey was carried out.

4.1.4 Conclusion

By combining social and economic variables it is possible to get an insight into the social and economic well being of the sampled households (Table 4.10). Although the statistical method may appear simplistic, it gives a visual impression of the social and economic conditions under which the respondents live. Table 4.10 shows the sum

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*Depo Provera is a three month injection.

Table 4.10 Rank Combining Social and Economic Variables by Census Divisons

Census Division	Rank	Sum of Ranking	Mean Ranking	Standard Deviation	Coefficient of Variance
		R_j	R_j/N	S	V
West	1	45	2.05	1.04	51
Southeast	2	49	2.23	1.01	45
Northeast	3	52	2.36	1.10	47
Central	4	73	3.32	0.92	28

SOURCES: Based on sampled data.

of rankings (R_j) for the social and economic variables, their mean rank score (R_j/N, standard deviation (S) and coefficient of variance (V) The lowest level of living is ascribed to farmers who are still dependent on the plantation system, that is those living and farming in the sugar cane belt (Central). There is a close association between the levels of living for farmers living in the Northeast, Southeast and West. This reveals that in a plantation economy, levels of living for small farmers can be ranked according to the degree of their independence of the plantation system.

On the whole, the level of living of the sampled farmers shows great improvement over that revealed by the census in 1960 and observed by Edwards (1961: 197-201).

> Cooking was usually done . . . on open wood fires on earth floor. . . . The people in the hilly areas relied more on springs . . . and on streams and rivers

> [for their water supply].
>
> Boots and shoes were not normally worn while the farmer was working . . . young babies wore only napkins . . . after the age of 13 there is a rapid decay of the permanent teeth.

The level of living of the sampled farmers is a reflection of their *Per Capita* income.

The criteria used in establishing a heirarchy in the levels of living for the four census divisions were based on some of the indices suggested by the United Nations such as demographic conditions, education, housing and household facilities, and aggregate consumption (UN, 1951; Moser, 1957: 7, in Brierley, 1974: 40). It is against this background that the major characteristics of small scale agriculture will now be examined.

4 2 The Farmer on the Land: Major Characteristics of Small Scale Agriculture

Land accessibility, farm size, type of tenure and farm management were identified as the main characteristics of the economy of small farmers. These features were considered important in determining effective change in the level of farming in the study area. For the purpose of analysis two or three elements of each of the major characteristics: spatial, agronomic, social, economic and political were isolated for specific study. The role of governments in developing small scale agriculture was outlined in Chapter III, which form the basis for analysing the characteristics above.

The guidelines set out below were used to assess the effectiveness of the role of governments in helping small farmers increase their contribution to domestic food production.

Spatial

i) The extent to which the ill-balance between the small farm sector and the plantation has been rectified, and more specifically (a) the previous occupation of the sampled farmers and the percentage who have gained access to land as a result of Land Reform/Project Land Lease, (b) an increase in farm size, and (c) an improvement in the quality of land allotted to small farmers engaged in the production of domestic food.

Agronomic

i) an increase in the number of farmers who have employed fertilizer to ensure the continued fertility of the soil,

ii) an increase in the quantity and quality of domestic food.

Social

i) the acceptance of leasehold as a basis of secured land tenure;

ii) an increase in the advancement of agricultural knowledge.

Economic

i) an increase in farm income and level of living,

ii) an improvement in the marketing and distribution of domestic food;

iii) an increase in credit facilities and subsidies.

Political

i) the level of farmer participation in the implementation of agricultural programmes and projects;

ii) the emergence of farmer groups capable of bargaining collectively for the improvement of small scale agriculture.

4.2.1 Access to Land and Farm Size

One of the most striking features of small scale agriculture in the

Table 4.11 Number of Sampled Farms and Acreage by Farm Size and Census Division

Census Division	0-<1	1-<2	2-<5	5-<10	10-<14	All Farms
Northeast	2	4	4	5	3	18
Southeast	-	11	9	8	6	34
Central	2	3	3	2	-	10
West	2	8	14	8	6	38
Westmoreland	6	26	30	23	15	100
			Acreage			
Northeast	1.75	5.25	12.00	32.25	39	90.25
Southeast	-	15.25	34.00	38.00	73	160.75
Central	0.50	4.00	9.50	18.80	-	32.80
West	1.00	11.00	47.00	55.00	75	189.00
Westmoreland	3.25 (0.54)	36.00 (1.38)	102.50 (3.42)	144.05 (6.26)	187 (12.47)	473.30 (4.73)

Mean farm size in parentheses.

Table 4.12 Percent Distribution of the Number of Sampled Farms and Acreage by Size Group and Census Division

Census Division	0-<1	1-<2	2-<5	5-<10	10-<14
Northeast	11.11	22.22	22.22	27.78	16.67
Southeast	-	32.35	26.47	23.53	17.65
Central	20.00	30.00	30.00	20.00	-
West	5.25	21.05	36.84	21.05	15.79
Westmoreland	6.00	26.00	30.00	23.00	15.00
			Acreage		
Northeast	1.94	5.84	13.30	35.72	43.21
Southeast	-	9.49	21.15	23.64	45.41
Central	1.52	12.20	28.96	57.32	-
West	0.53	5.80	24.80	29.20	39.58
Westmoreland	0.67	7.61	21.67	30.44	39.53

Parish was the preponderance of small farms. Tables 4.11 and 4.12 show the number of sampled farms, acreage and percent distribution of farm size and categories with access to land. Access to land included all owned, rented, and leased land. There were 100 farms surveyed in the less than 14 acre category, sharing a total of 473 acres of land, with an average farm size of 4.73 acres. The number of farms listed under the less than 5 acre category was 62. These shared a total of 141.75 acres with an average farm size of 2.3 acres. Only 32 percent of the farmers fell under the less than 2 acre category, while 68 percent had farms between 2 and 14 acres in size, 30 percent of which were between 2 and 5 acres in size.

The major concept of Land Reform, particularly PLL I, was to reallocate land so that the less privileged farmers could gain access to income earning resources. This was to be achieved through an increase in the size of existing farms. It was therefore expected that greater viability would reduce the tendency for farmers to fragment their farms. The study shows that the highest number of fragments per farm was 3.0, the average number of fragments being 2.4. Table 4.13 shows the number of farms, fragments and average fragments per farm. The highest average number of fragments occurred in the Northeast and Central. This may have been as a result of the scarcity of land in areas more closely associated with the plantation system, and the need to vary the ecological base of land held under insecure tenure.

Figure 4.1

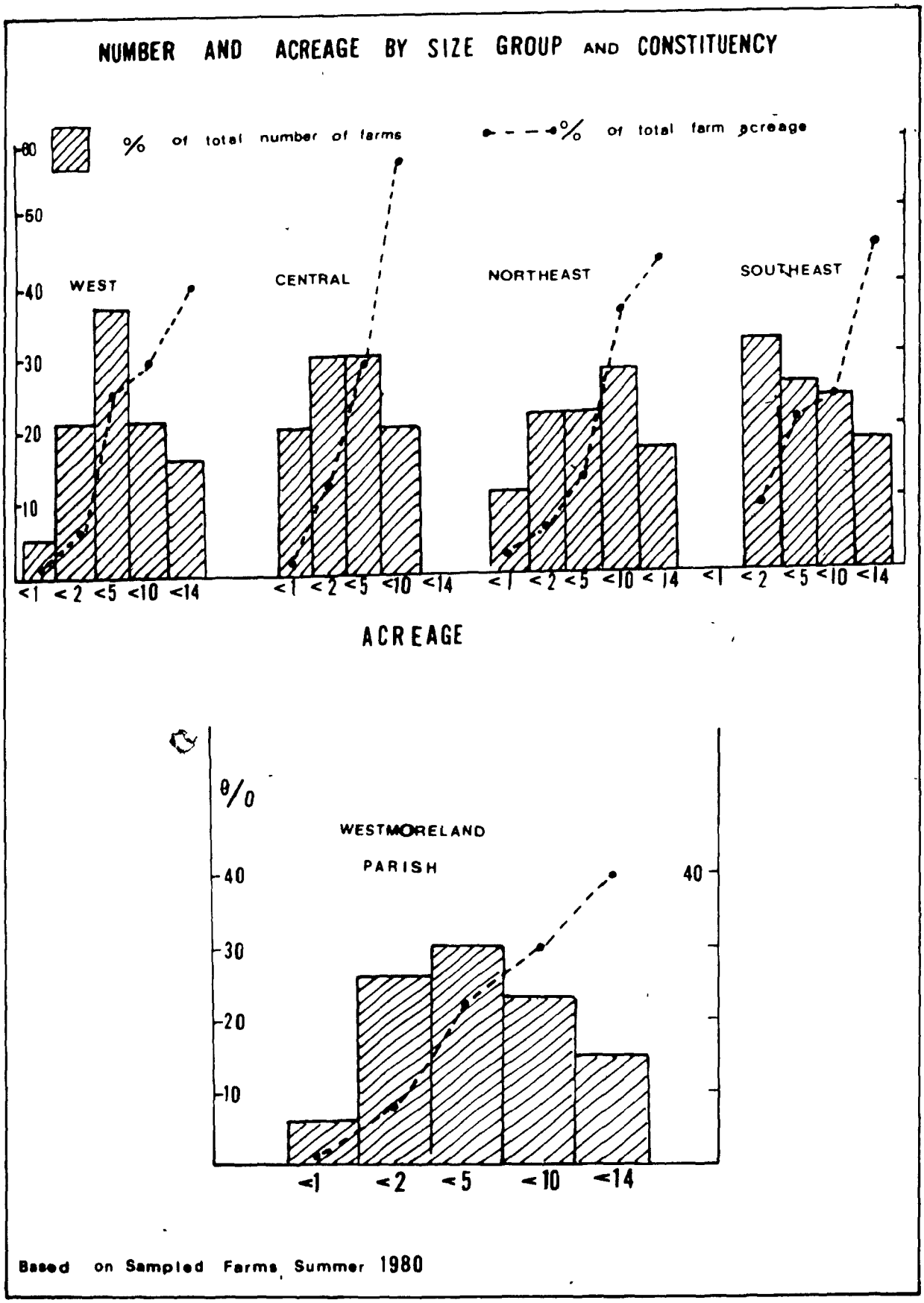

NUMBER AND ACREAGE BY SIZE GROUP AND CONSTITUENCY
% of total number of farms
% of total farm acreage
WEST
CENTRAL
NORTHEAST
SOUTHEAST
<1 <2 <5 <10 <14
ACREAGE
%
WESTMORELAND
PARISH
Based on Sampled Farms, Summer 1980

Table 4.13 Farm Fragmentation by Census Division

Census Division	Sampled Farms	No. of Farms Fragmented	% of Farms Fragmented	No. of Fragments	Average No. of Fragments
Northeast	18	10	55	29	2.9
Southeast	34	19	56	42	2.2
Central	10	6	60	15	2.5
West	38	26	68	61	2.3
Westmoreland	100	61		147	2.4

SOURCE: Based on sampled data.

4.2.2 Quality of Land

Under the *Land Reform Programme* it was expected that the quality of land going to the small scale sector would be improved. Most of the land that was made accessible to the sampled farmers continued to be marginal in that the land was located on the upper slopes (Maps 2.2 and 2.3). Where sugar land was made accessible to small farmers, the land continued to support sugar cane. Lack of access to alluvial lowlands forced many farmers in the Central and West to squat. The study shows that 20 percent of the sampled farmers squatted on 65.75 acres of land, a high percentage of which fell under PLL I.

One of the main problems with marginal land is not that it is unable to support food crops but that large expenditure is required in preparing the land for production as regards tillage, removal of stones, and the construction of soil erosion barriers. Therefore, 1.0 acre of flat to gentle sloping land may bring the farmer more economic return

than 3.0 acres of hilly terrain. In economic terms, the lowland farmer seems to be better able to achieve viability, whereby marginal cost is equal to marginal revenue (MC = MR).

Now that the morass land in the Negril area has been reclaimed by the government, small farmers have been gaining greater access to alluvial land. The farmers utilizing the land in this area were essentially vegetable and legume producers.

The study, relating to the spatial aspect of small scale agriculture in Westmoreland Parish, indicates that *farm size in the less-than-five-acre* category increased between 1972 and 1980. This was mainly due to the inauguration of the PLL programme. However, of the 100 sampled farmers, 32 were still in need of land since they shared only 39.25 acres of land out of a total 473 acres.

The standard acreage allotted to each farmer under PLL was 1.0 acre. Many farmers expressed dissatisfaction with the 1.0 acre allotment; as a result, 20 percent of the sampled farmers resorted to squatting on PLL land. On the whole, 66 percent of the farmers had access to land under PLL.

The Land Reform Programme, particularly in the Second Phase (PLL) (1973-1983), has been effective in the following areas:

i) it has partially satisfied the need for land among small farmers;

ii) it allowed many small farmers to increase the size of their farm;

iii) it allowed new farmers to settle on the land independently (Table 4.14);

iv) to a limited extent, it has managed to reduce the disparity that existed in the distribution of land between the small-scale

sector and the planter class.

The programme has been *less than effective in the acreage and quality of land allotted to small farmers*. More time is needed, however, to fully assess the effectiveness of land redistribution. There was no relationship between size of family and farm size. In the allocation and distribution of land, family size was not taken into consideration. As a result, it was observed that a few large families actually needed more land than was allotted. The amount of land allotted to the farm unit helps to give an indication of the involvement of the small scale sector in food production. There is no doubt that social and economic benefits have been accrued from the programme. Table 4.17 shows the sampled farmers who have gained access to land under PLL.

Table 4.14 Previous Occupation of Sampled Farmers Prior to Project Land Lease (PLL)

Occupation	Percent of Sampled Farmers
Small farmer	70
Farm labourer (estate)	10
Unemployed/Casual labourer	17
Salesman	1
Housewife	2
Westmoreland Parish	100

4.2.3 The Use of Fertilizer

The application of fertilizers to soil types that have become diminished of their natural nutrients may contribute to an increase in crop yields. The benefit of fertilizer application was widely accepted by the sampled farmers. However, 40 percent of the farmers felt that the price of fertilizer was too high and that it was irrational to employ expensive inorganic fertilizer on small farms located on upland slopes (>10°). The reasons given were that the soil was too shallow and that percolation and rapid run-off would rob the soil of the nutrients. It was the general feeling that mulch and other forms of organic fertilizer were better ways of maintaining soil fertility on upland areas. Mulch was comprised of branches cut from trees, ashes derived from burnt wood and animal manure. The use of poultry manure was observed in the Northeast.

In the majority of cases, nitrogen (NO_3), phosphorus (PO_4) and potassium (K^+) ingredients were being blended with organic fertilizer. Each blend was given a particular number for easy identification (Table 4.15). The Ministry of Agriculture, through the extension service, was responsible for advising farmers concerning the use of a particular "blend" for selected crop types. However, it appeared that little consideration was given to method of application, and areal differences in soil types and the nature of their mineral deficiencies. Therefore, farmers reported that applying fertilizer to the soil was a matter of trial and error. Between 1962 and 1980, 45 percent of the farmers applied some form of fertilizer blend to the soil.

Greater use of organic fertilizer is seen in the near future,

Table 4.15 The Use of Fertilizer by Census Division

Census Division	Number Reporting	Fertilizer Blend N	P	K	No. of Farmers and Year Adopted (all types) 1962-1967	1968-1972	1973-1977	1978-1980
Northeast	5				1	2	2	
		12	24	12 (5)				
		7	7	14 (1)				
		6	6	18 (1)				
		10	10	4 (1)				
		1	8	10 (1)				
Southeast	20				2	5	3	
					2	4	4	
		6	6	18 (8)				
		12	24	12 (6)				
		Potash		(4)				
		7	7	14 (3)				
		5	5	10 (2)				
		5	10	10 (2)				
Central	1							1
		12	24	12 (1)				
West	19				1	3	4	
					2	4	5	
		12	24	12 (15)				
		6	6	18 (4)				
		7	7	14 (3)				

Number of farmers using that particular blend in parentheses.

SOURCE: Based on sampled data.

the near future, with the hope that this will contribute to greater productivity per man power It is also hoped that further development along this line will help to reduce the island's dependency on foreign supplies of expensive inorganic fertilizers

Only 20 percent of the farmers were practicing some form of soil erosion technique These farmers were employing stone barriers and trenches to control the flow of water on their farms. The role of governments in the practice of soil erosion technique was not confirmed The general impression was that little had been done in the way of farm management. Farmers continued to use the traditional farm tools such as machete, garden fork and spade Farmers in the Southeast and West expressed a desire for small mechanical hand tillers. Mechanical hand tillers would certainly enable the farmers to overcome the tillage problem

4.2.4 Scale of Production and Crop Type

The levels of farming of the sampled farmers were determined by their scale of production. The majority of the farmers kept no record of their farm operations, therefore their economic orientation, size of cultivation and crop type were used to judge the scale of production for each farmer. On the basis of the percentage (estimated) of farm produce sold and income derived from the sale, the farmers were classified into three major groups:

i) commercial: over 50 percent of their farm income was derived from the sale of agricultural products,

ii) semi-commercial: up to 49 percent of their income was derived from the sale of their farm produce;

iii) non-commercial: less than 25 percent of their income came from

the sale of farm produce

Type of farmers and size of cultivation also gave an indication of the scale of production and the amount of income derived from agriculture In retrospect, income derived from agriculture was closely associated with the level of living of the farmers

The data reveal that the scale of production and income derived from the sale of agricultural produce were closely associated with access to land, farm size, and agronomic and economic inputs For example, non-commercial farmers had access to 0.5 to less than 1.5 acres of land and were in need of land and credit Farmers in this category were dependent on other sources of income such as the estates and the Public Works Department. On the other hand, commercial farmers had access to more than 2.0 acres of land, credit and other agronomic and economic inputs. Non-commercial farmers were living at a very low level compared to those in the commercial category. There was also a close relationship between type of farmers and degree of specialization Farmers with limited access to land, credit and other inputs practised mixed-cropping, with emphasis on yams and other tubers, while those with adequate access to land and other inputs emphasized vegetables and legumes as cash crops (see Appendix A1).

Figure 4.2 shows land use on the sampled farm of a 22 year old farmer who specialized in vegetables and legumes. He has had the benefit of a secondary education that emphasized agricultural instruction. Farmers in Bog, Beeston Spring and Cruise (NE) were also emphasizing vegetables and legumes as major cash crops. Most of the crops appeared to thrive fairly well on the upland slopes and plateaux (so long as the soil was of medium fertility and had enough room for root penetration).

Plantains and yams appeared to thrive well on the Shale Hills in the Glasgow-Moreland area (NW).

Rice growing is chiefly confined to the Central and West of the Parish on the wetlands not required for sugar cane production. New Hope, Big Bridge, Little Bridge and Old Hope (Central) are rice growing areas. The chief varieties are Surinam #2, Blue Bonnet and Buffalo. Surinam #2 grows well on marginal land and requires less fertilizer than does Blue Bonnet. The Buffalo variety is susceptible to pest and fungi. Emphasis is now being placed on Surinam #2 since it is more adaptable to the local ecological conditions. Paddy fields vary from 0.25 acre to 5.0 acres. Rice farmers reported that they were able to increase their rice acreage since the inauguration of Project Land Lease (1972). Under PLL it is expected that rice farmers will continue to gain more access to underutilized plantation land as well as the 4,500 acres of morass land in the Negril area that is now reclaimed.

Sixty-six percent of the farmers reported an expansion in the scale of their production since 1972, others since 1979. An increase in the scale of operation was attributed to access to land, subsidy and good market prices for rice, vegetables and legumes. It was found that 79 percent of the farmers were responding to market demand (Table 4.16). Small farmers who were detached from the plantation system made the most contribution to food production (Southeast and West).

Yields per farmer varied depending on land accessibility, slope, depth of soil, inputs, market facilities and managerial skills. Under similar situations, variation in yields and output per farmer depended on managerial skills. An increase in agricultural productivity and

Table 4.16 Number, Type of Sampled Farmers and Percentage of Produce Marketed, by Census Division

Census Division	Major Crop Type	Non-commercial 0-25%	Semi-commercial 25-50%	Commercial 50-100%
Northeast	Root crops*	8	5	5
Southeast	Vegetables Legumes Root crops Cereal	2	13	19
Central	Cereal Root crops	7	2	1
West	Vegetables Legumes Cereal	4	13	21
Westmoreland		21	33	46

*For crop definition see Appendix A.

output seems to indicate that the same quantity of output is being produced by fewer farmers. The data seem to indicate, however, that an increase in the quantity of food produced over the past 20 years was more related to an increase in the number of farms and acreages.

4.2.5 Land Tenure

The majority of the farmers in the sample held land under a freehold form of tenure (Table 4.17). Those who were operating on family land represented 13 percent of the farmers. The squatters were operating on PLL land because they desired more land than the modest amount allotted.

Table 4.17 Number of Land Parcels by Type of Tenure and Acreage by Census Division

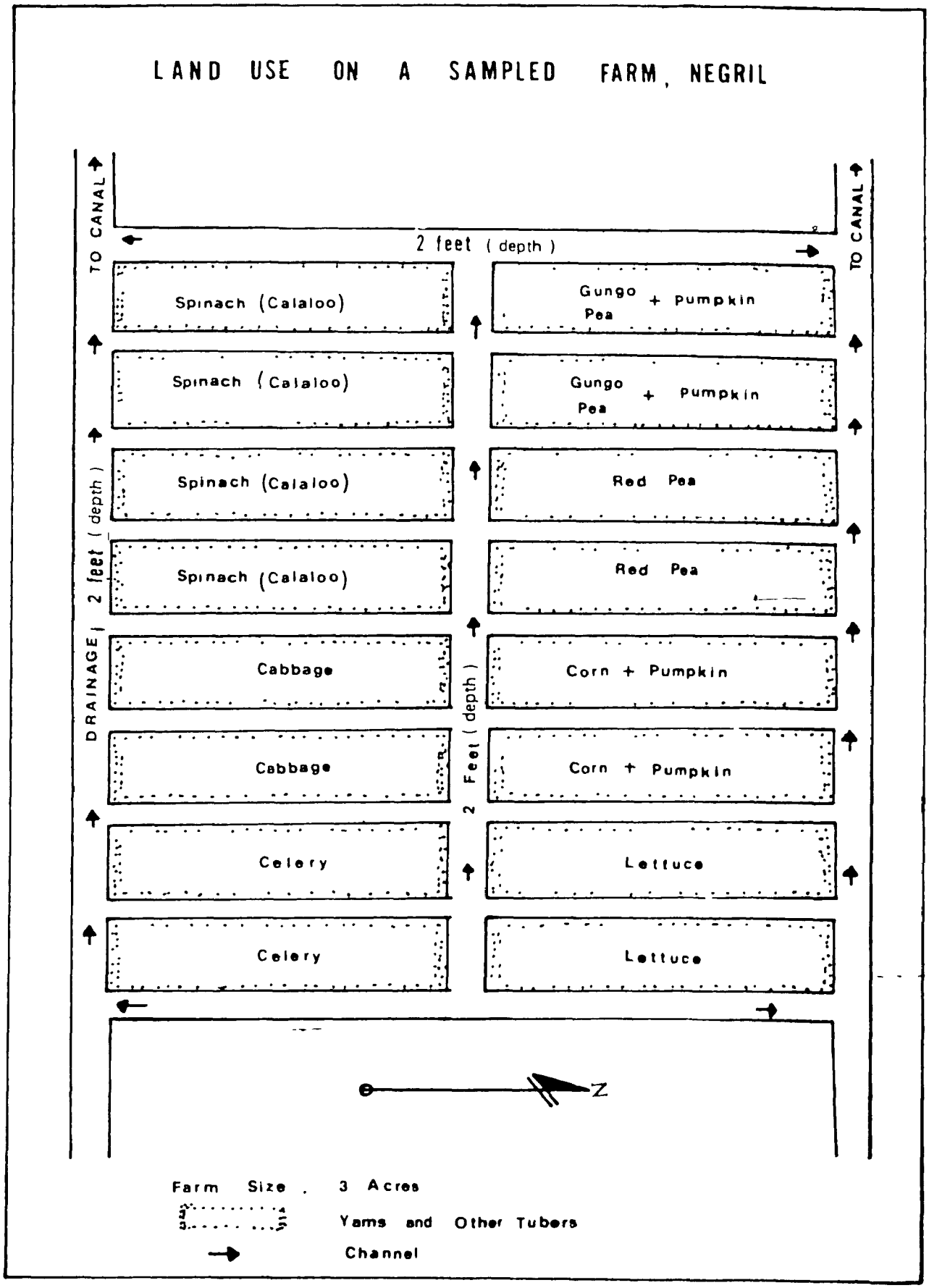
Census Division	Freehold	Rented (Private)	Rented (Free)	Project Land Lease	Squatted
Northeast	16	1	3	11	3 *
Southeast	28	6	6	9	3
Central	1	5	1	4	6
West	17	16	3	22	8
Total	62	28	13	46	20
		Acreage			
Northeast	37.00	0.50	17.25	27.50	8.00
Southeast	112.25	8.50	13.50	17.00	9.50
Central	2.00	11.25	1.50	14.00	4.00
West	46.75	25.50	7.50	44.25	44.25
Total	198.00	45.75	39.75	124.00	65.75

Table 4.18 Average Acreage of Land Parcels by Type of Tenure

Census Division	Freehold	Rented (Private)	Rented (Free)	Project Land Lease	Squatted
Northeast	2.3	0.25	5.80	2.50	2.70
Southeast	4.0	1.40	2.25	2.60	3.20
Central	2.0	2.30	1.50	3.30	0.67
West	3.71	1.59	2.50	2.98	5.53
Westmoreland	3.20	1.63	3.06	2.70**	3.29

*Some farms had more than one parcel, therefore the total number of parcels was greater than the number of farms. Table 4.18 shows the average acreage of land parcels by type of tenure (e.g. 37/16 = 2.3).

**Though standard allotment is 1 acre, some farmers have much larger holdings which inflates average.


LAND USE ON A SAMPLED FARM, NEGRIL
TO CANAL
2 feet (depth)
TO CANAL
Spinach (Calaloo)
Gungo Pea + Pumpkin
Spinach (Calaloo)
Gungo Pea + Pumpkin
Spinach (Calaloo)
Red Pea
Spinach (Calaloo)
Red Pea
DRAINAGE
2 feet (depth)
Cabbage
Corn + Pumpkin
Cabbage
Corn + Pumpkin
2 Feet (depth)
Celery
Lettuce
Celery
Lettuce
Z
Farm Size . 3 Acres
Yams and Other Tubers
Channel

This brings the total number of farmers gaining access to PLL land to 66.

Of the 62 freeholders, only three reported that they had procured land from speculators during the early phase of Land Reform (1962-1972). Since 1973, the PLL programme has attempted to popularize the merits of leasehold as a form of secured tenure in order to get land into the hands of *bona fide* small farmers.

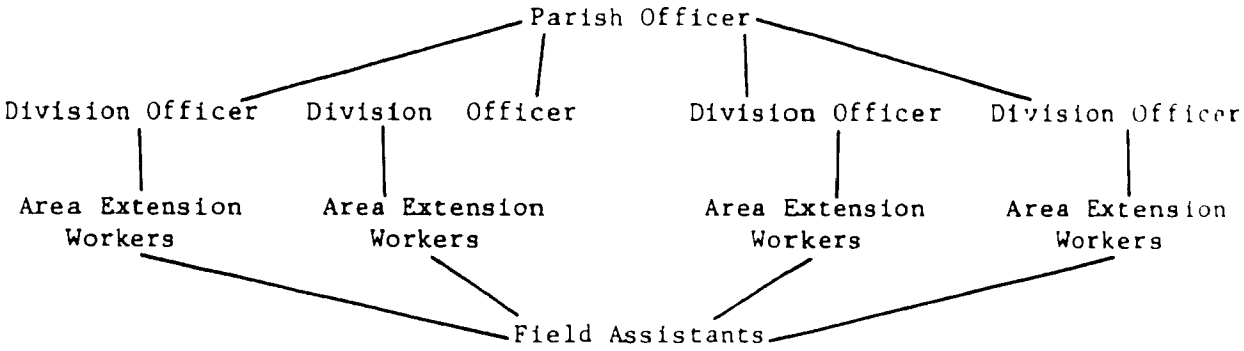
Table 4.17 indicates that *46 farmers were gaining legal access to publicly owned land, 73 percent of whom expressed satisfaction with the leasehold form of tenure.* However, they were dissatisfied with the standard size of the allotment (1.0 acre). The extent to which PLL has mitigated excessive fragmentation is not fully known. However, 35 of the 46 farmers utilizing PLL land reported that they had given up between 1.0 and 2.0 rented holdings in favour of leasing. Under PLL, each lessee was paying J$5 per acre annually to the government compared with J$15-J$80 per acre for privately owned land.

4.2.6 Agricultural Education

Extension Service

The Ministry of Agriculture has its main agricultural service branch at Savanna-la-Mar. This office is mainly responsible for extension services in the four agricultural divisions in the Parish: Savanna-la-Mar, Grange Hill, Darliston and Bethel Town. Each division is manned by an officer, who, along with area extension workers and their assistants, serve the farming communities.

Figure 4.3 The Organization of Extension Services in Westmoreland Parish



The extension service is organized to meet the needs of all farmers regardless of location. The parish branch is responsible for a broad spectrum of services: the implementation of PLL, land acquisition, property administration, crop care, storage and distribution of seeds, fertilizers and chemicals, and home economic development. Division officers act as co-ordinators for all programmes in the various areas, while the area extension workers and their assistants aid farmers in farm management, agronomic practice, and in the provision of inputs such as fertilizers, seeds, pest control and credit arrangements. Most of those who were involved with the extension service received their training at the Jamaica School of Agriculture in St. Catherine Parish. The field assistants usually get their training at a junior agricultural school such as Knockalva in Hanover Parish.

The study found that the extension service was not effective in assisting farmers in developing management skills and good agronomic practice. Farmers seemed to have little knowledge about farm organization, soil capability and management. Farmers throughout the Parish expressed

the need to know more about the soils they were utilizing. Furthermore, *77 percent of the farmers reported that their farms had not been visited by extension workers or their assistants.*

The heavy involvement of the extension workers with projects and services such as loan and subsidy arrangements left little time to train farmers in farm management and agronomic practice. The efficient use of time and money in the successful operation of the extension service is most vital in the process of agricultural development.

Field workers have access to government-funded, interest-free car loans, however, the majority of them cannot afford to procure a car because of the low salary received. The problem of mobility in the hilly interior could be mitigated if each worker was provided with a horse. It would appear that a horse would be more appropriate in ensuring mobility in hilly terrain. Extension workers could also rearrange their work schedules to coincide with the time the majority of farmers work on their farms, which is usually between five and eleven o'clock each morning, before the land heats up.

Agriculture in Schools

The aim of the government to raise the level of agricultural education in schools has been achieved. In 1962, the majority of school leavers (15 year olds) lacked agricultural knowledge. In 1980, agricultural instruction at the primary level is not compulsory. However, the teaching of agriculture is compulsory for all students between grades 7 and 9 at the secondary level.* Secondary schools are now located at

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*The school leaving age of the majority of school leavers has now been extended to 17+ years.

Little London, Grange Hill, Petersfield and Darliston. These schools were built during the 1960's and 1970's to meet the needs of students who were unable to gain admission into the grammar schools. Students have the option at the end of Grade 9 to continue in agriculture and those who continue usually spend another two years in this study. Upon graduation, an individual may continue training at one of the junior agricultural schools, such as Knockalva, before going on to the Jamaica School of Agriculture. Between 1962 and 1979, 13 percent of the students who entered Knockalva were from Westmoreland Parish.

At the secondary level, the students are taught by JSA graduates and other specialists from abroad. Some schools have viable farms and are able to supply their own cafeterias and other institutions, such as hotels, with vegetables, legumes and poultry products. There are 43 secondary schools offering compulsory instruction in agriculture (Grades 7-9) throughout the island. There are also three specialist schools catering essentially to the needs of agricultural students between 12 and 18 years of age. One of these schools is Knockalva where the students are provided with rigorous training in all aspects of agriculture. Students are prepared for continuing education at JSA, for extension service or assistant teaching. JSA is the principal source of technical manpower for government ministries, the private sector and teaching.

4.2.7 The Principal Organization of Marketing Process for Domestic Food Crops

The marketing system for domestic food crops has been closely intermeshed with the rise of small scale agriculture, which originated within the "slave worked estates". The 13 Parish markets seem to be

hierarchially organized in a *central place system.* These markets are located strategically on transportation routes in areas of old settlement. The Central market is in Savanna-la-Mar, the administrative centre and port town.

The markets are categorized according to periodicity, size and function. Central markets operate on a six-day cycle, opening on Mondays and closing on Saturdays, and usually accommodate over 61 sellers. Intermediate markets operate on a two-day cycle, opening on Fridays and closing on Saturdays and usually accommodate 20-61 sellers. The standard markets operate on a one-day cycle, may be opened on Fridays or Saturdays, and usually have 1-20 sellers.

Table 4.19 The Size Structure of Markets in Westmoreland Parish

Parish	Central Markets	Intermediate Markets	Standard Markets
Westmoreland	Savanna-la-Mar	Darliston	Little London
		Frome	Retrieve
		Grange Hill	Retreat
			Masemure
			Petersfield
			Hertford
			Shewbury
			Whithorn
			Whitehouse

Total Operative Markets = 13

When the Friday markets close, the sellers usually attend the Saturday markets. Westmoreland is the supplying parish for all the local markets, followed by St. Elizabeth, Kingston, Manchester, Hanover and St.

James in order of importance. Of the 13 operative markets in the Parish, nine are located in the sugar cane belt (Map 4.1), three of the nine are intermediate and one is central. Five are located on Frome Sugar Estate land. The location of the markets in the sugar cane belt creates a problem for the sellers and higglers.

The percentage of land devoted to food production in the Central is very small and so food sellers (higglers) often experience difficulty in obtaining food crops from farmers in close proximity to the markets. Travelling further afield for farm produce proves quite expensive for the higglers. The higgler usually travels on unpaved roads and bridle paths over hilly terrain to negotiate with the farmers for small quantities of produce, then assembles, stores and divides into small portions for wholesaling to retailers, and retailing to customers. (field observation)

Market Distribution Mechanism

The establishment of the Agricultural Marketing Corporation in 1963, was to regulate and formalize the distribution of farm produce in order to meet the demand for food by urban and institutional consumers, and to siphon off any surplus for the export market. The higgler and the AMC fall within the distributive sector and usually perform more than one marketing function within the same geographic sphere:

a) buying crops from farmers, bulking, transporting, debulking and storing;

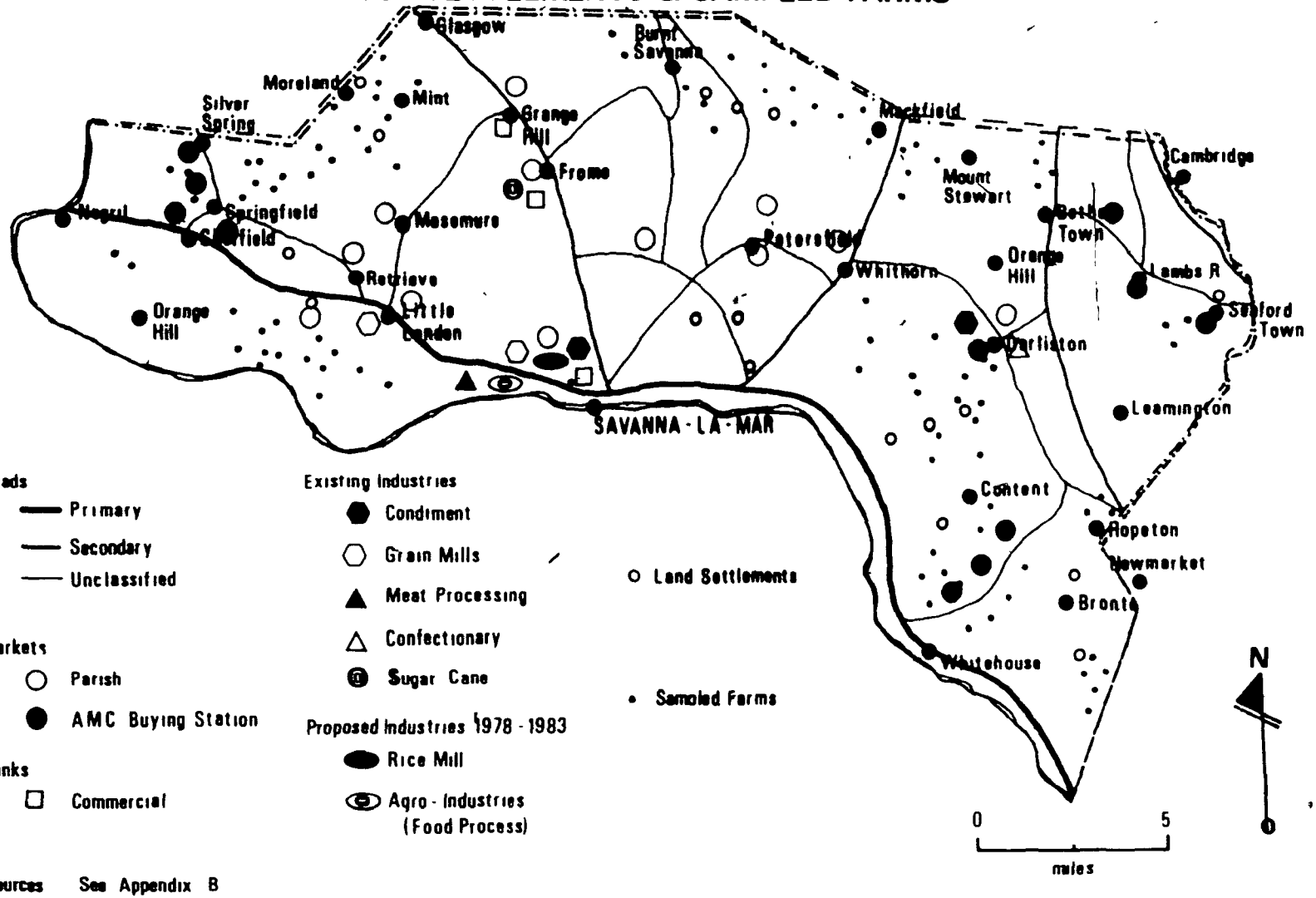
b) distributing farm produce from surplus to deficit areas;

c) wholesaling to retailers;

d) retailing to consumers.

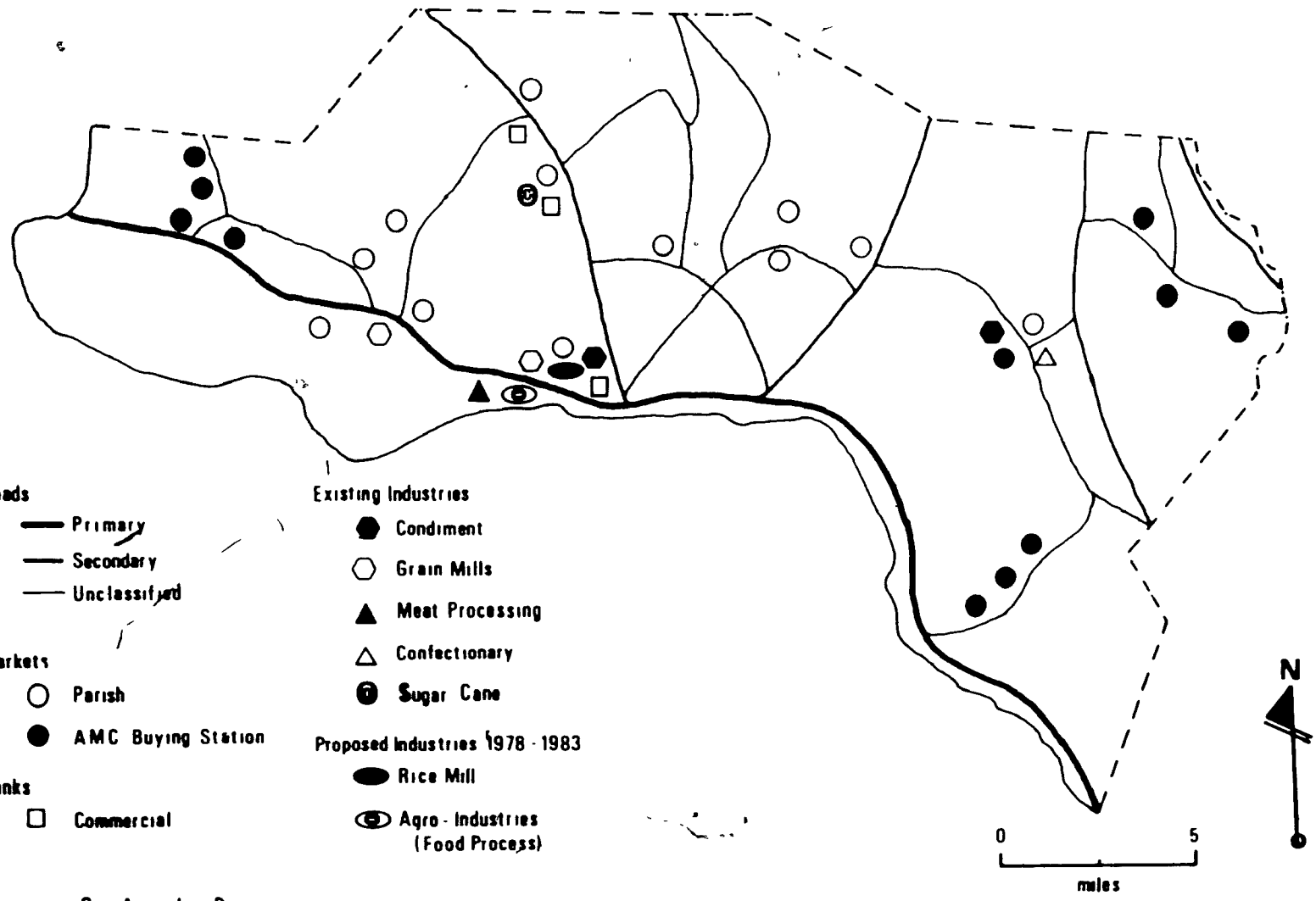
The distributive sector creates a network through which information and

SERVICE FUNCTIONS & ECONOMIC ACTIVITIES, LAND SETTLEMENTS & SAMPLED FARMS



Sources See Appendix B

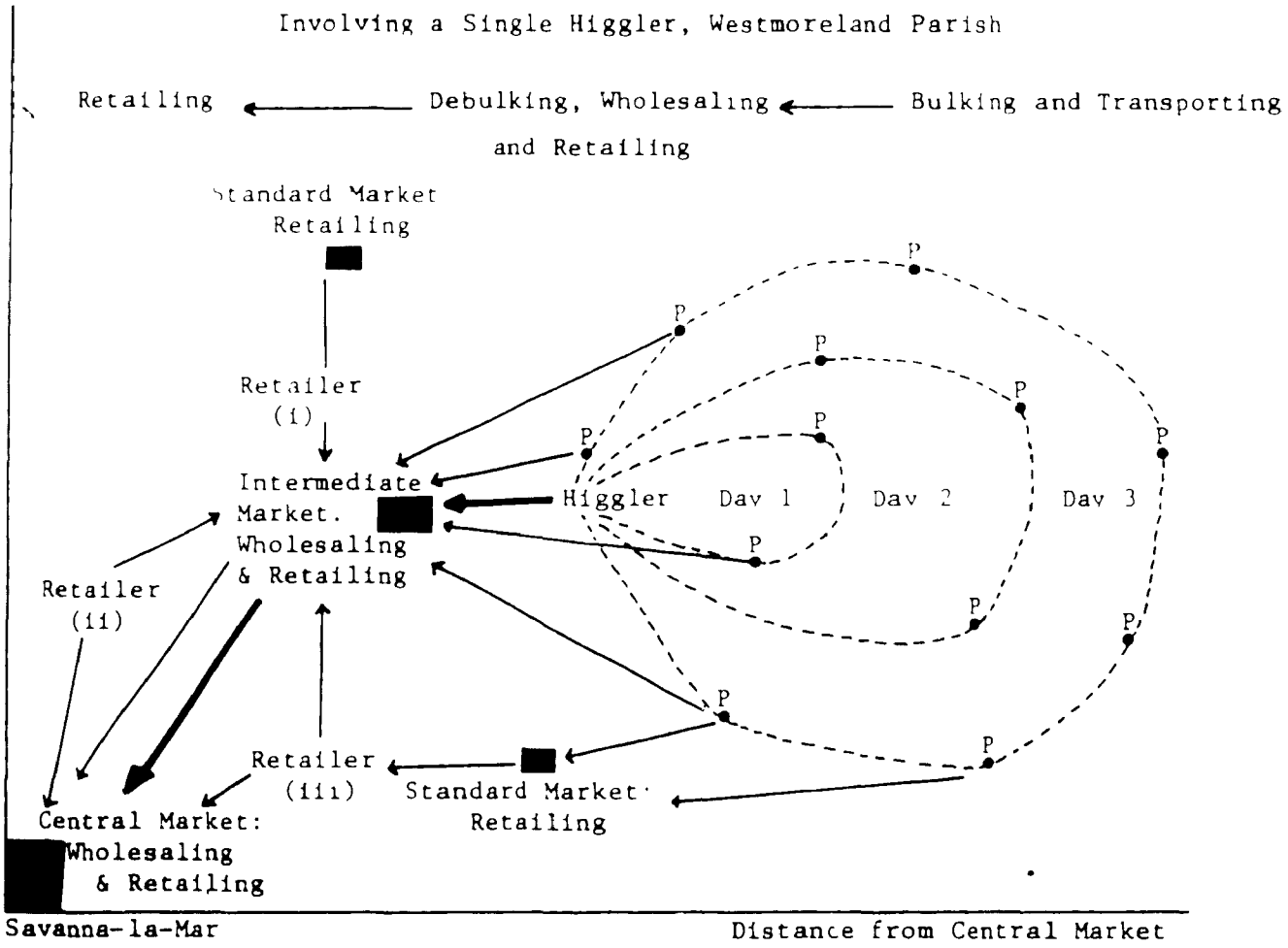
SERVICE FUNCTIONS & ECONOMIC ACTIVITIES



Sources See Appendix B

farm products flow from the farmer to the final consumer The spatial connections of a single higgler involving 12 producers and three retailers in Westmoreland Parish can be illustrated thus

Figure 4 4 The Principal Spatial Pattern of Domestic Marketing Involving a Single Higgler, Westmoreland Parish



Over a three-day period, the higgler is able to buy a reasonable amount of farm produce, which is then assembled, stored, and divided into smaller portions. The bulk is taken to the intermediate or central market where it is sold at a wholesale or retail price to consumers or retailers.

Funds for the rebuilding of delapidated and out-dated parish

Westmoreland Parish, given that the farm population is evenly distributed, where

$$R = \frac{\bar{r}_A}{\bar{r}_E}$$

$$\bar{r}_A = \Sigma \frac{r}{N}$$

and $$\bar{r}_E = \frac{1}{2\sqrt{N/A}}$$

then R_n shows that the expected mean distance in the distribution of the 13 Parish markets in 1962 was 2.48 miles, while the actual mean distance was 3.58 miles, giving a R value of 1.44 miles. When the 13 markets and 11 AMC outlets are combined, the expected mean distance is reduced to 1.85 miles and the actual mean distance becomes 2.16 miles, with a R value of 1.17 miles. R_n was measured by roads rather than straight lines. The statistical calculations show that the tendency is towards uniform spacing of markets and AMC outlets in areas where food crops are chiefly grown.

The location of AMC outlets in predominately food producing areas (Map 4.1) helps to provide an alternative marketing outlet for farmers. However the AMC, like the higgler system, relies on the poor infrastructure that serves the rural sector, as a result the influence of the distributive sector on locally produced food crops continues to be less than effective. In retrospect, women continued to play an important role in the marketing of food crops.

4.2.8 Price and Market Margins

In some cases, the AMC was offering higher prices for food crops than that which the farmers received from selling directly to the

markets are now being made available through loans from the World Bank and the Inter-American Development Bank. During the summer of 1980 new markets were near completion in Little London and Grange Hill. These new markets are equipped with display stalls, storage facilities and sanitary conveniences. Higglers and other retailers lose up to 25 percent of their perishable food crops because of inadequate marketing facilities. These new markets will certainly help to upgrade the marketing of food crops.

The AMC buying outlets are geographically fixed and so farmers have to travel to and from the outlets. On the contrary, the higglers are able to locate farmers irrespective of remoteness. Higglers sometimes buy the food in the fields. Negotiation usually takes place face to face and payment is made following a purchase. According to the farmers, the AMC usually pays a week or two after the first purchase.

The AMC has been less than effective in regulating and formalizing the market system. The competitive position of the traditional higgler system has not been eroded, because of the inefficiencies of the AMC. Of the 20 farmers utilizing the AMC service, 18 felt that the higgler system was more reliable. Seventy percent of the farmers continued to rely on the traditional higgler system. Therefore, every effort should be made to upgrade and modernize that system. According to one observer, it is the higgler and only the higgler who is capable of getting those food crops out of the hilly country to the consumers.

Nearest Neighbour Statistic (Rn)

If the Nearest Neighbour Statistic (Appendix C) is applied to the distribution of AMC buying outlets (11) and parish markets (13) in

consumer. According to Mr. Gardiner, crop care office, about 40 percent of the farmers in the Southeast division sell a portion of their saleable produce to the AMC. Note the AMC buying prices compared with the higgler selling prices at the parish markets for the following selected crops

Crops	AMC	Parish Markets
Cabbage	J$0 50 lb	J$0.60 lb
Carrot	0 60 lb	0.85 lb
Pumpkin	0.45 lb	0 40 lb
Tomato	0.60 lb	0.30 lb
Red Peas	3 00 lb	2 50 lb
Yam	0.50 lb	0.60/70 lb

SOURCES: Mr. C. Gardiner and Field Survey, August 1980.

"Rice and Peas" is a favourite Jamaican dish and so the demand for this pea variety has always been high. The farmers reported that they were reluctant to increase the production of red pea because of limited sources of credit and the problems encountered in the lack of storage facilities, and getting the produce to market.

4.2.9 Credit Facilities and Subsidies

One of the main objectives of the *Credit Scheme* (1962-1980) was to increase the volume of credit going to small farmers. Prior to 1977 the Peoples' Co-operative Bank (PCB) was the only financial institution that was granting credit to farmers in the less than five acre category. The PCB operates under the Agriculture Credit Board. The involvement of the commercial banks, Jamaica Development Bank, commodity associations and

other funding institutions were confined to medium and large scale farmers. Of the sampled farms, 45 percent reported that they have tried to secure credit from the PCB and other financial institutions without success. Both the PCB and commercial banks require land and other assets, and guarantor as collateral.

Had it not been for the inauguration of the Crop Lien Programme in 1977, many of the respondents would not have been able to secure credit. The administration and supervision of credit were found to be inadequate. Many who borrowed money under the programme did not understand the arrangement under which the credit should be repaid. Only 20 percent of the farmers had gained access to credit, the main sources being the PCB and Crop Lien. The rate of interest on all government loans was six percent per annum and share capital at a higher rate (8-10%).

The main supplier of subsidy to small farmers was the Ministry of Agriculture. Subsidies were given for tanks, for those located in dry areas (Negril Hill, West), land preparation, seeds, fertilizer, pesticides and tools. Individuals might receive one or two of the above. Extension workers were mainly responsible for recommending farmers for subsidy. Each farmer was dealt with as an individual rather than a collective group. This led to competition among farmers and non-farmers for subsidy. It was found that middle-income professionals who were farming part-time to maintain their standard of living were gaining access to subsidy at the expense of the *bona fide* small farmers. Of the sampled farmers, 44 percent were gaining access to some form of subsidy (Table 4.20). Fertilizer subsidy was granted at the rate of 33.3 percent of the cost of the fertilizer. On the whole, small farmers are still faced

Table 4.20 Credit Facilities and Subsidies

Census Division	Sample Size	Credit Extended		Subsidy		
		Source	No. of Farmers	Type	Source	No. of Farmers
Northeast	18	Crop Lien	3	Fertilizer	Government	6
		Jamaica Development Bank	1	Production ($)	Government	2
Southeast	34	Crop Lien	9	Fertilizer	Government	10
				Production ($)	Government	4
		Peoples' Co-operative Bank	1	Production (seeds)	Government	2
				Tools	Government	3
Central	10			Fertilizer	Government	1
West	38	Peoples' Co-operative Bank	4	Fertilizer	Government	6
				Tools	Government	4
		Crop Lien	2	Production ($)	Government	2
				Production (seeds)	Government	4
Westmoreland	100		20			44

SOURCE: Based on sampled data.

with problems relating to agronomic and economic inputs.

4.2.10 Farmer Participation

The sampled farmers related to the different programmes and projects as passive agents. As a result there was no active community or group input into the implementation process. This encouraged competition among individuals for agricultural inputs. The more influential benefitted first and most, while the less influential were forced into dependency through "relative and absolute impoverishment".

If all farmers, regardless of their social and enconomic status had been actively incorporated in the planning and implementation of programmes and projects, they would have developed a sense of commitment to the success of each project. Such a commitment, no doubt, might have helped to eliminate competition, encourage co-operative effort and reduce public spending of limited finance capital. For example, the canal that has been constructed to drain the morass land in the Negril area was clogged with mud and grass (Summer 1980). The farmers who were utilizing the fringe of the land were faced with the problem of flooding, yet they were not prepared as a collective group to empty the channel. The bureaucratic nature of the structure serving agriculture helps to explain the passivity of the farmers, and their dependency on the government to provide the necessary level of service to the farming community.

Sections B and C: Findings Based on Supplementary Data

The information that will be presented in sections B and C is based on Census reports, government documents and other related authentic sources. The primary motive for including these sections is to support

the validity of the findings presented in section A.

4.3 Section B: The Major Characteristics of Small Scale Agriculture

Access to Land and Farm Size

The 1961 agricultural census shows that there were 8,447 farms in the less than 5.0 acre category, sharing 14,480 acres of land with an average farm size of 1.7 acres in Westmoreland Parish. By 1968 the number of farms in this category increased by 79 percent, and 15,102 farms were sharing 19,450 acres of land with an average farm size of 1.3 acres. Between 1961 and 1968 the average size of small farms actually decreased by 21 percent (Table 4.21). According to the census, Land Reform in the First Phase (1962-1972) allowed for an increase in the number of farms but had not succeeded in increasing farm size as expected. Up to 1970 there were 16 Land Settlements in the Parish. The settlements comprised 2,270 farms and shared 11,360 acres of land, a large portion of which was marginal.

It has been found that acreage in the 5.0 acre category increased by 34 percent during the 1961-1968 period, while all other categories showed a decrease. The category with the highest decrease in acreage was the 100-500 acre group. In this category land was owned by private families and was identified as being underutilized and, as a result, became the major source of acreage for Land Reform. In 1966, 85,248 acres of land were identified in the Parish by the Development and Utilization Commission, 15.32 percent of which were believed to be underutilized. Land in this category was previously used or was presently being used for extensive grazing, and was essentially in the hands of private families. On the whole, the number of farms in all

Table 4.21 Westmoreland Parish: Percent Change in the Number of Farms, acreage and Farm Size by Size Groups, 1961 and 1968.

Size Group	No. of Farms 1961	1968	% Change	Acreage 1961	1968	% Change	Farm Size 1961	1968	% Change
0 - < 5	8,447	15,102	78.78	14,480	19,450	34.34	1.7	1.35	-20.59
5 - < 25	2,940	2,902	-1.29	28,143	27,434	-2.52	9.57	9.45	-1.25
25 - <100	306	338	10.45	13,834	13,670	-1.86	45.21	40.44	-10.55
100 - <500	60	47	-21.67	19,900	10,426	-47.61	331.67	221.83	-33.12
500+	34	34	0	75,186	64,134	-14.70	2,211.35	1,886.29	-14.70
Westmoreland	11,787	18,423	56.30	151,543	135,115	-10.84	12.86	7.34	-42.92

SOURCE: Agricultural Census, 1961 and 1968.

categories increased by 56 percent, while farm acreage decreased by 11 percent between 1961 and 1968 (Table 4.21).

The 11 percent decrease in total farm acreage has been related to an increase in the less-than-five acre category as well as a change in land use. Agriculture lost land to housing, education, tourism, recreation, industry and airport layout. Map 4.2 serves as an illustration of the present land use pattern on one of the properties acquired by the government through the Development and Utilization Commission Kent is the family name of the original owners of the property. The full development of the property was completed in 1978 and is now multi-functional, serving education (secondary), housing, industry (Darliston Foods Limited), agriculture and basic infrastructure.*

Between 1961 and 1968, all categories of farms decreased in farm size. It was expected, therefore, in the Second Phase (1972-1980), that agricultural planning would enable farmers in the less-than-five acre category to increase their farm size, while acreage and farm size in the more-than-100 acre category would continue to decrease. The 1980 agricultural census was not yet released, as a result it was not possible to get a general overview of continued change in the spatial relationship between the categories of farms (Table 4.21).

According to Jamaica/USAID (1978), the number of small farmers gaining access to land was expected to show an increase of 13 percent for

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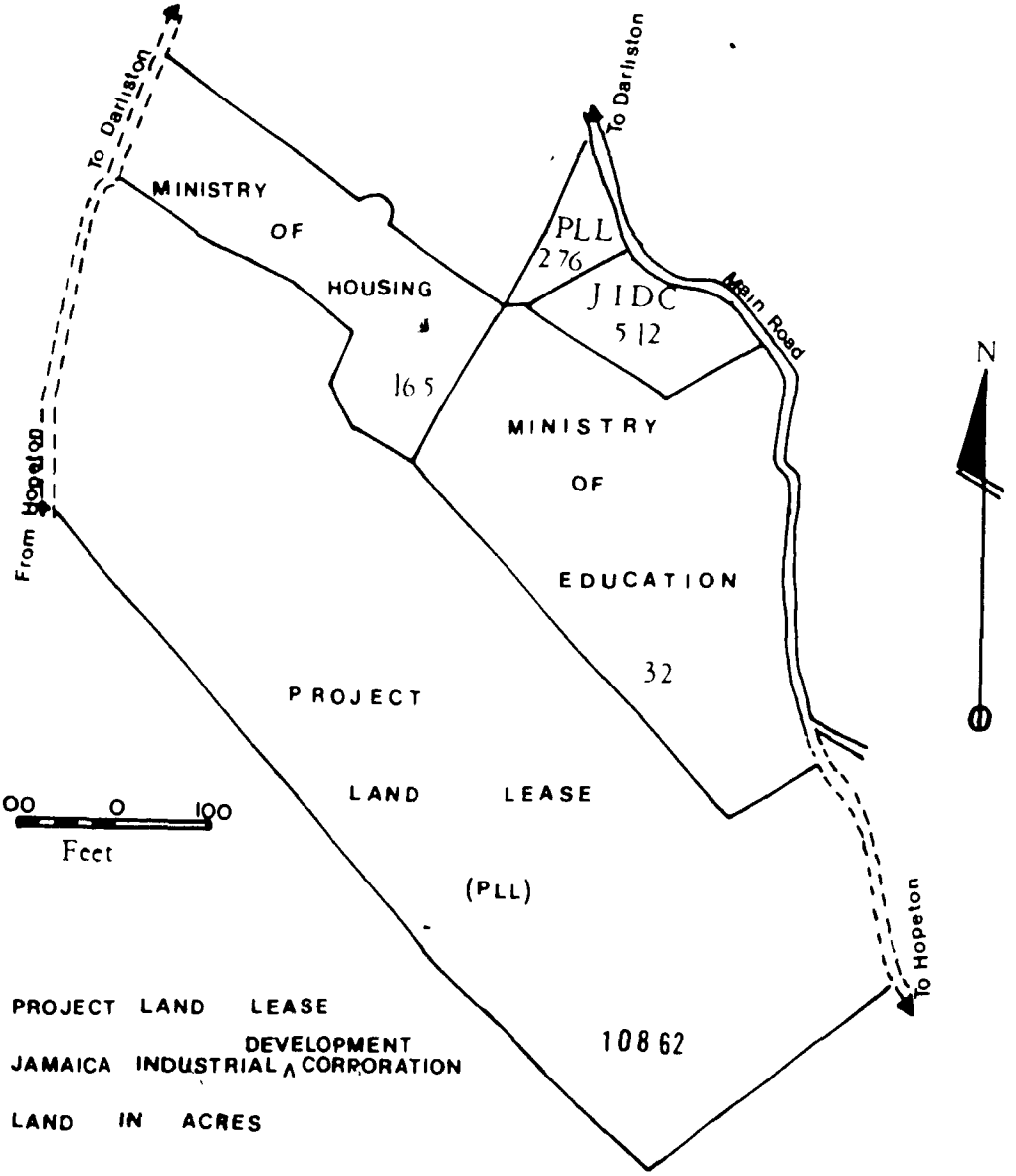
*Unfortunately, the development of the property appeared fragmented, for example, the farmers were not producing essentially for the small food processing plant. Neither was there much direct interaction between the farmers and the school. Each section of the property operated as an entity.

LAND DEVELOPMENT, KENT PROPERTY, DARLISTON



After Henry Baxter

the island as a whole since 1972. Up to 1978, there were 32 properties made accessible to small farmers in the Parish. The total acreage involved was 8,300 of which 4,473 acres were considered arable. Of the arable acreage only 861 were growing crops. Kent is one of such properties.

Use of Fertilizer

Fertilizer consumption in Westmoreland, and the island as a whole, increased between 1962 and 1972 then showed a rapid decrease after 1973. Total consumption for Jamaica was 71,081 short tons in 1971, compared to 37,000 short tons in 1978. In 1978 Westmoreland Parish utilized 0.66 cwt of fertilizer per farm, ranking eighth among all the parishes (*op. cit.*: 103). The rapid decrease in the use of fertilizers was a result of the rapid escalation in the prices of synthetic inorganic fertilizer brought on by the energy crisis, and the lack of foreign exchange to procure the desired amount.

In 1976, it cost Jamaica approximately J$102 per ton as against J$308.95 per ton in 1980 for inorganic fertilizers. The high price of synthetic inorganic fertilizers has directed the attention of local researchers to sources of organic manure. New development is now taking place in the use of poulty and bat (*Chiropteran*) excreta as well as that obtained from treated sewage and garbage. Poultry manure is now being distributed commercially throughout Westmoreland Parish and the island as a whole. The cost of poultry manure in the Parish under study varies depending on location and demand.

The possibility of using bat manure is also being explored in Jamaica. The manure, which was exported in the nineteenth century, can

still be found in a number of caves, the chief location of the bat. Bat manure is known for its high percentage of nitrogen, especially where deposition is recent. Nitrogen is of great importance in the humid tropics since losses and gains of nitrogen take place rapidly.

An increase in housing development has also seen an increase in sewage. Sewage treatment plants are now being established. "These plants are now sources of production of thousands of tons of processed sludge which give a typical analysis of 1-2% nitrogen (N), 2-2% Phosphate (P_2O_5), and 0.1-0.5% Potash (K_2O), along with a liberal supply of trace elements" (Percy Miller, 1980: 11).

Table 4.22 shows the chief nutrients in human excreta.

Table 4.22 Annual Average of Nutrients in Human Excreta

Nutrient	In Solid Excreta	In Liquid Excreta	Total
Nitrogen (N)	1.7	9.7	11.4
Phosphorus (P_2O_5)	1.3	1.4	2.7
Potassium (K_2O)	0.6	1.8	2.4

SOURCE: Percy Miller, 1980: 11.

New development is also seen in the production of supersoil, an organic compost derived from the conversion of garbage. "The Bumper Hall Compost Operation would have seen the conversion of some 400 tons of product per day processed from collected city garbage" (*op. cit.*). Hodder (1980: 121-122) seems to be in full agreement with the development of organic manure.

> Much still remains to be done in utilizing natural manures. . . . In some areas animal manure is wasted on a dramatic scale. . . . The bulk of available evidence . . . suggests that in some cases organic manure is generally effective and is occasionally even better at maintaining fertility than inorganic manure.

Scale of Production and Crop Type

In 1977, the estimate volume of selected crops for the Parish, such as legumes, vegetables, condiments, fruits, cereals, plantains, yams and other tubers was 27,328 short tons (Ministry of Agriculture, 1980). This figure represented 6.11 percent of Jamaica's total and ranked seventh among the figures given for the other parishes. Complete data for previous years could not be ascertained (Table 4.23).

Land Tenure

In a study carried out by Carl Stone (1977:131), it was found that 78 percent of the farmers he interviewed expressed "a preference for leasing land on a long-term basis, rather than using scarce income to purchase land". Since the inauguration of Project Land Lease, landowners have shown more willingness to rent land to small farmers.

The Marketing of Domestic Food Crops

To date the structure of small scale agriculture continues to be characterized by a number of dispersed small farmers seeking to market small quantities of farm produce. The structure encourages the participation of numerous higglers at the various markets and exchange points (Mintz, 1960; Lundgren, 1970; Norton and Symanski, 1975).

The higgler system handles 70-80 percent of the food traded throughout Jamaica. It is estimated that the total number of higglers in the island is as high as 30,000 including those who operate on a part

Table 4 23 Estimated Volume of Production of Selected Food Crops for Westmoreland Parish, 1977-1978

Selected Food Crops	Estimated Volume		Parish Ranking		% of Island's Total	
	1977	1978	1977	1978	1977	1978
Legumes	338	939	8	4	4 17	7 14
Vegetables	5,440	4,347	10	10	5 15	3 78
Condiments	96	59	12	13	1 97	0 37
Fruits	701	422	6	8	3.41	3 84
Cereals	1,974	1,272	2	2	15 40	11 23
Plantains	1,882	1,221	7	6	7 72	3.73
Potatoes	1,905	2,418	7	9	4.82	3.25
Yams	9,227	8,255	7	9	6.09	4.57
Other Tubers	5,765	4,248	7	8	7.67	5.04
Total Production	27,328	23,681			6 11	4.30

SOURCE. Ministry of Agriculture

time basis (Jamaica/USAID, 1978). Norton and Symanski (*op. cit.*: 475) argue that "the position of the AMC will erode the competitive position of the traditional [higgler] system". This has not been the case, the higgler system is as forceful as it ever was.

In the early phase of the AMC, it was streamlining and complementing the higgler system. In 1963, it handled approximately 12 million pounds of produce compared to 42 million pounds in 1971-1972 (AMC Annual Report, 1971-1972). Since 1968-1969, the AMC started its retailing function, which placed it in a competitive position with the higgler system. The AMC is now contracting its operation following a number of studies (FAO/IDB, 1976; Jamaica/USAID, 1978) which show that the corporation faces management problems and is not efficient in the service it is offering to the domestic sector.

Price and Market Margins

The 1970-1977 data show that while the economy was in a state of recession, farm-gate prices for domestic food crops grew more rapidly than consumer prices (Table 4.24). Between 1970 and 1975 farm-gate price index, based on 1975 prices, increased from 34.6 to 100.0, while consumer price index increased from 54.7 to 106.6. The data show that the farmers have benefitted more in relative terms than the consumers because relative price increase has been more rapid for farm-gate than for consumer prices.

Credit Facilties and Subsidies

The Peoples' Co-operative Bank continued to be the main source of credit for small farmers. The objectives of the *Credit Scheme* to increase the volume of credit going to small farmers have not been upheld. Between 1971 and 1977, credit granted to small farmers decreased

Table 4.24 Jamaica: Changes in Food Prices for Popular Crop Types, 1970-1977 (all money amounts in Jamaican dollars)

Year	Total Domestic Production (Per Capita $)	Farm-gate Prices (Mean Annual) (Index)	Consumer Prices	Volume in Production (Index)		
				Vegetables	Legumes	Yams
1970	27	34.6	54.7	100.00	100.00	100.00
1971	37	42.9	57.6	118.20	139.71	151.91
1972	37	43.7	60.7	137.15	137.60	157.94
1973	34	59.7	71.4	100.00	129.64	146.78
1974	35	72.2	90.8	108.93	139.24	159.64
1975	35	100.0	106.6	115.54	144.20	162.35
1976	33	108.0	117.1	86.69	176.46	148.00
1977	39	-	131.1	135.88	116.16	170.15

SOURCE: Computed from Ministry of Agriculture Data.

time basis (Jamaica/USAID, 1978). Norton and Symanski (*op. cit.*: 475) argue that "the position of the AMC will erode the competitive position of the traditional [higgler] system". This has not been the case, the higgler system is as forceful as it ever was.

In the early phase of the AMC, it was streamlining and complementing the higgler system. In 1963, it handled approximately 12 million pounds of produce compared to 42 million pounds in 1971-1972 (AMC Annual Report, 1971-1972). Since 1968-1969, the AMC started its retailing function, which placed it in a competitive position with the higgler system. The AMC is now contracting its operation following a number of studies (FAO/IDB, 1976; Jamaica/USAID, 1978) which show that the corporation faces management problems and is not efficient in the service it is offering to the domestic sector.

Price and Market Margins

The 1970-1977 data show that while the economy was in a state of recession, farm-gate prices for domestic food crops grew more rapidly than consumer prices (Table 4.24). Between 1970 and 1975 farm-gate price index, based on 1975 prices, increased from 34.6 to 100.0, while consumer price index increased from 54.7 to 106.6. The data show that the farmers have benefitted more in relative terms than the consumers because relative price increase has been more rapid for farm-gate than for consumer prices.

Credit Facilties and Subsidies

The Peoples' Co-operative Bank continued to be the main source of credit for small farmers. The objectives of the *Credit Scheme* to increase the volume of credit going to small farmers have not been upheld. Between 1971 and 1977, credit granted to small farmers decreased

from 40.9 percent to 15.2 percent for the island. Had it not been for the Crop Lien Programme in 1977 (Table 4.25), credit going to small farmers would have been minimal (Jamaica/USAID, 1978: 173). Two of "the main deficits in the current credit system related to the plethora of credit institutions and schemes resulting in inefficiencies, duplication, waste of resources and confusion in the minds of the farmers . . . [and a] lack of expertise in the administration of credit" (Five Year Plan, Vol. 3, 1978-1983·4) According to Carl Stone (*op cit.* 133) "paternalistic dependence on middle class administrative and political patrons has eroded" the effectiveness of the system serving the local level. Adequate information has been provided on subsidy in Section A.

4.4 Section C: The Interrelationship Between Plantation and Small Scale Agriculture

Plantation agriculture in the Parish is centered around the production of sugar cane. The production of sugar cane is still confined to the central lowlands (Map 2.4). The expansion of the plantation sector continued up to 1967. In 1967, the West Indies Sugar Company purchased Georges Plain Estate, which consisted of 2,458 acres. Up to the 1970's. the Company had ten functional sugar estates: Albany, Barham, Belle Isle, Blue Castle, Frome Central, Georges Plain, Masemure, Meyersfield and Shewbury. Each estate had a general overseer, an office, located labourers and equipment for weighing and hauling sugar cane. Frome Central is administered by a general manager, specialists, skilled and semi-skilled employees, along with its factory, communication and transport network, and survey, industrial relations and livestock departments.

The structure of the traditional relationship between the plantation

Table 4.25 Jamaica: Summary Table of Similarities and Contrasts of PCB's, SSFDP and Crop Lien Programme by Farm and Loan Characteristics

Term Structure	Size (Acreage Category)	Size of Loans	Enterprise Financed	Source of Funds	Lending Costs	Interest Rate	Collateral	Arrears	Administrative Organization
				Peoples' Co-operative Banks					
Short, medium and long term; short term predominant	Predominantly small to medium farms (acreage not specified)	No limits but predominantly loans less than $3000	Farm and family needs including non-productive purposes	Share capital and Government fund through ACB	Relatively low; no expensive administrative staff	Govt. fund lent at 6% and share capital at higher rate (8-10%)	Land and other assets and guarantor	Bad	Relatively worse, inadequately staffed, poorly trained
				Self-supporting Farmers Development Programme					
Short, medium and long term; medium to long term predominant	5-25 acre category	US$800 to US$24,000	Productive purposes financed (crop and livestock enterprises)	Loan from Inter-Amer. Dev't Bank, Govt. contribution and loan recovery	Quite high	7 percent	Land, other assets, stocks and bonds, life insurance policies	Relatively better	Organized, more manpower and better trained
				Crop Lien Programme					
Short term	Less than 5 acres of cultivable land	Less than $6,000	Food crop enterprises (productive purpose only)	Government fund	Low, no expensive administration for loan evaluation or collection	6 percent	None	Remarkably high	Not equipped with trained personnel to evaluate and collect loans

SOURCE: Jamaica/USAID, 1978: 177

Table 4.26 WISCO Classification of Land by Type of Usage, Westmoreland Parish, 1967

Fully Cultivated Land			Uncultivated Land		
Land Use	Acreage	% of Total Acreage Owned	Land Use	Acreage	% of Total Acreage Owned
Sugar lands	13,174	49.6	Forest	3,670	13.8
Pasture	4,590	17.3	Swamp	1,270	4.8
Factory, club, offices, etc.	802	3.0	Ruinate Ponds, etc.	102	0.4
Sublet for various purposes	1,042	3.9			
Recreational playgrounds	100	0.4			
Settlement	200	0.8			
Roadways and intervals	1,606	6.0			
Total	21,514	81.0	Total	5,042	19.0

SOURCE: Scott, 1968: 92

and small scale agriculture still survives in the Parish. Firstly, the plantation system continues to control the central lowlands for the production of sugar cane while small scale agriculture is confined to marginal areas beyond the sugar belt. According to Hamilton (Ministry of Agriculture) this

> creates a problem . . . as the percentage of the land devoted to [food crops] is small The food sellers therefore experience difficulty in obtaining a variety of food crops within close proximity to the markets The sellers have to go further afield to obtain produce to satisfy the consumer demand and this proves more expensive for the higglers.

Another traditional element that has survived is the settlement pattern. The management staff, factory and some farm workers were provided with houses on the plantation land. Each category of workers lived in separate locations (Map 4.3). The size and quality of the houses varied depending on the socio-economic status of the employee. For example, the largest house went to the person in the top management position, while the smallest houses of low quality went to the located labourers. Job promotion meant a larger house and other benefits and *vise versa*. The settlement structure has encouraged the separation of management from workers, thus creating social tension and disharmony in the work community.

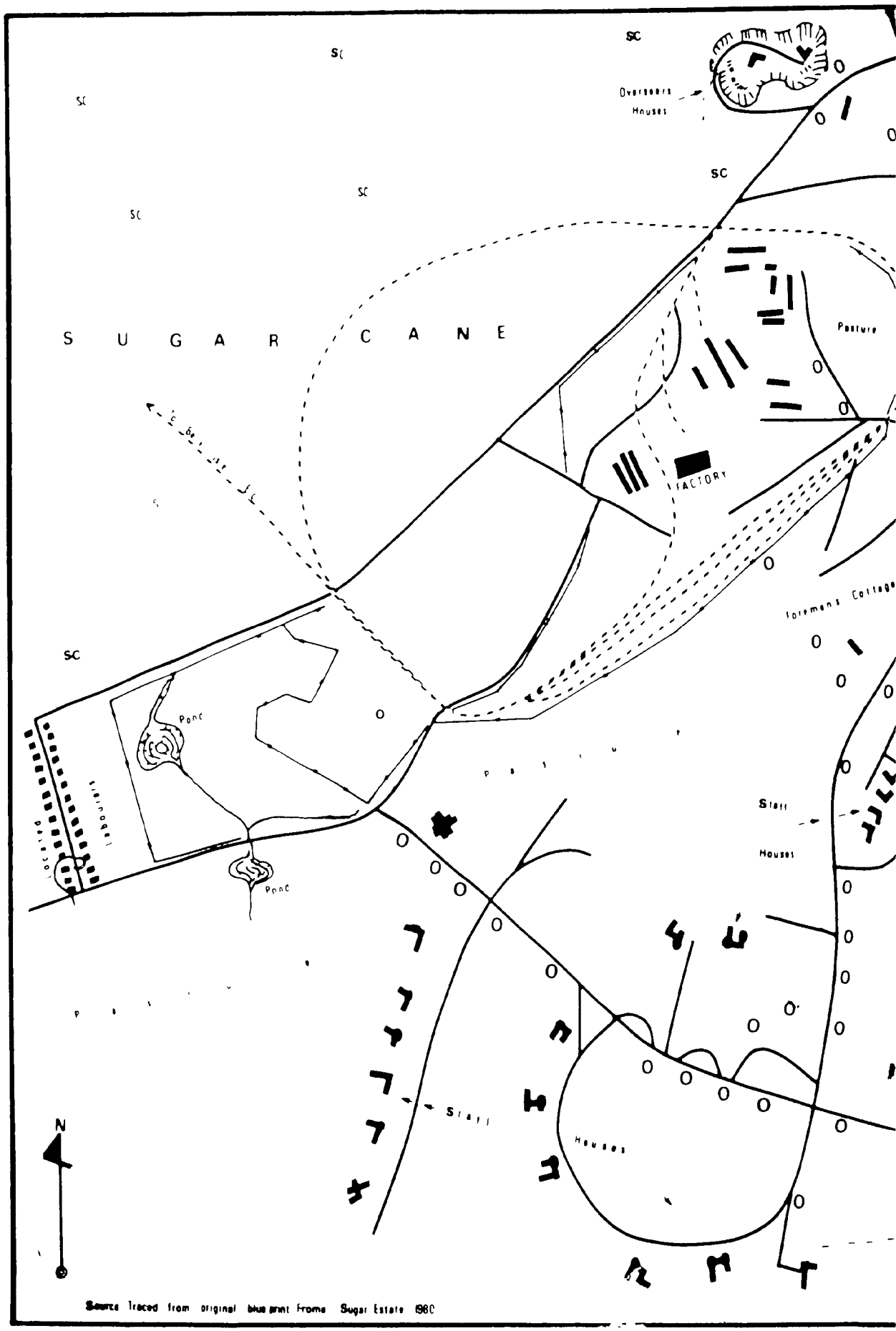
> The community from which the worker is isolated by his own labour is life itself, physical and mental life, human morality, human activity, human enjoyment, human nature.
> (Marx in Tucker (ed.), 1978: 131)

Note that the home of the farm manager/overseer is still strategically located so as to allow full view of the surrounding sugar lands (Map 4.3)

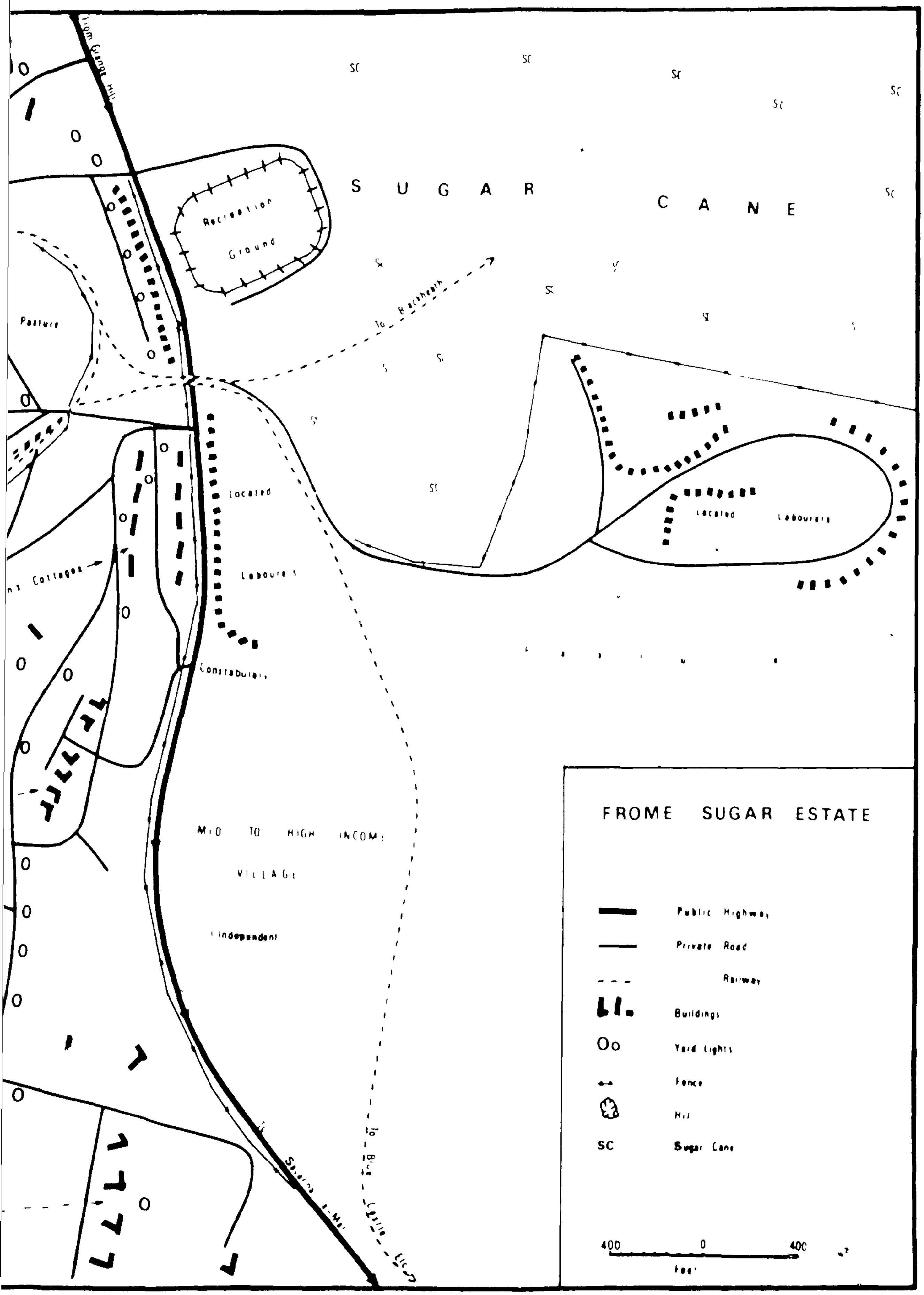
Labour Supply and Wages

During the planting and harvesting periods, farm workers are engaged for 4-5 days weekly, leaving 1-2 days for working on their own farms. Of

Map 4.3



Source Traced from original blue print Frome Sugar Estate 1980


SUGAR CANE
Recreation Ground
To Blackheath
Pasture
Located Labourers
Located Labourers
Constabulary
MID TO HIGH INCOME VILLAGE
Independent
FROME SUGAR ESTATE
Public Highway
Private Road
Railway
Buildings
Yard Lights
Fence
Hill
SC
Sugar Cane
400
0
400
Feet

the sampled farmers, 10 percent fell into this category. They also produced domestic food crops on marginal estate land essentially for home consumption. According to Mr. Hall (Frome Sugar Estate), there has always been an oversupply of farm workers.

Since 1938, there has been a steady increase in the supply of farm workers in the plantation sector. However, government reports seem to point out that farm workers have always been in short supply. According to Scott (1968. 277), "some employers complained of labour shortage because they have been indoctrinated into the myth of the laziness of the peasantry".

The problem concerning labour appears to be two-fold. Firstly, there is a lack of communication and recruiting procedures regarding the availability of jobs and, secondly, on small private estates (100-1,000 acres) workers are often paid low wages and subjugated to the power of the estate owner. Some individuals referred to those who worked on cattle estates as "slaves" because they continued to work for owners who maintained a master/slave relationship with them.

Those who worked on the cattle estates in the Bethel Town area up to 1978 were compensated with subsistence wages and rent-free land for subsistence farming. Workers were permitted to use pasture land free of charge with the conditional agreement that grasses would be planted after short term crops had been reaped. The dependent small farmers usually farmed the land for 18 months, reaped the produce, planted grass and then moved on to new land allotted for the new planting season. Squatting was tolerated since the labourer's energy was required to tend the cattle.

Most estate workers were illiterate. The most pathetic case was

found in the Central. The worker was 65 years of age and was born on the estate. He had never had the opportunity to go to school. In responding to every question asked, he bowed, smiled and answered, "Yes" His working companion had to supply the necessary information needed. This particular subsistence farmer had children of his own and they too were living on the estate. The relationship between the estate owner and the workers was paternalistic.

Male workers on the Frome Sugar Estate earned as little as J$1 65 per day in 1970, compared to J$5.30 per day in 1975, and J$8 00 ($6.00 Canadian) per day in 1980. The rapid increase in farm wages was as a result of the inauguration of the Minimum Wage Law, that came into effect during the early 1970's. Today, men and women earn the same wages for the same task done (Frome Central, Summer 1980). Low wages prevented farm workers from acquiring land and establishing themselves as independent producers. Subsistence wages kept them in a state of dependency, thus maintaining a "Reserve Army of Labourers" at no distance from the estates

Structural Changes 1971-1980

The sugar industry is the focus of economic activity in the Parish as well as the biggest employer of labour, and contributor to foreign exchange. The rapid expansion of the industry up to the mid-1960's was primarily due to the existence of the Commonwealth Sugar Agreement, which provided a secured market for sugar at a price above that which was prevailing on the world market.

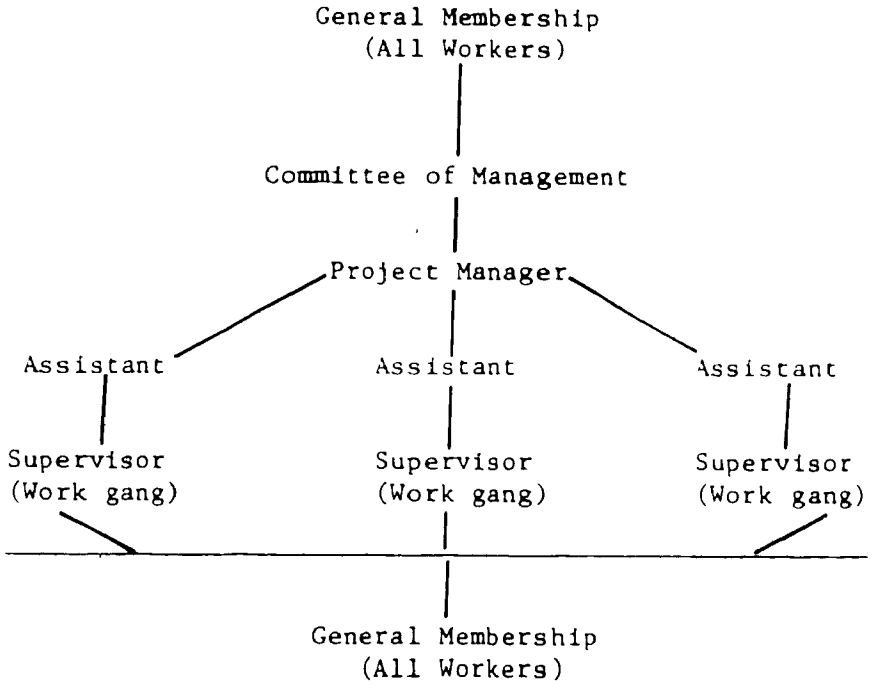
The sugar industry is a high cost producer and it was the general belief that output on a high level was feasible in order to offset total cost. In 1972, the Mordecai Report made some recommendations that would

help upgrade the industry. The Mordecai Report is recognized as the most significant and authoritative report on the Jamaica Sugar Industry (Five Year Development Plan, 1978-1983: 26). One of the main recommendations of the Report was that the Sugar Industry Authority (SIA) "delineate cane growing zones for each factory with proper safeguards for workers in each zone (*op. cit.*). Other reports, such as the Ministry of Agriculture Green Paper (1973), made similar recommendations. Limited response was made to both recommendations, which led the government to safeguard what was considered to be the largest employer of labour -- the sugar industry.

The government therefore nationalized the Frome Sugar Industry. The ten sugar cane farms in the Parish were bought from the West Indies Sugar Company (WISCo), while the sugar factory was nationalized. Plans were underway to replace worn out factory machinery in order to increase production. The total cost was set at US$10.58 million, US$4.50 million to be generated locally and US$6.08 million in loans from abroad. SIA is now fully responsible for the marketing of sugar, with the Sugar Manufacturing Corporation Jamaica Limited as sole distributing agent.

The sugar farms are co-operatively leased from the government by the original farm workers for 49 years, with option to renew the lease. Each farm is an autonomous co-operative with its own worker-members (Fig. 4.6). Operation on the farms remains the same except that each farmer now becomes a shareholder in the industry. Severance payments were made by WISCo to each worker. Each worker invested 50 percent of the money received in the co-operative. In 1978, the workers made a request to the government for 66 percent of the money invested. This took the form

Figure 4.5 The Structure of the Sugar Co-operative, Frome Central, Westmoreland Parish, 1980



of a loan that is being repaid weekly. Paid dividend on the shares is in the order of eight percent (1980) per year, and is paid every sixth month.

The management of the co-operative was not solely in the hands of its members. For example, the project managers for the individual farms were formally employed by WISCo as farm overseers, however it was the general feeling that members were ill-equipped in education and managerial skills. An education drive was underway (1980) to upgrade the education of the members. Frome Central Co-operative presently has 180 members.

Other changes in the plantation sector involved the purchasing and leasing of underutilized family estates. For example, it was found that after the government acquired an estate comprising 1,100 acres in the Northeast, the owner retreated to another estate in the adjacent parish.

The home of the ex-owner is now being used as an extension office. Of the total acreage acquired, 200 acres were given to Project Land Lease, 180 acres of which were considered arable The acquisition of land is governed under the government regulation set out in Chapter III

Chapter V

CONCLUSION

5.1 Assessment of the Role of the Governments Regarding Major Land Use Elements

In analysing the physical resources that were made accessible to the sampled farmers (Chapter IV), it was found that Land Reform in the First Phase (1962-1972) was less than effective in increasing the size of existing farms. Farmers did not have the means to acquire land and much of it ended up in the hands of speculators. The inauguration of Project Land Lease in the Second Phase (1973-1983) brought more land under productive use and some of the farmers were able to lease additional land to supplement their holdings. The standard acreage (1.0 acre) allotted to each farmer was very small and as a result the problem of farm fragmentation had not been rectified. Furthermore, most of the land that had been made accessible to farmers was confined to the less arable areas of the Parish (Maps 2.3 and 4.1). The central lowlands continued to support sugar cane production. Indeed, more marginal land had been made accessible to the small scale sector in order to accommodate more of the rural population.

The disparity in the quantity and quality of land between large landowners and the small-scale farmers is still to be rectified. To suggest that *all* small farmers were on marginal land would be quite misleading. Where a small farmer found himself with a reasonable amount of arable land, the emphasis was placed on export crops These crops had traditionally been the most reliable commercial staples in terms of output

and the risk involved. Furthermore, the existence of a stabilized marketing arrangement and the availability of adequate credit facilities necessitated the continuance of export crops on arable land within the small-scale sector. The production of domestic crops appeared to be a last resort for those farmers on marginal land, since the land provided optimum conditions for such crops, so long as the soil was of medium fertility and provided adequate depth for root penetration. Where a farmer possessed land that varied in the ecological base he tended to confine the production of food crops to the marginal areas, leaving the more arable areas for export crops.

> As far back as 1790, Beckford observed that 'ground provisions are successfully cultivated in the mountains. . . . They generally make choice of such land for their grounds; and I think they prefer the side of hills. . to the bottoms. Some will have a mixture of both, and will cultivate the plantain tree upon the flat and their provisions upon the rising ground. . . .'
>
> (Beckford, 1970, 2: 129-130, 151-187 in Mintz, 1960: 7)

The study was mainly concerned with *bona fide* food producers and was therefore more confined to *the typical small-scale farmer* who was producing essentially for local consumption. Surprisingly, the farmers who were responding most to the demand for food were located in the Southeast, an area characterized by steep slopes, heavy rainfall during the rainy season, and low to medium soil fertility. The factors that influenced the development of commercial small-scale agriculture in an area that was considered to be relatively marginal were (1) access to land over a long period, (2) agricultural experience through trial and error and travel abroad, and (3) access to market.

Of the sampled farmers in the Southeast, 39 percent worked on farms in Canada and the United States and were able to use the money accrued to buy land and establish themselves as independent producers over a long period. Land settlement had occurred in the area right up to the 1950's. Although large tracts of land were bought by speculators, these were later subdivided and sold to small farmers Access to a reasonable amount of "family land" was also significant in this area Remittance from relatives abroad enabled many farmers to develop their farms. Leasing land from the government under PLL was less prevalent in the Southeast.

Experience on farms abroad exposed a number of farmers (39 percent) to good farm management and agronomic practice, and an economy that was based on profit. The location of St. Elizabeth, the leading agricultural parish, and Newmarket, the chief market centre for higglers from all over the island, also influenced market decisions. Of the seven AMC outlets in the eastern upland, four were located in the Southeast to minimize unnecessary movements of perishable foodstuffs.

Although these farmers were trying their best, the marginality of their land had great impact on farm management, especially in situations where agronomic and economic inputs were limited. Some of the problems they faced were associated with loss of soil and soil nutrients during the rainy season, and lack of water supply for irrigation in the dry season, high labour requirement for land preparation, and the transportation of input and output via bridle paths and gravel roads. The amalgamation of farms located on slopes greater than 20°, and the reallocation of those involved elsewhere in order to reduce the risk of erosion may be quite feasible. These farmers were energetic, enthusiastic and quite open to

suggestions. Existing roads were badly in need of improvement. Credit could be made available to these farmers for the building of terraces, ridges and other forms of erosion barriers, the purchasing of donkeys and motorized hand tools to overcome transportation and tillage difficulties, and the building of mini-tanks to mitigate the irrigation problem during the dry season.

Non-commercial farmers were identified with the plantation sector. These farmers had difficulty saving money out of their meagre wages. Furthermore, their time, interest and effort were divided between providing for their own subsistence and working on estates, as well as engaging in other casual jobs. The scarcity of land for sale in plantation areas prevented the development of commercial small farms. Many small farmers were leasing land under the PLL programme, however, the standard allotment of 1.0 acre, to satisfy the social needs of the farmers, can hardly form the basis for the establishment of economic farms.

It was found that as farm size increased, and the availability of credit and other inputs was ensured, farmers were becoming more specialized (West and Southeast). Where farm size continued to be small (<2.0 acres) and agronomic and economic inputs were inadequate, farmers were still experiencing hardship and the tendency to specialize was not evident (Northeast and Central).

Soil management was somewhat neglected on most farms. Farmers were not practicing soil conservation techniques as would have been expected. Only about 20 percent of the farmers employed stone barriers and trenches to control the flow of water on their farms. Many factors may have contributed to the lack of concern for the soil: (1) there was a

lack of long term credit available to the farmers from government sources, and the commercial banks felt that the advancement of credit to domestic food producers was too risky; (2) farmer lacked interest in spending whatever cash was available on the land because of its size and marginality; and (3) a low priority was given to this problem by the extension workers throughout the Parish.

The remarkable decline in the use and importation of inorganic fertilizer due to the balance of payments problem had less of an impact on the sampled farmers. Many of them were relying on local sources of organic fertilizer. The unavailability of herbicides and pesticides, however, was having a devastating impact on farmers planting in pure stands in the Negril (West) and Bronte, Hopeton and Content (Southeast) areas. Some farmers were complaining that where pesticides were available in small quantities, there was unfairness in the distribution process. Overhead spraying in areas where farmers plant the same crop combinations may help to avoid the need to compete for inputs.

Farmers who showed little interest in the use of inorganic fertilizer felt that using expensive fertilizer on steep slopes (>10°) would be a waste of money. The main reasons given were that the soil was too shallow and that percolation and rapid runoff would rob the soil of the nutrients. It was believed by these farmers that mulching was a better way of maintaining soil fertility on upland slopes. Mulch is comprised of branches cut from trees, grasses, animal manure and ash derived from burnt wood. A few farmers admitted that soil in different locations were responding differently to the use of inorganic fertilizer and that applying this form of nutrient to their soils was a matter of

trial and error. One farmer in the Southeast expressed openly the desire to know more about the land he was farming. The general impression was that the sampled farmers had a keen interest in knowing more about the application of science to agriculture and that the extension service was not helpful in this respect. In a study carried out by Kruijer (1969: 41-44) in the Christiana area of the island, he found that his responents described a good farmer as a man with an adequate amount of land "who keeps his farm in good condition, applies scientific techniques, follows the advice of the authority and is an active member of his agricultural association."

Lack of agricultural knowledge does affect the ability of the farmers to adapt to the land under their control. In *The Economics of Poverty*, Balagh (1966: 229) claims that the lack of education is the fundamental reason for agricultural backwardness in the island as a whole. Of the sampled farmers, only one had had the benefit of increasing his agricultural knowledge significantly through the Farmers Training Programme. He was actively engaged in the production of sugar cane independently, prior to his becoming a food producer. *The Daily Gleaner*, the most widely circulated newspaper, devoted a supplement to agriculture each Saturday. Only five percent of the sampled farmers bought the newspaper regularly. The majority of the farmers were unable to read the newspaper, neither were they able to read *The Farmer's Guide*, the most authoritative literature on agriculture. The television carried programmes on agriculture; however, most of the information was not related to agronomic techniques and soil capabilities. Only five percent of the sampled farmers possessed television sets. Since 71 percent of the farmers had radios, more effort

could be directed at developing radio programmes aimed at improving the farmers' understanding of agriculture. An abridged version of *The Farmer's Guide*, written in simple English and suitable print would help farmers immensely. In 1969, Kruijer suggested that since thousands of people visited market towns on Saturdays,

> these townships could be used by the Authority for window displays of educational posters, photographs and other visual aids. A relatively informal channel of communication between the Authority and the farmers could be established by having an officer . . . in attendance at these displays whose task it could be to distribute leaflets and other literature. (Kruijer, 1969: 11)

This recommendation was not activated in any of the market towns visited in Westmoreland Parish and other market towns throughout the island. The majority of the sample farmers (90 percent) continued to farm by trial and error. Thus there was no significant change in agronomic practice and farm management.

Farmers usually work their farms between 5:00 and 12:00 a.m. before the land heats up. It would be beneficial to both the extension workers and the farmers if the workers rearranged their work schedule to coincide with the time the farmers spend on the farms. The use of the horse would be a great asset in increasing the mobility of the extension worker in the hilly interior where most farms are located.

Some changes were observed in types of food crops planted. Vegetables and legumes were taking precedence over yams and other tubers as major cash crops. The scope for reducing dependency on imported foodstuffs such as rice, flour and other cereals appeared problematic. The cost of producing yams and other bulky foodstuffs locally was higher relative to the price at which imported substitutes were available. The

urban population found it more economical to buy rice and other imported foodstuffs as opposed to yams and potatoes. "Rice and peas" is a favourite Jamaican dish. This combination is good from a dietary viewpoint, therefore, the prospect of producing rice and legumes is promising. The 4,500 acres of Morass land that has been reclaimed in the Negril area (West) could be devoted in its entirety to the production of rice and legumes.

Farmers in this area had experience in the planting of rice, therefore, effort could be made to get them involved in the planning and implementation of projects aimed at developing the land. Red pea was being sold at J$5.00 per quart in the markets. The demand was so high that the AMC was paying J$6.00 per quart (J$3.00 per pound) for the peas at the Darliston buying station. Onion, tomato, carrot and cabbage were also high in demand. The price for onions sometimes exceeds J$4.00 per pound, during the out of crop season. The common variety in the island is photoperiodic and can only be produced during the short days. New varieties that can be produced during the long days are now being considered.

Many farmers expressed caution about increasing their production, regardless of how attractive prices may be because they realized that the economy was in a state of recession and was experiencing negative growth. According to a study carried out by Jamaica/USAID in 1978, the AMC had a history of withdrawing from the market when farmers faced a period of glut. Thus the volatile market for domestic food crops continued to hinder the development of a reliable and efficient marketing system. The need for proper storage facilities in the farming communities was openly aired by the sampled farmers. Lack of adequate storage facilities during the

surplus period deterred farmers from increasing production. Other factors, such as inadequate communications and distribution, created imperfection in the marketing system. Thus while some areas were being over-supplied, others were experiencing deficit For farmers relving on the sale of farm produce to repay loans, the impact was quite frustrating This was a real problem in 1977, when production rose to its highest point since 1962. Many farmers received credit for that vear as a result of the Crop Lien Programme, unfortunatelv, the majoritv of them were unable to repay their loans due to spoilage Everv effort should be made to ensure adequate storage and to improve rural roads and communication networks in order to reduce spoilage and to speed up the circulation of perishable foodstuffs to areas of great demand.

The higgler system could be strengthened by making credit available for the purchasing of donkeys and horses to take the food out of the hilly country. The higglers could also be encouraged to work co-operatively on a regional basis to ensure the smooth flow of farm produce to the final consumer. The improvement of the higgler system will depend on the availability of credit.

In retrospect, credit to the small scale sector is limited. The Peoples' Co-operative Bank was a major source of credit for the small farmer. Every effort should be made to strengthen the PCBs because the small scale sector can identify itself with the Bank's *raison d'être*.

From a social, economic and political viewpoint, the small scale sector continued to play a marginal role in the development of domestic agriculture. The small farmers were alienated from the very programmes and projects that were supposed to serve their needs. They were not

actively and voluntarily incorporated in the planning and implementation of government policies. The farmers should have been entrusted with the essential role of initiating change and agricultural development, instead of playing the role of passive and helpless agents of change. If all small farmers were urged to reflect on the problems they faced and suggest ways in which these could be ameliorated or removed collectively, some consensus could have been reached as to how the problems should be tackled. Such reflection would, no doubt, arouse within each farmer the need to organize collectively rather than compete individually for resources. The role of governments, therefore, would be confined to arousing, encouraging, guiding and financially supporting the initiative of the farming communities in the process of agricultural development. It may be said that active participation on the part of the community as a whole in the planning and implementation of agricultural programmes and projects is and will be the *sine qua non* for any successful development strategy in Jamaica and other countries where the shortage of food is a major problem.

5.2 Assessment of the Primary Objectives of Governments

The idea of increasing the quantity and improving the quality of domestic food supply in order to meet the daily requirements of the nation, and reducing expenditure of money on imported foodstuffs has been a primary concern ever since the inception of the "slave provision grounds". The fundamental objectives for proposing to upgrade small scale agriculture (1962-1980) were to produce adequate food of a high nutritional quality for a growing population, and to reduce expenditure on imported foodstuffs. *According to the government, the most important criterion for assessing the performance of the agricultural sector is its ability to feed the nation.*

Small scale agriculture is the major supplier of domestic food crops such as legumes, vegetables, yams and other tubers. Geographically, St. Elizabeth and Clarendon are the leading parishes in the production of food crops (Table 5.1 and Map 5.1). These parishes contributed J$36.2 million and J$30.5 million respectively in the value of production for 1977. On a value per acre basis, Westmoreland Parish contributed J$1,235.59 and ranked last among the 14 parishes in Jamaica for the same year. The poor performance of Westmoreland Parish appears to have been due to its export oriented base. Urban areas such as Kingston and St. Andrew, and St. James surpassed Westmoreland in values per acre.

For Jamaica as a whole, yams ranked first in the value of production and contributed J$20.2 million in 1973 compared to J$61.7 million in 1977 or 30 percent of total production (Table 5.2). Yams were followed by vegetables with a value of J$12.3 million in 1973 compared to J$54.1 million, or 26.7 percent of the total production in 1977. Between 1965 and 1977 vegetables showed an increase of 315.5 percent. For the production of food crops, 1977 was a record year. This may have been due to the inauguration of the Crop Lien Programme. Table 5.3 shows the relation between the value per acre of certain selected food crops and sugar cane for 1977. While sugar cane occupied the largest amount of arable land and produced the highest yields per acre, value per acre was not very impressive. On the whole, the value of domestic food crops increased from J$43.6 million in 1969 to J$81.4 million in 1977, with an annual increase of 8.1 percent. During the same period, export agriculture decreased in value from J$39.4 million to J$29.5 million (Table 5.5). On a Per Capita basis, the relationship between the two sectors showed the

Table 5.1 Value of Production, Acreage and Value Per Acre of Domestic Crops by Parish, 1977 (all money amounts in Jamaican dollars).

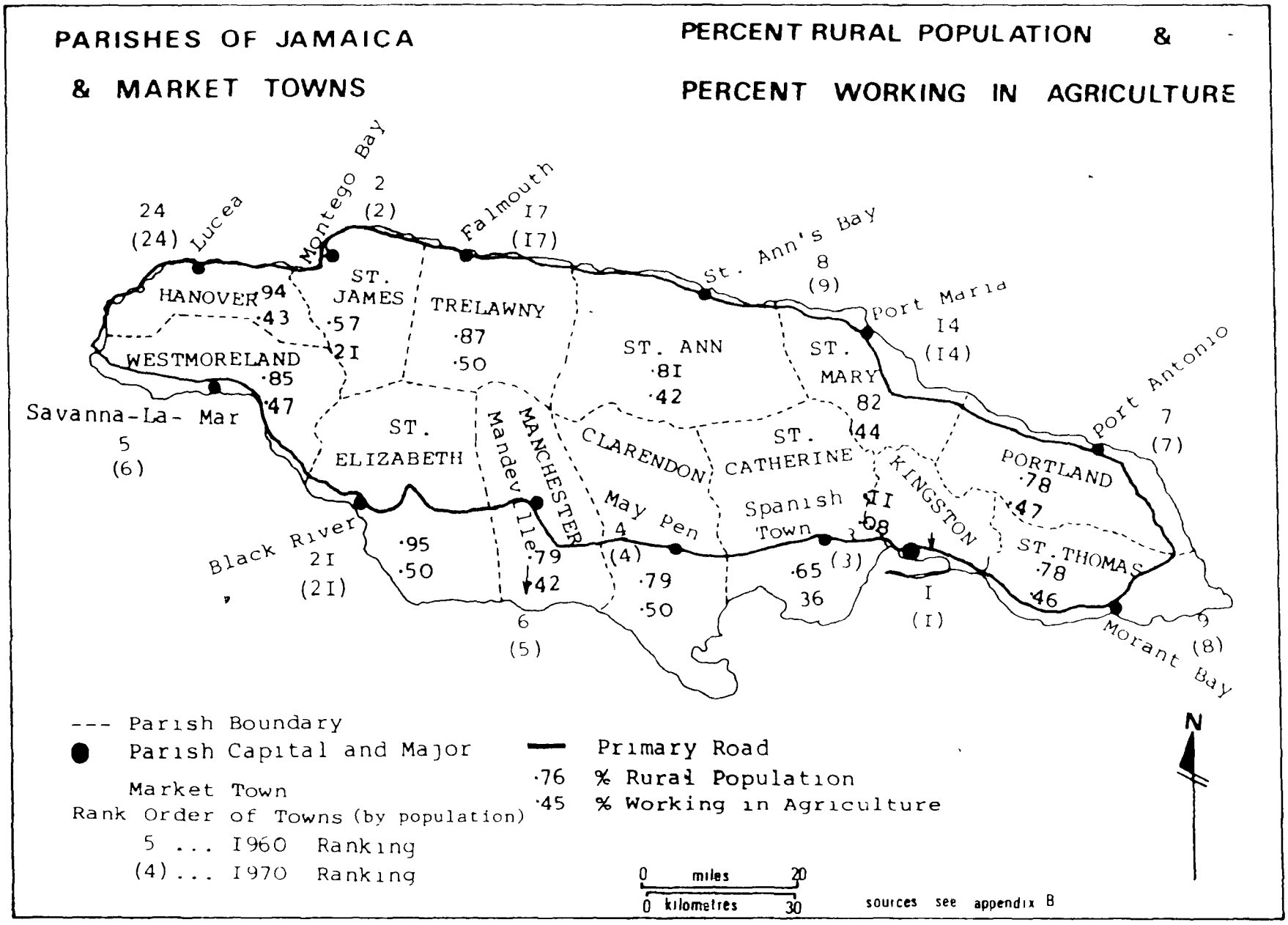
Value Per Acre Rank	Parish	Value of Production	Acreage	Value Per Acre
1	St. Elizabeth	36,294,940	20,256	1,799.59
2	Clarendon	30,503,280	17,411	1,751.95
3	Hanover	10,586,300	6,166	1,716.88
4	Trelawny	9,907,060	5,804	1,706.93
5	St. James	7,456,580	4,530	1,646.04
6	Manchester	19,019,760	11,975	1,588.28
7	St. Mary	12,594,600	8,172	1,541.18
8	St. Ann	17,819,180	11,765	1,514.59
9	St. Catherine	19,291,480	13,175	1,464.42
10 & 11	Kingston and St. Andrew	7,044,760	4,899	1,438.00
12	St. Thomas	9,827,180	7,004	1,403.08
13	Portland	11,946,540	8,741	1,366.72
14	Westmoreland	10,360,460	8,385	1,235.59
	Total	203,607,120	128,283	1,587.17

SOURCE: Data from the Ministry of Agriculture.

Table 5.2 Jamaica. Value of Production of Domestic Food Crops by Major Groups, 1973-1977

Crop	1973		1974		1975		1976		1977	
	Value of Production		Value of Production		Value of Production		Value of Production		Value of Production	
	J$	%	J$	%	J$	%	J$	%	J$	%
	Short Tons									
Legumes	4,282	8.1	5,915	7.1	5,838	5.9	5,552	4.7	17,645	8.7
Vegetables	12,366	23.4	17,449	20.8	24,605	24 8	36,262	30.5	54,107	26.7
Condiments	1,672	3.2	2,600	3.1	3,917	3.9	6,360	5.4	16,545	8.2
Fruits	1,353	2.6	1,490	1.8	1,901	1 9	2,647	2.2	4,707	2.3
Cereals	492	0.8	1,301	1.6	1,479	1.5	1,473	1.2	4,138	2.0
Plantains	2,802	5.3	3,962	4.7	3,409	3.4	2,838	2.4	6,335	3.1
Potatoes	4,656	8.8	6,430	7.7	4,744	4.8	10,194	8.6	16,043	7.9
Yams	20,218	38.3	36,997	44.2	42,479	42.7	41,270	34.8	61,780	30.5
Other Tubers	4,836	9.2	7,450	8.9	10,874	10.9	11,754	9.9	20,638	10.3
Miscellaneous	176	0.3	115	0.1	134	0.1	326	0 2	648	0.3
Total	52,795	100.0	83,715	100.0	99,383	100.0	118,679	100.0	202,592	100.0

SOURCE: Jamaica/USAID, 1978.


PARISHES OF JAMAICA
& MARKET TOWNS
PERCENT RURAL POPULATION &
PERCENT WORKING IN AGRICULTURE
24
(24) Lucea
Montego Bay
2
(2)
Falmouth
17
(17)
St. Ann's Bay
8
(9)
Port Maria
14
(14)
Port Antonio
7
(7)
HANOVER
·94
·43
WESTMORELAND
·85
·47
ST.
JAMES
·57
·21
TRELAWNY
·87
·50
ST. ANN
·81
·42
ST.
MARY
·82
·44
PORTLAND
·78
·47
Savanna-La- Mar
5
(6)
ST.
ELIZABETH
·95
·50
Black River
21
(21)
Mandeville
MANCHESTER
·79
·42
6
(5)
CLARENDON
May Pen
4
(4)
·79
·50
ST.
CATHERINE
Spanish
Town
·11
·58
·65
36
(3)
KINGSTON
I
(I)
ST. THOMAS
·78
·46
Morant Bay
6
(8)
--- Parish Boundary
● Parish Capital and Major
Market Town
Rank Order of Towns (by population)
5 ... 1960 Ranking
(4) ... 1970 Ranking
Primary Road
·76 % Rural Population
·45 % Working in Agriculture
0 miles 20
0 kilometres 30
sources see appendix B
N

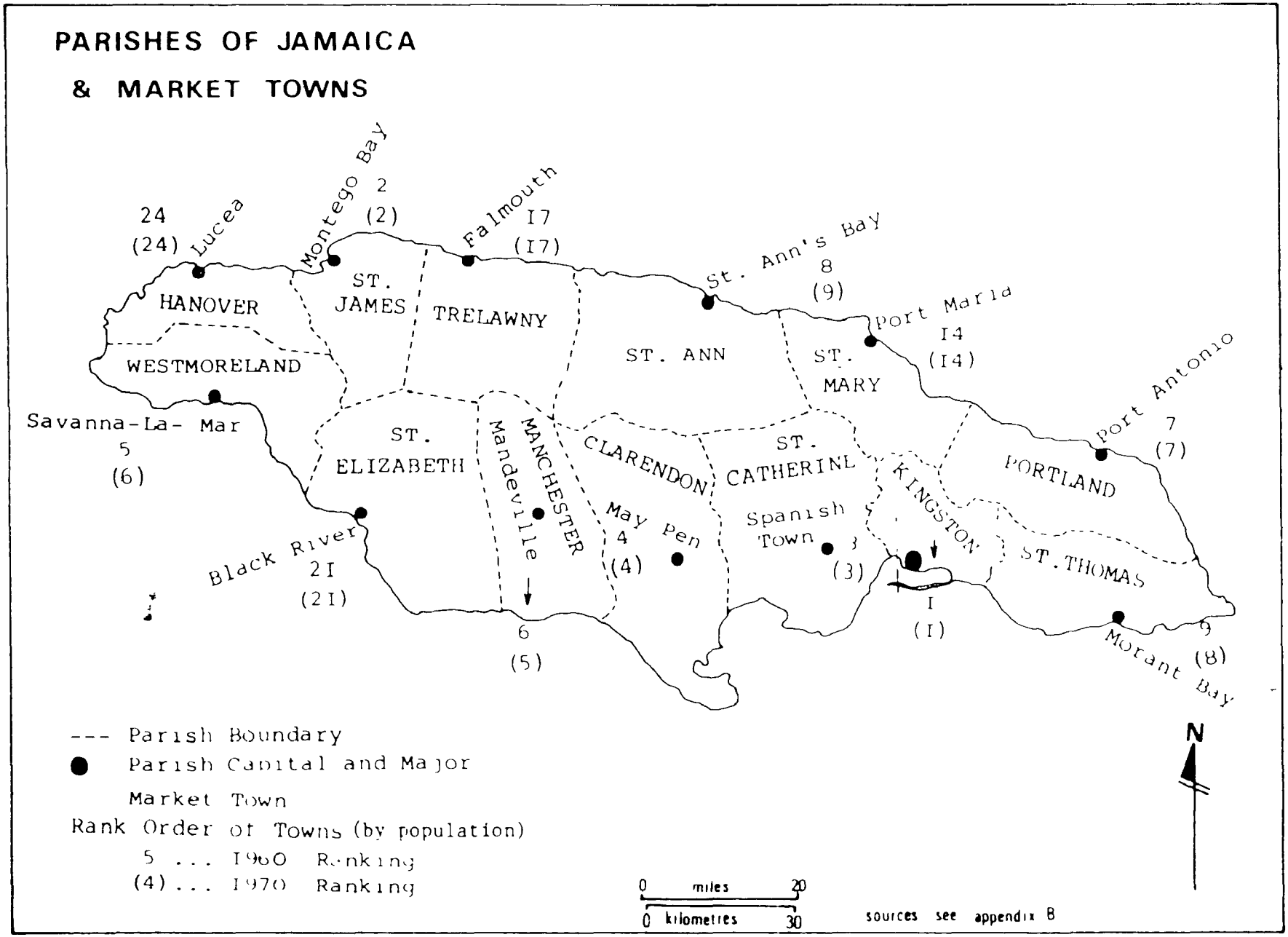
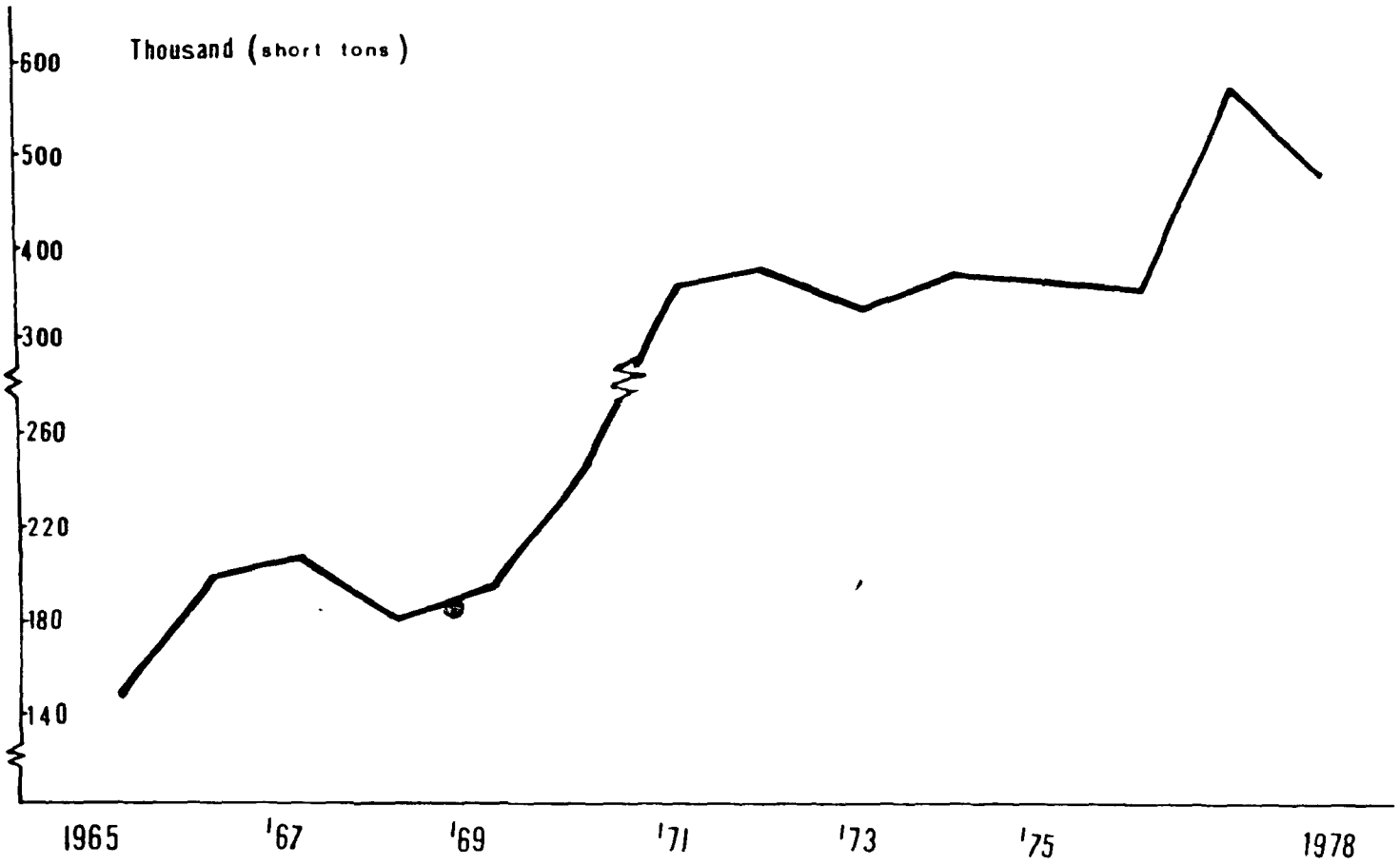

PARISHES OF JAMAICA
& MARKET TOWNS
24
(24)
Lucea
Montego Bay
2
(2)
Falmouth
17
(17)
St. Ann's Bay
8
(9)
Port Maria
14
(14)
Port Antonio
7
(7)
HANOVER
ST. JAMES
TRELAWNY
ST. ANN
ST. MARY
WESTMORELAND
Savanna-La-Mar
5
(6)
ST. ELIZABETH
MANCHESTER
Mandeville
CLARENDON
May Pen
4
(4)
ST. CATHERINE
Spanish Town
3
(3)
KINGSTON
PORTLAND
ST. THOMAS
Black River
21
(21)
6
(5)
1
(1)
Morant Bay
9
(8)
--- Parish Boundary
● Parish Capital and Major Market Town
Rank Order of Towns (by population)
5 ... 1960 Ranking
(4) ... 1970 Ranking
0 miles 20
0 kilometres 30
N
sources see appendix B

Figure 5.1



SOURCE : Based on MINISTRY of AGRICULTURE FIGURES

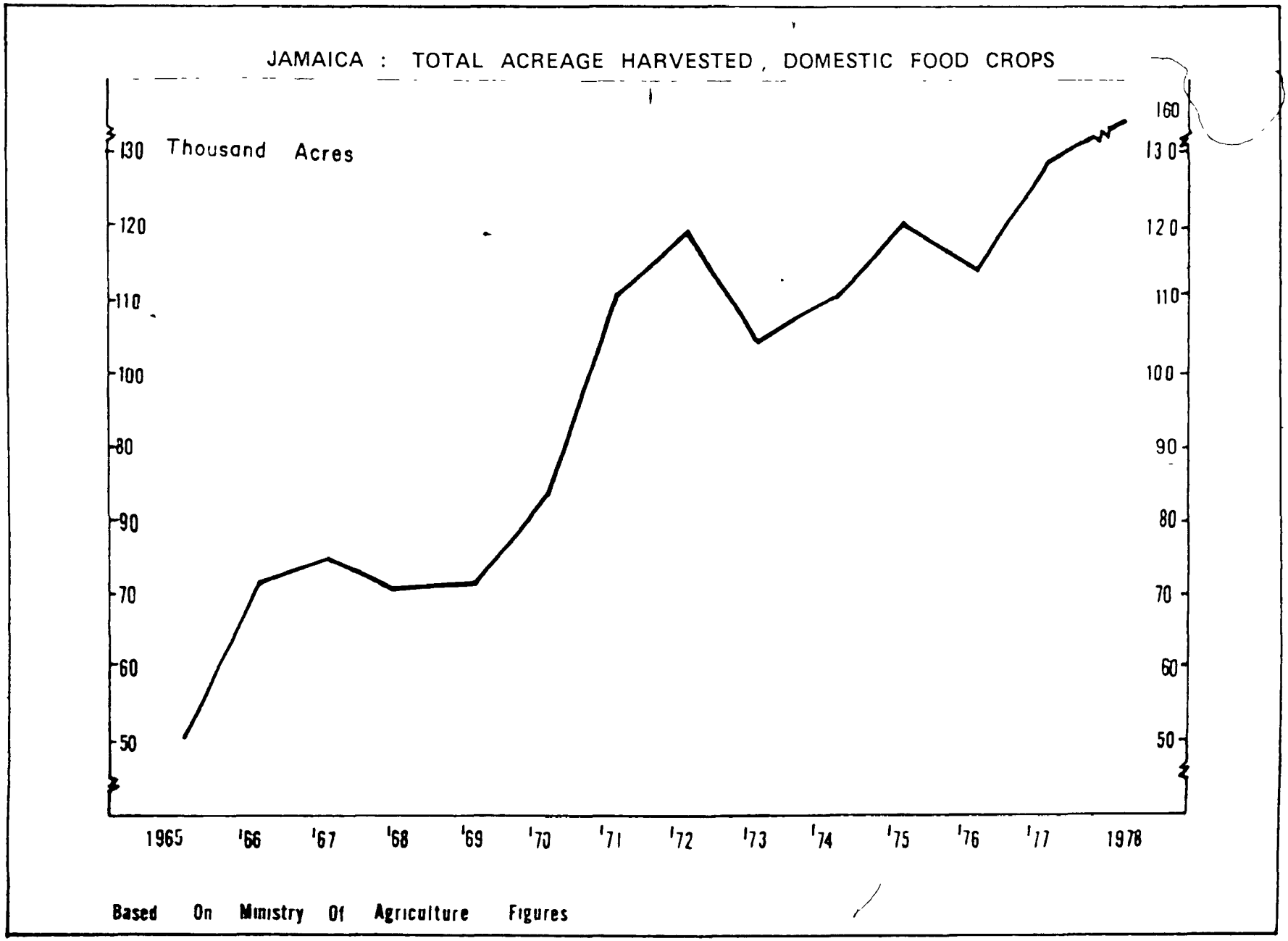

JAMAICA : TOTAL ACREAGE HARVESTED, DOMESTIC FOOD CROPS
130 Thousand Acres
160
130
120
110
100
90
80
70
60
50
1965
'66
'67
'68
'69
'70
'71
'72
'73
'74
'75
'76
'77
1978
Based On Ministry Of Agriculture Figures

Figure 5.2

Table 5.3 Acreage, Production, Price, Yield and Value Per Acre of Specified Crops, Jamaica, 1977

Crop	Acreage (Pure Stand)	Production (Short Ton)	Yield Per Acre (Tons)	Farm-gate Price Per Ton	Value Per Acre	Rank in Value Per Per Acre
Sugar Cane	138,000	3,492,394	25.31	J$ 21[3]	J$ 531	12
Rice	2,623	6,141	2.34	300[4]	702	10
Carrot	2,331	8,611	3.69	620	2,288	5
Cucumber	1,926	8,012	4.16	260	1,082	8
Tomato	4,341	26,677	6.14	760	4,666	2
Onion	1,175	4,749	4.04	2,280	9,614	1
Horse Plantain	3,473	8,971	2.58	260	671	11
Irish Potato	2,337	9,283	3.92	620	2,430	4
Sweet Potato	6,422	30,283	4.71	340	1,601	6
Yellow Yam	9,199	52,117	5.67	460	2,608	3
Bitter Cassava	4,267	23,279	5.46	260	1,310	7
Sweet Cassava	3,258	13,710	4.21	260	1,010	9

[3]Average of $18-$24 range depending on sucrose content.

[4]AMC August 12, 1977 for 13% moisture "brown type".

Highest ranking in value per acre = Onion

Lowest ranking in value per acre - Sugar Cane

SOURCE: Jamaica/USAID, 1978: 101.

Table 5.4 Jamaica: Gross Domestic Product and Agricultural Production Per Capita, 1970 to 1977

Year	Population (Mean)	Gross Domestic Product (1974 prices-J$M)	Per Capita (J$)				
			Agriculture Forestry and Fishing	Domestic Agriculture	Export Agriculture	Livestock	Gross Domestic Product
1970	1,869,100	2,019.5	80	27	21	23	1,080
1971	1,901,100	2,068.9	88	37	21	19	1,088
1972	1,932,400	2,264.4	88	37	21	19	1,171
1973	1,972,000	2,258.9	81	34	17	20	1,145
1974	2,008,000	2,265.4	81	35	18	19	1,128
1975	2,042,700	2,243.7	81	35	16	20	1,098
1976	2,072,300	2,094.2	80	33	17	21	1,010
1977	2,096,800	2,011.1	84	39	14	22	959

SOURCE Demographic Statistics 1977, National Income and Product Account, 1977 (Adapted from Jamaica/USAID, 1978 3)

same trend.

Table 5.5 Agriculture in Relation to GDP 1969-1977, at Constant Price (money amounts in millions of Jamaican dollars)

			% of GDP	
Year	Export Agriculture	Domestic Agriculture	Export Agriculture	Domestic Agriculture
1969	39.4	43.6	2.19	2.43
1970	39.6	50.0	1.96	2.47
1971	40.3	70.5	1.95	3.39
1972	40.5	71.5	1.76	3.16
1973	33.1	66.0	1.46	2.92
1974	36.5	70.1	1.61	3.09
1975	32.4	72.3	1.44	3.22
1976	35.9	68.6	1.71	3.27
1977	29.5	81.4	1.46	4.05

SOURCE: Department of Statistics (adapted from Jamaica/USAID, 1978. 2).

The performance of the small scale (domestic) sector was dramatically higher than that of the export sector for the period 1969-1977. The total acreage available to the small scale sector accounted for only 6.1 percent of the total acreage in farms in 1970. Furthermore, 78 percent of the small farmers were operating under the five acre category with an average farm size of 1.8 acres. This indicated that the small farmers were using the resources available to them efficiently. One should also bear in mind that a high percentage of small farmers were also producing for the export market.

Has the small scale sector been able to feed the nation and reduce

expenditure on imported foodstuffs? In 1976, the Food Balance Sheet for the Caribbean showed that for the year 1972, 46 percent of the calories and 63 percent of the protein consumed in Jamaica were imported. On a *per capita* basis, cereal and cereal preparations contributed 31.3 percent to the total calories consumed, 95 percent of which was imported. Cereal alone contributed 38.3 percent to the total protein consumed, 96 percent of which was imported. Maize made up the bulk of the cereal imported; a large percentage of which was fed to livestock, poultry and pigs. That which was fed to animals can be viewed as indirect consumption since it was converted to animal protein.

According to reports from the Nutrition Advisory Council (1974):

> There is a marked difference between amounts of protein and calories available to low income groups compared to those available to higher income levels. Dietary energy intakes fall short of requirements by about 27 percent and dietary protein by about 14 percent in the low income group which constitutes about 70 percent of the population. (Five Year Development Plan Vol. 2, 1973-1983 6)

Table 5.6 shows that cereal and cereal preparations accounted for an expenditure of J$30.1 million in 1972 compared to J$77.3 million in 1977. Consistent data between 1962 and 1971 could not be ascertained. Of the J$77.3 million spent on cereal and cereal preparations in 1977, maize accounted for J$20.2 million, rice J$18.9 million, wheat J$12.2 million and flour J$17.1 million. The Ministry of Agriculture honestly acknowledged that the value of food imports for 1976 was 84.5 percent higher than that for 1972. Therefore an adequate supply of domestic foodstuffs is yet to be achieved.

Governments' involvement in small scale agriculture continues to be less than effective, thus justifying some of the criticism of Jamaican

Table 5.6 Imports of food 1972-1976, Jamaica (money amounts in millions of Jamaican dollars)

Items	1972	1973	1974	1975	1976
Meat and meat preparations	16.8	18.2	22 1	27.4	27.1
Dairy products and eggs	15.3	12.9	25.7	20.5	22.4
Fish and fish preparations	11 8	14.5	16.7	19.6	17.6
Cereal and ceral preparations	30 1	48.1	83 9	84 9	77 3
Fruits and vegetables	6.4	8.3	10.4	9.3	6 8
Sugar and sugar preparations and honey	2.7	1.4	3.3	3.1	3.2
Coffee, tea, cocoa, spices, etc.	2.4	2.3	3.1	3.9	3.4
Animal food	3.8	5.6	6.0	3.9	4.5
Miscellaneous food preparations	0.99	3.7	3.7	5.3	3.7
Total	90.20	115.0	175.0	178.4	166.0

SOURCE: Ministry of Agriculture.

agricultural development policies. An approach to land reform that takes into consideration the amalgamation of fragmented holdings seems to be a more rational system of procedure. Furthermore, the structures serving small scale agriculture are too bureaucratic and tend to be overlapping, uncoordinated and fragmented. The need for good management and a strong chain of command at all levels of the development process is obvious, as well as a rational system of choices among feasible development possibilities.

APPENDIX A1

DOMESTIC FOOD CROPS

Common	Botanical	Common	Botanical
Legumes		**Fruits**	
Broad Bean	*Vicia faba*	Paw-paw	*Carica papaya*
Sugar Bean	*Phaseolus spp*	Pineapple	*Ananas comosus*
Gungo Bean	*Cajanus cajan*	Watermelon	*Citrullus vulgaris*
Red Pea	*Phaseolus vulgaris*		
Peanut	*Arachis hypogaea*		
Vegetables		**Cereal**	
Beetroot	*Beta vulgaris*	Corn	*Zea mays*
Cabbage	*Brassica oleracea var capitata*	Rice	*Oryza sativa*
Calaloo	*Amaranthus viridis*	**Plantains**	
Carrot	*Daucus carota*	Horse	*Musa paradisiaca*
Celery	*Apium gravelens*	Other	
Cauliflower	*Brassica oleracea var. botrytis*	**Potatoes**	
Chocho	*Sechium edule*	Irish	*Solanum tuberosum*
Cucumber	*Cucumis sativus*	Sweet	*Ipomoea batatas*
Egg Plant	*Solanum melongena*	**Yams**	
Lettuce	*Lactuca sativa*		*Dioscorea spp*
Okra	*Hibiscus esculentus*	Lucea	
Pumpkin	*Curcurbita spp.*	Negro	
String Bean	*Phaseolus vulgaris*	Renta	
Turnip	*Brassica rapa*	Saint Vincent	
Tomato	*Lycopersicum esculentus*	Yellow	
Condiments		Other	
		Other Tubers	
Escallion	*Allium ascalonicum*	Cassava	*Manihot utilissima*
Ginger	*Zingiber officinale*	Coco	*Colocasia esculenta*
Hot Pepper	*Capsium annum*	Dasheen or Taro	*Colocasia antiquorum*
Sweet Pepper	*Capsium frutescens*		
Thyme	*Thymus vulgaris*		
Onion	*Allium cepa*		

SOURCES: G.B. Masefield *et. al.*, 1969
L.H. Bailey, 1957
E. Mortensen and E. Bullard, 1968
J.W. Purseglove, 1968

APPENDIX A2

BOTANICAL AND COMMON NAMES OF ALL CROPS

Common	Botanical
Root Crops	
Arrowroot	*Maranta arundinacea*
Cassava	*Manihot esculenta*
Coco	*Colocasia esculenta*
Ginger	*Zingiber officinale*
Irish Potato	*Solanum tuberosum*
Sweet Potato	*Ipomoea batata*
Yam	*Dioscorea spp.*
Legumes and Cereals	
Banner Beans	*Dolichos lablab*
Corn	*Zea mays*
Cow, Blackeye and Marrow Fat Peas	*Vigna unguiculata*
Congo (Gungo) Peas	*Cajanus cajan*
Garden Beans	*Phaseolus spp.*
Guinea Corn	*Sorghum vulgare*
Overlook Beans	*Canavalia ensiformis*
Peanut	*Arachis hypogaea*
Red Peas (String Beans)	*Phaseolus vulgaris*
Rice	*Oryza sativa*
Vegetables	
Beetroot	*Beta vulgaris*
Cabbage	*Brassica oleracea*
Calalu	*Amaranthus viridis*
Carrot	*Daucus carota*
Chocho	*Sechium edule*
Egg Plant	*Solanum melongena*
Escallion	*Allium ascalonicum*
Okra	*Hibiscus esculentus*
Pepper	*Capsicum annum, C. frutescens*
Pumpkin	*Cucurbita pepo*
Thyme	*Thymus vulgaris*
Tomato	*Lycopersicum esculentum*
Turnip	*Brassica rapa*
Tree Crops	
Ackee	*Blighia sapida*
Almond	*Terminalia catappa*
Annatto	*Bixa orellana*
Avocado Pear	*Persea gratissima*
Breadfruit	*Artocarpus incisa*
Cashew	*Anacardium occidentale*
Cherimoya	*Annona cherimola*
Cherry	*Malpighia punicifolia*
Cinnamon	*Cinnamomum zeylanicum*
Citrus	*Citrus spp.*
Cocoa	*Theobroma cacao*
Coconut	*Cocos nucifera*
Coffee	*Coffea arabica*
Custard Apple	*Annona reticulata*
Golden Apple	*Passiflora laurifolia*
Granadilla	*Passiforma quadrangularis*

Appendix A2 - continued

Common	Botanical
Tree Crops - continued	
Guava	*Psidium guajava*
Guinep (Genip)	*Melicocca bijuga*
Jackfruit	*Artocarpus integrifolia*
Jew Plum	*Spondias cytherea*
Jimbelin	*Phyllanthus acidus*
Kola Nut (Bissy)	*Cola nitida*
Mango	*Mangifera indica*
Naseberry	*Achras sapota*
Nutmeg	*Myristica fragrans*
Otaheite Apple	*Eugenia malaccensis*
Peach	*Persica vulgaris*
Pimento (Allspice)	*Pimenta officinalis*
Rose Apple	*Eugenia jambos*
Soursop	*Annona muricata*
Star Apple	*Chrysophyllum cainito*
Sweetsop	*Annona squamosa*
Tree Tomato	*Cyphomandra betacea*
Semi-permanent Crops	
Banana	*Musa sapientum*
Pineapple	*Ananas comosus*
Plantain	*Musa paradisiaca*
Sugar Cane	*Saccharum officinarum*
Timber	
Bamboo	*Bambusa spp*
Cedar	*Cedrela odorata*
Guango	*Samanea saman*
Logwood	*Haematoxylon campechianum*
Mahoe	*Hibiscus elatus*
Silky Oak	*Grevillea robusta*
Grasses	
Guinea Grass	*Panicum maximum*
Napier Grass	*Pennisetum purpureum*
Rice Grass	*Ischaemum rugosum, Rottboellia exaltata*
Seymour Grass	*Andropogon pertusus*
Miscellaneous	
Castor Oil Bean	*Ricinus communis*
Paw-paw	*Carica papaya*
Tobacco	*Nicotiana tabacum*
Watermelon	*Citrullus vulgaris*

SOURCE: David Edwards, 1961. 360

APPENDIX B

MAP SOURCES

Map	Title	Source
2.2	Topography of Westmoreland Parish	Computer plotting based on data taken from Topographic Maps of Jamaica 1:500,000 and 1:250,000
2.3	Topography, Land Use Capabilities	Stark, J., *Soil and Land Use Surveys, No. 15*, Jamaica, Trinidad, West Indies, 1964
	Soils Classification and Capabilities	Jamaica/USAID, 1978 Lands Department, Ministry of Agriculture
2.4	Aerial Photographs	Alan Eyre, University of the West Indies
3.1	Service Functions and Economic Activities	Statistics Department Kingston Jamaica Town Planning Department
	Land Settlements and Sampled Farms	Field Survey, Summer 1980 Jamaica/USAID, 1978
5.1	Parishes of Jamaica, Percent Rural Population and Percent Working in Agriculture	Census of Jamaica, 1960 and 1970

APPENDIX C

NEAREST NEIGHBOUR STATISTIC (R_n)

Nearest Neighbour Statistic (N) was based on a series of road measurements (miles) taken between each market and its nearest neighbour, given that the population is evenly distributed

where $R = \bar{r}_A / \bar{r}_E$

$\bar{r}_A = \Sigma r/N$

$\bar{r}_E = \frac{1}{2\sqrt{N/A}}$

1960		1980	
Number of Market Locations	= 13	Number of AMC Stations/Market Locations	= 24
Area	= 320.39 sq. miles	Area	= 320.39 sq. miles
$\bar{r}_E$	$= \frac{1}{2\sqrt{N/A}}$	$\bar{r}_E$	$= \frac{1}{2\sqrt{N/A}}$
	= 2.48		= 1.85
$\bar{r}_A$	$= \Sigma r/N$	$\bar{r}_A$	$= \Sigma r/N$
	= 3.58		= 2.16
R	$= \frac{\bar{r}_A}{\bar{r}_E}$	R	$= \frac{\bar{r}_A}{\bar{r}_E}$
	= 1.44		= 1.17

APPENDIX D

DATA SCHEDULE, WESTMORELAND PARISH, JAMAICA

SMALL SCALE AGRICULTURE

Census Division _____ Sample No _____

District _____

Farmer's Name _____

Date _____

A THE SOCIO-ECONOMIC BACKGROUND OF THE SAMPLED FARMERS

HISTORY OF FARMER

1 How long have you been living in this district? _____

2 Were you born here? _____ If no where were you born? _____

3 Where were you living before? _____

4. What was your occupation there? _____

5. At what age was farming taken up? _____

6. What is your main occupation? _____

7. What is the main occupation of your spouse? _____

8. Are there any other farmers in the family? _____

9. At what standard did you stop going to school? _____

10. Have you received any other training in agriculture since you left school?

_____

11. How many members of your family are you responsible for? _____

12. Give the names of all the places you have visited outside your district.

_____

13. Do you receive remittance from abroad? _____

14 How often do you visit a doctor? _____

15. Where do you go to visit a doctor? _____

16. Is there a clinic in this district, or near here? _____

HOUSEHOLD GOODS AND CONVENIENCES

1. Do you own or rent any of the following articles?

ARTICLES	OWN	RENT
House		
Refrigerator		
Telephone		
Electric light		
Boat		
T V		
Gas stove		
Oil stove		
Motor vehicle		

2 Number of rooms _____

3. Age of house _____.

4 Building material _____

5. Well kept _____ average _____ neglected _____.

6. Toilet facilities _____pit, _____ sewerage, _____ other.

7. Water supply _____ piped, _____ tank, _____ public, _____ other.

8. Leaking roof _____.

POPULATION

1. Number of people in the farm unit _____.

2. Size of family _____.

3. Sex of farmer _____.

4. Age of farmer _____.

5. Marital status _____.

6. Number of boys and age distribution _____.

7. Number of girls and age distribution _____

SERVICES

1 Which town or district do you visit for

ITEMS	LOCATION	DISTANCE FROM HOME	TYPE OF TRANSPORTATION AND COST	FREQUENCY
Groceries				
Clothing				
Furniture				
Farm tools				
Pest control				
Seeds				
Drinking water				
Medical treatment				
Schooling				
Mail/Post Office				
Banking				
Library service				

THE FARMER ON THE LAND. MAJOR CHARACTERISTICS OF SMALL SCALE AGRICULTURE.

SPATIAL/TENURE

1. What is the size of your farm? _____

2. What amount of land do you own? _____ O

rent? _____ R

lease? _____ L

sharecrop? _____ S

X

3. Number of fragments? Y

Fragment	Location	O	R	L	S	X	Y	Home	Market	Size Acreage

Fragment	Slope	Soil	How Acquired	Rate Cost

4. Distance from home to a paved road _____

5. Have you bought any land since 1960? _____

6. If yes, where is the land located? _____

7 How much tax do you pay for your land(s)? _____

8. What is the basis of valuation (in 7)? _____

AGRONOMIC

1. What tool do you use for tillage? _____

weeding? _____

harvesting? _____

2. Do you use fertilizer? _____

3. If yes, give detail·

(a) Farm yard manure - animal

Type of animals _____

Method of application _____

History of application _____

(b) Other organic manure

Mulch _____

Sludge _____

Compost _____

History of application _____

(c) Inorganic manure

Ammonium sulphate _____

Potash _____

Other _____

History of application _____

4. Reason for using (a)

(b)

(c)

5 What method do you employ to prevent your soil from being washed away?

DEVICE	MATERIAL	REASON	HISTORY OF METHOD
Stone barrier			
Covers			
Terraces			
Drains			
Trenches			
Silt trap			
Other			

6. Crop inventory

NO. OF FRAGMENT	TREE CROPS	VEGETABLES	LEGUMES	ROOT CROPS

7. Cultivation pattern _____

8. What portion of the farm produce is consumed at home?

0-25%

25-49%

50-74%

75%

9. Do you process any of your farm produce? _____

10. Do you have any special interest in the production of any particular crops? _____

11. Have you introduced any new crops on the farm since 1962? _____

TYPE OF CROP	YEAR INTRODUCED	REASON

12. Do you keep livestock? If yes

TYPE	NUMBER	HISTORY

13. Do you keep any draught animals? _____

14. Farm machinery inventory _____

15. Do you rent/hire any farm machinery? _____

16. Means of transportation to and from farm _____

SOCIAL

1. If you rent, lease, sharecrop - - -.give date of first rental/tenancy and rate.

NO. OF FRAGMENTS	TENURE	TERM SHORT	TERM LONG	DURATION YEARS	LANDLORD	ACREAGE	COST

2. How did you acquire your land(s)?

   A. Bought

   B. Inherited

   C. Subdivision:

      1) Government Land Settlement

      2) Project Land Lease

      3) Private Land Settlement

3. If 2C above applies to you, what is the arrangement between you and the landlord? _____

4. Will you be compensated for any improvement in the land? _____

5. Is your farm ever subdivided? _____

6. Are you planning to subdivide your farm? _____

7 Do you feel secure living/farming the land you rent/lease? _____

8. Do you have any contact with extensions workers? _____

9. If yes, about what? _____

10. Is their advice helpful to you? _____

11 Do you attend extension workshops/lectures? _____

12. Where do you get your information about agriculture? _____

13. Do you frequently listen to agricultural programmes on the radio? _____

14. Are you a member of any agricultural association/co-op? _____

ECONOMIC

1. Marketing Do you sell any of your agricultural produce? _____

2. If yes: What amount is sold outside the farm?

0-24% non-commercial

25-49% semi-commercial

50-74% commercial

> 75%

3. How is your produce marketed?

CROP	OUTLET	LOCATION	AMOUNT	PRICE	DESTINATION OF CROP
Trees					
Vegetables					
Legumes					
Root crops					

4. If the family is responsible for marketing produce,

   Where would you sell the produce? _____

   To whom would you sell the produce? _____

   How is produce transported from farm to selling point? _____

   Distance from farm to selling point? _____

5. If by higgler (intermediary) would higgler buy the crop in the field? _____

   harvested? _____

6. Where would the higgler take the produce to market? _____

7. If by AMC, BOARD/CO-OP:

   would he/she buy the crop in the field? _____

   harvested? _____

   buying station? _____

8. State the distance from your farm to buying station. _____

9. To which buyer do you sell the largest amount? _____

10. Do the higglers belong to this area? If not, where do they come from? _____

11. Which buyer is more reliable? Higgler _____

    Board _____

    AMC _____

12. To which buyer do you prefer to sell your produce?

13. Do you keep a record of your farm activities? _____

14 Farm expenditure/farm income? _____

15. How many members of the family assist you on the farm? _____

16. Do you employ non-family labour? _____

17. Rate per day for hired labour. _____

18. Have you received a loan for farm improvement? _____

If yes, give details. _____

19. Have you received any subsidy? If yes, give details. _____

POLITICAL

1 Are you a member of any agricultural association/co-op?

If yes, give details. _____

2. Do you vote at agricultural association/co-op meetings? _____

3. Are you involved in the planning and implementation of the various programmes and projects being carried out in your community? _____

4 Is the community involved at all in the planning and implementation process? _____

5. What are your major agricultural problems? _____

6. How do you hope to solve the problems? _____

7. Are you satisfied with your farm size? _____

8. Are you interested in co-operatives? _____

Give details. _____

9. Can you suggest ways in which the present agricultural system can be improved? _____

10. Are you planning to continue in agriculture? _____

11. General attitude to agriculture. _____

12. Attitude to questioning. _____

APPENDIX E

METRIC (SI) CONVERSIONS

ACRES	HECTARES
2,000	809
2,200	890
2,300	930
3,500	1,416
3,700	1,497
5,200	2,104
5,392	2,182
7,900	3,197
8,000	3,237
8,700	3,520
19,527	7,902
22,934	9,281
24,462	9,899
24,712	10,000
29,659	12,002
36,541	14,787
43,244	17,500
47,009	19,024
48,289	19,542
66,227	26,801

INCHES	CENTIMETRES
1 - 12	2.54 - 30.48
85	213.36
120	302.8

FEET	METRES
1,000	300

DISTANCE	
1 millimetre (mm)	= 0.039 inches
1 centimetre (cm)	= 0.393 inches
1 metre (m)	= 3.28 feet or 1.09 yards
1 kilometre	= 0.62 miles

AREA	
1 hectare (ha)	= 2.47 acres
1 square kilometre (Km^2)	= 247 acres
1 acre	= 0.40 ha
1 square mile	= 258.9 ha or 2.59 Km^2

WEIGHT	
1 gram (g)	= 0.035 ounces
1 kilogram (kg)	= 2.20 pounds
1 ton. (t)	= 1.10 short tons
1 ounce	= 28.35 grams
1 pound	= 453.59 grams
1 short ton	= 2,000 pounds or 0.907 ton
1 cwt.	= 112 pounds

BIBLIOGRAPHY

Balogh, T. "The Ten Years Plan for Jamaican Development A Report and Suggestions". Unpublished. Kingston, Jamaica, 1962.

Balogh, T. *The Economics of Poverty.* London: Weidenfield and Nicolson, 1966.

Bailey, L.H. *Manual of Cultivated Plants* New York: The Macmillan Co., 1957.

Beachey, R.W. *The British West Indies Sugar Industry in the Late 19th Century.* Sussex: Ditchling Press Ltd., 1957.

Beckford, G.L. *Persistent Poverty· Underdevelopment in Plantation Economies of the Third World.* New York, 1972.

Berry, Brian J.L. *Geography of Market Centres and Retail Distribution* Englewood Cliffs, New Jersey: Prentice-Hall Inc., 1967

Best, L. "A Model of Pure Plantation Economy", Third West Indies Agricultural Conference, Mona, Jamaica, in *Social and Economic Studies*, Vol. 16, No. 3, 1968.

Best, L. and Kari Levitt. "An Idea Type Accounting Framework for Plantation Economy Further Modified". Second Conference of Caribbean Commonwealth Statisticians, Georgetown, 1968.

Blaut, J. "Geography and Development of Peasant Agriculture" in *Problems and Trends in American Geography.* S.B. Cohen, ed. New York: Basic Books Inc., 1967.

Boserup, E. *The Conditions of Agricultural Growth: The Economics of Agrarian Change Under Population Pressure.* Chicago: Aldine Publishing Co., 1965.

Brierley, J.S. *Small Farming in Grenada An Investigation of its Nature and Structure*. Edinburgh: University of Edinburgh, 1974

Brookfield, H.C. "Multum in Paruo: Some Questions about Diversification in Small Countries". Montreal McGill University, Department of Geography, 1972 (Mimeographed).

Brossard, D.B. "Some Aspects of Supervised Agricultural Credit", in *Small Scale Farming in the Caribbean* Conference on Education and Small Scale Farming, Trinidad, October, 1954.

Campbell, Rosemary R. "Adaptation in Adversity Peasant Response to Environmental and Economic Constraints in Nevis, West Indies". M.A. Thesis, Department of Geography, McGill University, Montreal, 1973.

Chayanov, A.O. *The Theory of Peasant Economy*. Daniel Thorner *et al* , eds. Homewood, Ill.: Irwin, 1966.

Clarke, C. "The Morphology of Economic Growth., in *The Conditions of Economic Progress*. London, 1940.

Cumper, G. "A Modern Sugar Cane Estate", *Social and Economic Studies*, Vol. 3, No. 2 (September 1954).

Demas, William G. *The Caribbean Community: A Guide*. Caribbean Community Secretariat, Georgetown, June, 1973.

Dumont, René. *Report to the Government of Jamaica on Planning Agricultural Development*. FAO Report, 1717. Rome, 1963.

Edwards, D. *An Economic Study of Small Scale Farming in Jamaica*. Institute of Social and Economic Research, University of the West Indies, 1961.

Eisner, Gisela. *Jamaica 1830-1930: A Study in Economic Growth*. Manchester University Press, 1961.

Eyrie, Alan. "Land and Population in the Sugar Cane Belt of Jamaica". U.W.I., Department of Geography, n.d.

Eyrie, Alan. "How Long Can Jamaica Feed Itself?", *Cajanus*, Vol. III: 77-86, 1970.

Found, William C. "A Multivariate Analysis of Farm Output in Selected Land-Reform Areas of Jamaica", *Canadian Geographer*, Vol. 12, No. 1: 41-52, 1968.

Found, William C. *A Theoretical Approach to Rural Land-Use Patterns*. Macmillan Company of Canada, 1971.

Girvan, N. and O. Jefferson. "Corporate Versus Caribbean Integration", *New World Quarterly*, Vol. 4, No. 2, 1968.

Griffith, A. "Diversification of Peasant Agriculture in Barbardos: Problems of Directed Change in a Small, Open Economy". Ph.D. Thesis, Department of Geography, McGill University, Montreal, 1979.

Hammon, R. and P.S. McCullagh. *Quantitative Techniques in Geography: An Introduction*. Oxford: Clarendon Press, 1975.

Hayami, Y. and U.W. Ruttan. *Agricultural Development: An International Perspective*. London: Johns Hopkins Press, 1971.

Henshall, Janet D. "The Spatial Structure of Barbadian Peasant Agriculture". M.Sc. Thesis, Department of Geography, McGill University, Montreal, 1964.

Higgins, B.H. "The Dualism Model of Underdeveloped Areas", *Economic Development and Cultural Change*, Vol. 4, No. 2, 1955-56.

Hills, Theo. "The Poor Man and His Land", *New World*, Vol. 3, 1966

Hills, T.L., S. Iton and J. Lundgren. *Farm Fragmentation in the Commonwealth Caribbean*. McGill University, 1972.

Hills, T.L. "Land Settlement Schemes: Lessons from the British Caribbean", *Revista Geografica*, No. 63: 67-82, 1965.

Ho, Yhi-Min. *Agricultural Development in Taiwan 1903-1960.* Vanderbilt University Press, 1966.

Hodder, B.W. *Economic Development in the Tropics*, 3rd ed. London: Methuen & Co. Ltd., 1980.

Innés, Donald. "The Efficiency of Jamaican Peasant Land Use", *The Canadian Geographer*, Vol. 5, No. 2, Summer 1961.

International Bank for Reconstruction and Development, *The Economic Development of Jamaica.* Baltimore: The Johns Hopkins Press, 1952.

Iton, Stanley. "Agronomic Characteristics of Small Scale Agriculture, Jamaica: A Basis for Geographic Classification". M.A. Thesis, Department of Geography, McGill University, Montreal, 1970.

Johnston, B.F. "Agriculture and Structural Transformation in Developing Countries", *Journal of Economic Literature*, Vol. 8, No. 2 (369-404), 1970.

Johnson, I.E. "Problems and Needs of Agriculture:. Unpublished. Kingston, Jamaica, 1973.

Jolly, A.L. *Readings in Small Scale Farming.* Port of Spain, Trinidad, 1956.

Jorgenson, Dale W. "The Development of a Dual Economy", *The Economic Journal*, Vol. 73, June 1961.

Lewis, A. "Economic Development With Unlimited Supplies of Labour", *Manchester School of Economics and Social Studies*, Vol. 22, 1954.

Lewis, A. *The Theory of Economic Growth.* Homewood, Illinois: Richard D. Irwin, 1955.

Lewis, A. *Development Planning: The Essential of Economic Policy.* London: George Allen & Unwin, 1966.

Lewis, Gordon. *The Growth of the Modern West Indies.* New York: Monthly Review Press, 1968.

Lowenthal, D. *West Indian Societies* New York: Oxford University Press, 1972.

Lundgren, J.O. "Agricultural Marketing Mechanisms: Functional and Geographical Relationships". Farmer/Crops/Marketing Arrangement, 1970.

Macmillan, M. *A Land of Look Behind.* London, 1957.

Mandel, J.R. *The Plantation Economy Population and Economic Change in Guyana 1838-1960.* Temple University Press, 1973.

Manley, N.W. *Manley and the New Jamaica.* Rex Nettleford, ed., William Clowes & Sons, Ltd., 1971.

Marshall, W.K. "Notes on Peasant Development in the West Indies Since 1838", *Social and Economic Studies*, Vol. 17, No. 3 (252-263), 1968.

Masefield, G.B. *et al.* *The Oxford Book of Food Plants.* Oxford University Press, 1969.

Mintz, S. and D.G. Hall. "The Origins of the Jamaican Internal Marketing System", *Anthropology* (Yale University Press), No. 57, 1960.

Momsen, J.D. "The Geography of Land Use and Population in the Caribbean: Barbados and the Windward Islands". Ph.D. Thesis, University of London, 1969.

Morgan, W.B. *Agriculture in the Third World: A Spatial Analysis.* G. Bell & Sons, Ltd., 1978.

Mortensen, E. and Ervin T. Bullard. *The Handbook of Tropical and Subtropical Horticulture.* Washington, D.C.: Department of State, Agency for International Development, 1968.

Myint, H. *The Economics of Developing Countries*. London: Hutchenson University Press, 1964.

Norton, Ann and Richard Symanski. "The International Marketing System of Jamaica", *The Geographical Review* (Institute of Latin American Studies, University of Texas), Vol. 64, No. 4, October 1975. Offprint Series, No. 177.

Nurse, L.A. "Spatial Organization in Hinterland Economy". Ph.D. Thesis, Department of Geography, McGill University, Montreal, 1979.

Olivier, L.S.H. *Jamaica the Blessed Island*. London: Faber & Faber, 1936, cited in *Agricultural Planning in Jamaica*. McFarlane *et al.*, eds. 1968.

Paget, E. "Land Use and Settlement in Jamaica", in *Geographical Essays on British Tropical Lands*. R.W. Steel and C.A. Fisher, eds. London: George Philip & Son, Ltd., 1956.

Pearse, Andrew. "Metropolis and Peasant: The Expansion of the Urban-Industrial Complex and the Changing Rural Structure", *Peasants and Peasant Societies*. Teodor Shanin, ed. Harmondsworth: Penguin Books, 1971, pp. 69-80.

Purseglove, J.W. *Tropical Crops: Dicotyledons I and II*. New York: John Wiley & Cons Inc., 1968.

Redfield, R. *Peasant Societies and Cultures*. Chicago, 1956.

Renis, G. and J.C. Fei. "A Theory of Economic Development", *American Economic Review*, Vol. 51, September 1961.

Rostow, W.W. *Stages of Economic Growth*. Cambridge, Mass., 1967.

Rubin, Vera. *Plantation Systems of the New World*. Washington, D.C.: Social Science Monographs VII, 1959.

Sauer, C.O. *The Early Spanish Main*. University of California Press, 1966.

Schultz, T.W. *Transforming Traditional Agriculture*. New Haven: Yale University Press, 1964.

Scott, S.E. "Land Utilization in Westmoreland, Jamaica: The Influence of Physical and Socio-economic Factors in Agriculture". M.A. Thesis, University of Manitoba, 1968.

Seers, Dudley. "The Stages of Economic Development of a Primary Producer in the Middle of the 20th Century". *Economic Bulletin of Ghana*, 1963.

Seers, Dudley. "Economic Programming in a Country Newly Independent", *Social and Economic Studies*, March 1962.

Shannin, Teodor, ed. *Peasants and Peasant Societies*. Harmondsworth: Penguin Books, 1971.

Shepherd, C.Y. "Peasant Agriculture in the Leeward and Windward Islands", *Tropical Agriculture*, Vol. 24. 1947.

Stark, J. *Soils and Land Use Surveys, No. 15, Jamaica: Parish of Westmoreland*. Regional Research Centre, University of the West Indies, July 1964.

Stone, Carl. "Political Aspects of Postwar Agricultural Policies in Jamaica 1945-1970", *Social and Economic Studies*, Vol. 23, No. 1, 1974.

Thorner, D. *et al*. *The Theory of Peasant Economy*. Illinois, 1966.

Tucker, R.C. *The Marx-Engels Reader* (2nd ed.). New York: W.W. Norton & Company Inc., 1978.

Wagner, P.L. *The Human Use of the Earth.* Illinois: Free Press, 1960.

Waterton, A. "A Hard Look at Development Planning", *The Fund and Bank Review: Finance and Development*, 1966.

Wharton, C.R., ed. *Subsistance Agriculture and Economic Development.* Chicago: Aldine, 1969.

Wilken, Gene C. "Peasant Agriculture in the 21st Century". AAG Conference, Atlanta, Georgia, April 17, 1973.

Williams, Eric. *Capitalism and Slavery.* Chapel Hill, N.C.: University of North Carolina, 1974.

Wolf, E.R. *Peasants.* New York: Prentice-Hall, Inc., 1966.

Wood, R.C. "Rotation in the Tropics", *J. Imperial Coll. Tropical Agriculture* (Trinidad), Vol. 11, No. 2, pp. 44-46, 1934.

Government Documents and Other Publications

Agricultural Census Unit. *Census of Agriculture 1961, 1968-69*, various volumes. Kingston, Jamaica, Department of Statistics.

Data Bank and Evaluation Division. "The Nutritional Status of Residents in Canaan Mountain, Westmoreland". Ministry of Agriculture, Jamaica, 1980.

Department of Statistics. *Consumer Price Indices, 1977.* Kingston, Jamaica, 1977.

Department of Statistics. *Demographic Statistics, 1960, 1972, 1977.* Kingston, Jamaica.

Department of Statistics. *The Labour Force, 1977.* Kingston, Jamaica.

Domestic Agricultural Production, 1965-1978 (Indices). Ministry of Agriculture, Kingston, Jamaica, 1980.

FAO, "Small Hillside Farmers in the Lucea-Cabaritta Watershed Complex". Hanover, Jamaica, 1970.

Finner, W. *Report to the Government of Jamaica on Marketing of Domestic Food Crops.* FAO Report No. 1564, 1963.

Government of Jamaica. "Green Paper on Agricultural Development Strategy". Kingston, Jamaica, 1970. (Mimeographed)

Henry, Danial. "Brief Overall Diagnosis of Hillside Farming in Jamaica". IICA, Kingston, Jamaica, 1978. (Mimeographed)

Holcomb, John. *Report on Curriculum Evaluation for Vocational Agricultural Schools of Jamaica and Their Co-ordination with JSA.* Washington, D.C.: American Association of College Teacher Education, July 1978.

Jamaica Development Bank. "Self Supporting Farmers' Development Programme: Socio-economic Evaluation Report". Kingston, Jamaica, 1976. (Mimeographed)

Johnson, L. *et al.* "Land Settlement in Jamaica". IICA, Kingston, Jamaica, 1976. (Mimeographed)

Kruijer, G. and A. Nuis. *Report on an Evaluation of the Farm Development Scheme. First Plan 1955-1960.*

Kruijer, G. and A. Nuis. *Sociological Report on the Christiana Area.* Ministry of Agriculture and Lands, Kingston, Jamaica, 1956.

Locher, Uli. "Marketing of Agricultural Produce in Jamaica". IICA, Kingston, Jamaica, 1977. (Mimeographed)

McFarlane, Rosley *et al.* *Agricultural Planning in Jamaica.* Divison of Economics and Statistics, Ministry of Agriculture and Lands, Jamaica, March 28, 1968.

Miller, Percy. "A Look at the Use of Organic Fertilizer in Jamaican Agriculture". The Jamaica School of Agriculture Supplement 1910-1980 in *The Daily Gleaner*, Saturday, August 2, 1980.

Ministry of Agriculture. *Annual Reports*. Kingston, Jamaica.

Ministry of Agriculture. *National Production/Extension Report 1977-78*. Kingston, Jamaica, 1978. (Mimeographed)

Moyne Commission. *The West India Royal Commission Report*. London: His Majesty's Stationary Office, 1939.

National Planning Agency. *Economic and Social Survey 1973, 1977*. Kingston, Jamaica.

Peck, Austin. *Economic Planning in Jamaica: A Critique*. Social and Economic Studies, Kingston, Jamaica, 1958.

Smikle, C. and H. Taylor. "Higgler Survey:. Agricultural Planning Unit, Ministry of Agriculture, Kingston, Jamaica, 1977. (Mimeographed)

Sugar Cane: Varieties for Planting in 1980 and after (Sugar Industry Research Institute, Jamaica), Vol. 11, No. 1, May 1980.

The West India Royal Commission Report. London: His Majesty's Stationary Office, 1898.

USAID. "Assessment of Jamaica's Agricultural Sector". Kingston, Jamaica 1975.

Jamaica/USAID. "The Small Farmer in the Jamaican Agriculture: An Assessment of Constraints and Opportunities". Ministry of Agriculture, Kingston, 1978.