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**THE SMALL FARMER IN JAMAICAN AGRICULTURE:
AN ASSESSMENT OF CONSTRAINTS AND OPPORTUNITIES**

**Report of the Agriculture Sector Assessment team of
the Office of International Cooperation and Development
U.S. Department of Agriculture to
USAID / JAMAICA
and to the Ministry of Agriculture, Jamaica**

Kingston - November 1978

The Small Farmer in Jamaican Agriculture

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Introduction

Our main concern in this assessment of the agricultural sector is the small farmer: the conditions under which he is operating, the role he is playing--and might play--in the continuing transition from a traditional to a more modern agriculture, and his present and future welfare. The small farmer is viewed, however, against the background of the agricultural sector as a whole. In switching the spotlight from one to the other, matters implicit in this relationship have been brought to the surface for review and examination. One result of this process has been the confirmation (to some) and the discovery (to others) that the rhetoric on behalf of the small farmer, for the past couple of decades, has been greater than the value received. What the small farmer has obtained is a small, and in certain instances a declining, share of the technical and financial assistance intended for this sector. It should be added--to the disadvantage and detriment of both.

Although successive Governments have shown a continuing interest in the welfare of the small farmer in the postwar period, it cannot be said that a consensus ever emerged with respect to his potential to contribute to his own welfare and to the Nation's goals in this sector. The present study is an effort to bring together the relevant data on this subject, to up-date 'old' data where possible, to identify the key constraints to the improvement of his condition, and to offer some suggestions for their neutralization. It is hoped that the study will serve as a basis for action in specific areas.

The assessment is divided into two parts. Part I (Volume I) is an island-wide view of the small farmer. It deals with the characteristics

of the small farmer and the conditions under which he is operating. It examines the constraints which press upon him at various levels: economic, social, administrative and cultural. Part I also provides the background and standard of comparison for the appraisal of the assets and liabilities of the Target Area. The performance of the agricultural sector and its contribution to national production goals and targets are examined in Chapter 1. The physical environment (topography, soils, climate, and water) is described in Chapter 2. In Chapter 3, the characteristics of the Jamaican small farmer are reviewed--how his means of production have remained traditional even as the economy moved forward during the 50s and 60s; and how, despite it all, he remains the chief producer of domestic food crops and of a substantial part of the export crops. By using unpublished census data on the constituency (a smaller unit than the parish), small farmers numbers and location were delimited more precisely. The resources and operation of the typical small farm, including inputs and implements, are examined in Chapter 4. The extent to which the small farmer has access to rural infrastructure is examined in Chapter 5. Chapters 6 and 7 are devoted to agricultural support activities, commercial and non-commercial, respectively. Demographic, social, and attitudinal aspects, including a profile of the small farm family, are considered in Chapter 8. In Chapter 9, the question of the number and spacing of market towns is examined, including the place of these in the rural development/urban hierarchy, and regional development. Finally, in Chapter 10, the constraints named and analyzed in the preceding chapters are summarized, and a strategy is suggested for reducing or neutralizing their impact.

Part II (Volume II) deals with the small farmer in the Portland Region (West Portland and Eastern St. Mary parishes). The project area consists essentially of the constituency of Western Portland plus that portion of the constituency of Eastern Portland that includes Port Antonio, and that part of Eastern St. Mary parish contained within the Portland Region (defined by the Town and Country Planning Department). A special effort was made to look into the specific problems of the farms and farming communities along the valleys of the Rio Grande River, Swift River, Spanish River, and Buff Bay River, and into the potential for future development food crops, export crops, agro-industry, market towns and regional centers. A number of indicators (income, acreage, volume of production, yields, population growth and migration, etc.) show that this part of the North Coast has seen its development needs postponed, particularly as they apply to the small farmer. The analysis makes use of the methodological consideration that, whatever the problems of the small farmer on an island-wide basis, they combine in a very specific proportion in a particular area. Projects are proposed for the elimination or neutralization of these constraints. The inter-sectoral nature of these projects provides the basis of an integrated rural development program in the Target Area.

Such a program would not only fill a deeply felt need in the region, but, it is believed, would have some degree of replicability in other parts of the country.

Participants of the Agricultural Sector Assessment team were: Dr. Harold Brodsky, Dr. Joan Campbell, Dr. Frank Erickson, Mr. Francis Kutish, Mr. Ray Williams, Dr. Orlin Scoville, and Mr. David Sarfaty, Team Leader.

For further details with respect to any of the chapters in this report, reference may be made to the individual studies made by members of the Agricultural Sector Assessment team.

Brodsky, Harold. Regionalism and Rural Development.

Campbell, Joan. Demographic, Social and Attitudinal Aspects in the Rural Sector of Jamaica and Constraints to Agricultural Development in Jamaica and Suggested Strategies to Overcome Some of Them.

Erickson, Frank. Location of the Rural Majority, Physical Resources and Infrastructure and Portland Parish: Location of the Small Farmer, Physical Environment and Developmental Infrastructure.

Kutish, Francis. Assessment of Agricultural Marketing in Jamaica with Special Reference to Small Farmers in Portland Parish.

Scoville, Orlin J. The Rural Poor in Jamaican Agriculture, Farm Resources and Resource Potentials on Small Farms in the Target Area (Central and West Portland and Eastern St. Mary), Production Constraints on Small Farms and Production Potentials, Institutional Constraints of Development to Small Farms in Jamaica, Strategy and Projects for Development in Target Areas, and Small Farm Development in Jamaica: A Summary.

Williams, Ray. Agro-Industry Report.

1.1.1 Agricultural Production

The sector Agriculture, Fishing and Forestry has averaged 8.4 percent of the Gross Domestic Product over the past decade. It has ranged from a low of 7.2 percent in 1974 to a high of 9.2 percent in 1971. In 1977, it was 8.8 percent.

Worthy of note is the increasing share of domestic agriculture and the declining share of export agriculture. The value of domestic agriculture rose from \$43.6 million in 1969 to \$81.4 million in 1977 for an average annual increase of 8.1 percent. In contrast, the value of export agriculture was lower in 1977 than it was in 1969: \$29.5 million vs. \$34.4 million. The value of livestock production has barely held its own in this period. Production was valued at \$42.8 million in 1976 and \$41.2 million in 1969 with relatively little change in between. However, it rose to \$46.4 million in 1977.

Domestic agriculture increased its share of the Gross Domestic Product from 2.43 percent in 1969 to 4.05 percent in 1977, while that of export agriculture declined from 2.19 percent to 1.46 percent in the same period. (Table 1-1)

Seen on a per capita basis, the trend during the past eight years shows that Gross Domestic Product was J\$959 in 1977. It reached a peak of \$1,145 in 1973 and has suffered a steady decline since that year. Agriculture, Forestry and Fishing have declined since 1972, but to a lesser extent. And so has export agriculture where the decline has been most severe, by one-third, between 1970 and 1977. Domestic agriculture declined moderately between 1971 and 1976 and recovered sharply in 1977. (Table 1-2)

Table 1-1. Agriculture, Forestry and Fishing in Relation to Gross Domestic Product 1969-1977 at Constant Prices.

Year	Agriculture, Forestry and Fishing						Gross Domestic Product	Percent of Gross Domestic Product		
	Total	Export Agriculture	Domestic Agriculture	Livestock and Hunting	Fishing	Forestry and Logging		Total Agriculture Forestry & Fishing	Export Agriculture	Domestic Agriculture
(\$ Millions, Constant Prices 1974)										
1969	141.4	39.4	43.6	41.2	13.9	3.3	1792.0	8.9	2.19	2.43
1970	149.8	39.6	50.0	42.3	14.4	3.5	2019.5	8.0	1.96	2.47
1971	167.5	40.3	70.2	36.2	17.1	3.7	2068.9	9.2	1.95	3.39
1972	170.6	40.5	71.5	36.6	17.9	4.2	2260.4	9.0	1.79	3.16
1973	159.4	33.1	66.0	38.9	17.1	4.3	2258.9	8.9	1.46	2.92
1974	162.6	36.5	70.1	37.2	16.1	2.7	2265.4	7.2	1.61	3.09
1975	164.9	32.4	72.3	41.2	16.1	2.8	2243.7	7.3	1.44	3.22
1976	166.3	35.9	68.6	42.8	16.1	2.8	2094.2	7.9	1.71	3.27
1977	176.6	29.5	81.4	46.4	16.1	3.2	2011.1	8.8	1.46	4.05

SOURCE: Department of Statistics

Table 1-2. Jamaica: Gross Domestic Product and Agricultural Production Per Capita, 1970 to 1977.

Year	Population (Mean)	Gross Domestic Product (1974 prices, \$J Million)	Per Capita (\$J)				Gross Domestic Product
			Agriculture, Forestry, and Fishing	Domestic Agriculture	Export Agriculture	Livestock	
1970	1,869,100	2019.5	80	27	21	23	1080
1971	1,901,100	2068.9	88	37	21	19	1088
1972	1,932,400	2264.4	88	37	21	19	1171
1973	1,972,000	2258.9	81	34	17	20	1145
1974	2,008,000	2265.4	81	35	18	19	1128
1975	2,042,700	2243.7	81	35	16	20	1098
1976	2,072,300	2094.2	80	33	17	21	1010
1977	2,096,800	2011.1	84	39	14	22	959

SOURCE: Demographic Statistics 1977, National Income and Product Account 1977.

1.2 Agricultural Employment

Of total employment of 699,200 in October, 1977, that in agriculture, forestry and fishing was 248,300 or 35.5 percent of the total. It represented the largest component in the employment category. It was followed by Public Administration with 111,800; Other Services with 98,500; and Commerce with 90,100. (Table 1-3)

Table 1-3. Employed Labor Force by Industry Group, 1977.

Group	April	October
Agriculture, Forestry and Fishing	239,600	248,300
Mining, Quarrying, and Refining	7,200	7,500
Manufacture	77,600	74,900
Construction and Installation	33,700	32,200
Transport, Communications, and Public Utilities	27,700	31,400
Commerce	86,600	90,100
Public Administration	110,800	111,800
Other Services	93,500	98,500
Industry, Not Specified	3,600	4,500
TOTAL	680,300	699,200

SOURCE: The Labour Force 1977.

The number of persons employed in the sector of agriculture, forestry and fishing has been increasing, but at a rate less than that of the total employed. Although employment rose from 202,500 in 1968 in this sector to 243,950 in 1977, its share of total employment fell from 37.9 percent to 35.4 percent. It had fallen to 32.0 percent in 1973 and has since recovered. (Table 1-4)

Table 1-4. Agricultural Employment in Relation to Total Employment, 1968-1977.

Year	Agriculture, Forestry and Fishing	Total Employed	Agriculture, Forestry and Fishing as Percent of Total Employed
1968	202,500	582,250	37.9
1969	236,900	617,350	38.4
1972	204,350	611,300	33.4
1973	202,000	629,550	32.0
1974	225,200	645,000	34.9
1975	226,850	682,250	33.2
1976	243,900	685,850	35.5
1977	243,950	689,750	35.4

SOURCE: Computed from various issues of The Labour Force.

1.3 Agricultural Exports and Imports

Agricultural exports in the form of primary products show a declining trend during the past eight years in relation to total (domestic) exports. This may be seen in Table 1-5 where agricultural exports declined from 20.1 percent in 1970 to 17.2 percent in 1974. The sharp recovery shown in 1975 was due, of course, to the unprecedented rise in the price of sugar. Following its decline in 1976, the overall share of agricultural exports resumed its downward trend. At 16.3 percent, its share was the lowest in the last decade.

Table 1-5. Jamaica: Agricultural Exports in Relation to Total (Domestic) Exports, 1970-1977.

Year	Total Exports	Domestic Exports	Re-Exports	Agric- cultural	Agricultural Percent Domestic Exports
		(\$J Million)			
1970	284.8	279.1	5.7	56.2	20.1
1971	282.7	275.2	7.5	52.5	19.1
1972	300.1	292.3	7.9	56.0	19.2
1973	354.6	347.8	6.8	70.3	20.2
1974	642.1	630.8	11.3	108.8	17.2
1975	774.1	760.9	13.3	173.6	22.8
1976	575.0	560.9	14.1	88.4	15.7
1977*	707.3	693.4	13.9	112.8	16.3
1977**	666.9	655.3	11.6	112.8	17.2

*Mixed rate.

**Basic rate.

NOTE: Agricultural exports consist of the following primary products: citrus, banana, coffee not roasted, cocoa beans, pimento, ginger, sugar unrefined, molasses in bulk, and other.

SOURCE: Economic and Social Survey, various issues.

Imports of food take the form of primary products and processed materials. Despite changes in the relative position of individual products, food imports as a group have maintained their share of total merchandise imports. For the seven-year period 1970 through 1976, they averaged 12.3 percent. In 1975, they reached a high of 14.5 percent, and in 1976 a low of 9.6 percent. The foreign exchange crisis of 1976 led to special measures to reduce imports to the maximum extent. (Table 1-6)

The makeup of food imports may be seen in more detail in Table 1-7. Cereals, rice in particular, were at the top of the list among the food imports in the period 1970 through 1975. In 1974 and 1975, imports of cereals represented 37.9 percent and 35.1 percent, respectively of total food imports. In the year 1976, meat and meat preparations rose to first place with 33.1 percent. Dairy products and fish and fish preparations join cereals and meat and meat preparations as the main food imports.

Table 1-6. Jamaica: Food Imports in Relation to Merchandise Imports, 1970-1977.

Year	Merchandise Imports (C.I.F.)	Food Imports	Food Imports Percent of Merchandise Imports
	(J\$ Million)		
1970	437.8	53.8	12.3
1971	459.8	60.2	13.1
1972	489.3	71.3	14.5
1973	615.1	76.4	12.4
1974	850.8	111.2	13.1
1975	1021.4	118.1	11.6
1976	829.8	79.8	9.6
1977*	781.6		
1977**	679.0		

*Mixed rate

**Basic rate

SOURCE: External Trade, Economic and Social Survey, various issues.

Table 1-7. Jamaica: Food Imports 1970-1976.

Category	1970	1971	1972	1973	1974	1975	1976
	(\$J Million)						
Meat & Meat Preparations	11.9	12.9	16.3	16.7	19.8	25.9	26.4
Dairy Products	6.6	9.6	9.4	9.8	20.7	15.9	12.7
Fish & Fish Preparations	8.6	9.5	12.1	10.3	13.0	19.4	15.1
Cereals	14.2	14.9	16.8	22.6	42.1	41.4	16.6
Fruits & Vegetables	4.6	4.5	6.3	6.1	7.3	6.1	3.4
Sugar & Sugar Preparations	2.4	1.4	2.2	1.1	1.0	1.3	0.6
Coffee, Tea, Cocoa, Spices	1.2	1.9	1.9	0.9	1.3	1.0	0.7
Beverages	3.4	4.7	5.3	5.2	2.6	2.3	1.3
Other	0.9	1.1	1.0	3.7	3.4	4.8	3.0
TOTAL FOOD IMPORTS	53.8	60.2	71.3	76.4	111.2	118.1	79.8
	(Percentages)						
Meat & Meat Preparations	22.1	21.4	22.8	21.8	17.8	21.9	33.1
Dairy Products	12.3	15.9	13.2	12.8	18.6	13.5	15.9
Fish & Fish Preparations	16.0	15.7	17.0	13.4	11.7	16.4	18.9
Cereals	26.4	24.7	23.5	29.7	37.9	35.1	20.7
Fruits & Vegetables	8.6	7.4	8.8	8.1	6.6	5.5	4.3
Sugar & Sugar Preparations	4.5	2.2	3.1	1.4	0.9	1.1	0.8
Coffee, Tea, Cocoa, Spices	2.2	3.1	2.7	1.2	1.2	0.7	0.9
Beverages	6.3	7.8	7.4	6.8	2.3	1.8	1.6
Other	1.6	1.8	1.5	4.8	3.0	4.0	3.8
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE: Economic and Social Survey, various issues.

Agricultural raw materials represent a relatively small part of total merchandise imports, even though their share rose from 4.8 percent in 1970 to 8.0 percent in 1974. The decline to 6.4 percent in 1975 was more like the relative share of this group in the early 70s. The rise to 10.6 percent in 1976 was due more to the absolute decline in the value of merchandise imports than to the rise in the imports of food, tobacco and animal feed. (Table 1-8)

Table 1-8. Agricultural Raw Material Imports in Relation to Total Merchandise Imports 1970-1977.

Year	Food and Tobacco	Animal Feed	Agricultural Raw Material Imports	Total Merchandise Imports	Percent Agricultural Raw Materials of Merchandise Imports
(\$J Million)					
1970	16.9	3.9	20.8	437.8	4.8
1971	20.0	3.5	23.5	459.8	5.1
1972	23.1	3.8	26.9	489.3	5.5
1973	33.7	5.6	39.3	615.1	6.4
1974	64.1	3.9	68.0	850.8	8.0
1975	62.8	2.8	65.6	1021.4	6.4
1976	84.9	2.9	87.8	829.8	10.6
1977				781.6*	

* Mixed Rate

SOURCE: Economic and Social Surveys

1.4 Balance of Payments

Not at all unusual for the open economy of a developing country, Jamaica's current balance has fairly consistently been in deficit with respect to merchandise and services. These have generally been covered by capital movements, mainly private, which have ranged from \$100 million to over \$200 million annually during the past decade. In the year 1975, the deficit on current account rose sharply to \$257 million, but it was covered by capital movements in the amount of \$189.9 million. In the crisis year of 1976, however, the deficit on current account rose further to \$275.2 million, while net capital movements dropped sharply to \$49.3 million. The balance of payments deficit reached the unprecedented figure of \$238.1 million in that year, exceeding the highest deficit of any earlier year by more than three times; and foreign exchange reserves were exhausted. (Tables 1-9 and 1-10)

A number of factors contributed to this situation. Jamaica's proclivity to deficit in her current account balance was sorely tried by the petroleum crisis of 1973 and its after-effects in subsequent years. For not only did the four-fold increase in the price of oil directly add to Jamaica's deficit on the merchandise account, but it also contributed indirectly by reducing her sales of bauxite and alumina to the United States which had fallen into recession in 1974 and 1975. (The sharp rise in the international price for sugar provided some respite in that year, but this declined in the year 1976.) Tales of violence and of changing political orientation contributed to an already uncertain climate, and the customary 'safety belt' of inward capital movements vanished--indeed they were negative in the amount of \$49.3 million in

Table 1-9. Jamaica's Balance of Payments: Current Account Balance and Financing of Current Account Deficit.
1969-1977

Year	Current Account Balance				Financing of Current Account Deficit			
	Merchandise	Services	Transfer Payments	Total	Net Capital Movements	Allocation of SDR's	Net Errors & Omissions	Total Current and Capital Transactions
1969	- 74.4	- 40.5	11.9	-103.0	107.7	-	-6.8	-2.1
1970	- 89.2	- 56.2	18.2	-127.2	134.1	5.3	5.4	2.5
1971	-108.2	- 51.4	17.3	-142.3	160.2	4.7	13.8	36.4
1972	-121.0	- 59.0	22.4	-157.6	117.0	4.7	7.7	-43.6
1973	-161.2	- 85.4	23.5	-223.1	196.8	-	-	-26.3
1974	-106.9	- 79.5	21.3	-151.8	221.1	-	-15.2	54.1
1975	-144.8	-136.0	23.8	-257.0	189.9*	-	-6.5	-73.6
1976	-119.9	-175.5	36.2	-275.2	43.9*	-	-6.8	-238.1
1977	142.3	-134.3	18.9	26.9	-41.5*	-	-	-14.5
*Net capital movements were comprised of:						1975	1976	1977
							(\$J Millions)	
						195.0	93.2	6.2
						-5.1	-49.3	-47.7

SOURCE: National Planning Agency.

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Table 1-10. Jamaica: Net Foreign Exchange Reserves and Other Assets.

<u>Year</u>	<u>Foreign Exchange Reserves and Other Assets (as of December 31)</u>
	J\$ Million
1969	105.0
1970	125.3
1971	143.0
1972	115.8
1973	130.2
1974	56.7
1975	- 73.5
1976	-183.8
1977	-240.5

SOURCE: Economic and Social Surveys

1976 and \$47.7 million in 1977. Efforts on the part of the Government to cope with this complex situation, such as the monitoring of imports of merchandise and services and the promotion of exports, aimed at the defense of its foreign exchange reserves, succeeded up to the point where capital movements fell away.

Fuel jumped from 10.8 percent of the value of merchandise imports in 1973 to 20.8 percent in 1974 following the price rise. The share of fuel has continued to rise, reaching 22 percent in 1976. Indicative of Jamaica's vulnerability on imports for the functioning of her economy is the fact that total raw materials constitute more than 50 percent of total imports in 1976. (Table 1-11)

Table 1-11. Jamaica: Imports by Economic Function or End Use, 1968-1977.

<u>Category</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>
	(J\$ Million)									
<u>Consumer Goods</u>	99.9	118.1	131.2	138.9	165.4	171.0	182.3	212.6	149.5	
Food	43.3	45.9	53.8	60.2	71.3	84.0	111.2	118.1	80.0	
Other Non-Durables	29.5	37.5	39.4	35.0	43.3	50.3	33.0	43.8	32.5	
Durables	27.1	34.7	38.0	43.7	50.8	36.7	38.1	50.7	37.0	
<u>Raw Materials</u>	111.4	119.1	139.8	159.6	179.0	245.1	439.4	494.3	467.6	
Fuel	22.8	25.2	27.9	43.4	44.0	65.4	177.4	195.5	185.0	
Other	88.6	93.9	111.9	116.5	134.6	179.7	262.0	298.8	282.8	
<u>Capital Goods</u>	108.7	125.4	163.5	159.6	148.2	186.5	229.1	314.5	212.7	
Construction	22.0	22.1	31.2	37.6	35.4	52.8	88.9	89.2	65.2	
Transport	14.4	33.1	20.3	28.2	28.1	32.7	34.2	78.7	24.2	
Other Machinery	72.3	70.1	111.2	93.9	84.7	101.0	98.3	137.3	108.9	
Other Capital Goods	0.6	0.7	3.3	1.3	0.6	1.5	7.7	9.3	14.3	
TOTAL	320.4	363.3	437.8	459.7	493.2	604.1	850.8	1021.4	829.8	
	(Percentages)									
<u>Consumer Goods</u>	31.2	32.5	30.0	30.2	33.5	28.3	22.0	21.0	18.0	
Food	13.5	12.6	12.3	13.1	14.4	13.9	13.0	13.0	10.0	
Other Non-Durables	9.2	10.3	9.0	7.6	8.8	8.3	4.0	4.0	4.0	
Durables	8.5	9.6	8.7	9.5	10.3	6.1	5.0	5.0	4.0	
<u>Raw Materials</u>	34.8	32.8	31.9	34.8	36.3	40.6	51.0	48.0	56.0	
Fuel	7.1	6.9	6.4	9.5	9.0	10.8	20.0	19.0	22.0	
Other	27.7	25.9	25.5	25.3	27.3	29.8	31.0	29.0	34.0	
<u>Capital Goods</u>	33.9	34.5	37.3	34.7	30.1	30.8	27.0	31.0	26.0	
Construction	6.9	6.1	7.1	8.2	7.2	8.7	11.0	9.0	8.0	
Transport	4.5	9.1	4.6	6.1	5.7	5.4	4.0	8.0	3.0	
Other Machinery	22.6	19.3	25.4	20.4	17.2	16.7	12.0	13.0	13.0	
Other Capital Goods	0.2	0.2	0.8	0.3	0.1	0.3	-	-	2.0	
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

SOURCE: National Planning Agency

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1.5 Structure of Agricultural Production

The production of domestic food crops rose significantly in the year 1977 to a level of 109.7 or 11.8 percent over that of 1976 (1972 = 100). It is the first year that the volume of production exceeded the previous high of the year 1972. Two factors which undoubtedly played a part in this positive response on the part of the small farmers are the stimulation of higher prices and the special efforts at promotion on the part of the Ministry of Agriculture. Farmgate prices of domestic food crops rose again in 1977 continuing the trend since the beginning of the decade. Prices in 1977 were two-and-a-half times the 1970 level. (Table 1-12)

Table 1-12. Changes in the Annual Indices of Domestic Food Crops.

	(1972 = 100)	
<u>Year</u>	<u>Quantity Index</u>	<u>Price Index</u>
1970	67.2	79.2
1971	91.2	98.1
1972	100.0	100.0
1973	91.7	136.6
1974	98.2	181.3
1975	99.1	228.6
1976	98.1	247.8
1977	109.7	335.2

SOURCE: Ministry of Agriculture.

Farmers evidently responded by increasing the acreage under cultivation. Acreage reaped rose from a total of 115,450 in 1976 to 129,450 in 1977, for an increase of 12.1 percent. Acreage reaped, like the volume of production, had reached a high point in the year 1972, before declining during the next two years. Acreage (and production) rose again in 1975

Table 1-13. Jamaica: Production and Acreage Reaped of Domestic Food Crops by Major Groups, 1965-1977.

Year	Legumes	Vegetables	Condiments	Fruit	Cereals	Plantain	Potatoes	Yams	Other Tubers	Sorrel & Other	Total
					(Short Tons)						
1965	1,485	25,333	2,688	1,820	3,500	3,900	26,871	50,554	23,632	-	190,337
1966	4,700	41,421	1,545	1,700	5,500	5,702	37,458	69,982	31,597	-	199,605
1967	6,466	42,374	1,654	2,422	4,092	10,102	26,876	82,211	30,312	-	206,509
1968	6,894	37,885	1,214	3,087	3,504	9,844	21,787	73,090	20,742	-	178,047
1969	5,797	34,359	1,367	5,047	4,297	10,916	26,499	68,956	25,001	-	182,239
1970	5,964	48,841	2,028	9,584	4,879	13,129	23,280	89,095	44,847	-	241,647
1971	7,094	68,110	3,353	11,047	5,758	25,825	36,146	135,435	48,860	-	341,583
1972	8,294	67,212	3,664	11,383	4,826	29,168	39,770	140,533	56,200	200	361,250
1973	5,965	62,601	3,734	10,531	4,308	28,028	27,631	130,717	45,344	737	319,596
1974	6,497	67,598	5,016	9,153	10,885	25,718	47,370	142,161	46,852	1,027	362,277
1975	6,892	70,431	6,037	9,514	12,329	19,570	31,538	144,579	55,359	657	356,906
1976	5,170	86,190	7,690	10,380	12,280	16,725	26,445	133,800	56,245	575	355,500
1977	8,104	105,259	9,896	20,560	16,335	24,368	39,542	151,522	75,128	902	451,536
					(Acres)						
1965	6,836	6,814	2,818	379	7,992	901	7,760	9,689	6,834	-	50,023
1966	12,394	11,147	1,774	521	12,562	1,027	10,859	12,013	9,170	-	71,467
1967	20,539	12,026	648	676	7,720	2,594	6,488	16,979	7,071	-	74,741
1968	16,505	12,336	663	882	8,909	2,625	7,260	15,049	5,990	-	70,219
1969	19,490	11,070	1,001	1,087	8,020	2,357	6,726	13,745	7,543	-	71,039
1970	17,871	14,890	1,520	2,057	8,068	3,053	6,422	17,589	11,599	-	83,069
1971	21,786	19,511	2,389	2,680	9,989	5,632	9,368	26,164	12,227	-	109,746
1972	25,067	19,541	2,661	2,453	9,800	6,490	10,646	28,138	13,682	n.a.	118,788
1973	19,390	18,250	2,470	2,370	8,500	5,490	8,440	27,140	11,570	540	104,200
1974	18,200	18,660	2,929	1,980	15,310	4,890	9,570	26,290	11,770	n.a.	109,590
1975	20,578	20,060	3,407	2,182	16,773	5,129	9,644	28,698	13,307	644	120,422
1976	18,184	22,947	3,901	2,169	15,050	4,265	7,390	27,379	13,160	558	115,003
1977	22,329	24,226	4,531	2,893	16,523	5,181	8,759	28,336	15,718	954	129,450

SOURCE: Ministry of Agriculture.

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Table 1-14. Jamaica: Volume and Value of Production of Domestic Food Crops by Major Categories, 1973 to 1977.

Crop	1973			1974			1975			1976			1977		
	Production	Value of Production		Production	Value of Production		Production	Value of Production		Production	Value of Production		Production	Value of Production	
		\$	%		\$	%		\$	%		\$	%		\$	%
							(Short tons and \$'000)								
Legumes	4,773	4,282	8.1	6,497	5,915	7.1	6,892	5,838	5.9	5,170	5,552	4.7	8,103	17,645	8.7
Vegetables	62,601	12,366	23.4	67,607	17,449	20.8	69,913	24,605	24.8	85,710	36,262	30.5	105,119	54,107	26.7
Condiments	3,734	1,572	3.2	5,016	2,600	3.1	6,037	3,917	3.9	7,690	6,360	5.4	9,896	16,545	8.2
Fruits	10,531	1,353	2.6	9,153	1,490	1.8	9,514	1,901	1.9	10,390	2,647	2.2	20,560	4,707	2.3
Cereals	4,308	429	0.8	10,535	1,301	1.6	12,357	1,479	1.5	12,280	1,473	1.2	16,395	4,138	2.0
Plantains	28,028	2,802	5.3	25,718	3,962	4.7	19,576	3,400	3.4	16,725	2,838	2.4	24,368	6,335	3.1
Potatoes	27,631	4,656	8.8	47,370	6,430	7.7	31,538	4,744	4.8	26,445	10,194	8.6	39,542	16,043	7.9
Yams	130,711	20,218	38.3	132,025	36,997	44.2	144,579	42,479	42.7	131,270	41,270	34.8	151,532	61,780	30.5
Other Tubers	44,944	4,836	9.2	46,852	7,450	8.9	55,359	10,874	10.9	56,245	11,754	9.9	75,128	20,633	10.3
Miscellaneous	737	176	0.3	1,027	115	0.1	1,175	134	0.1	1,055	326	0.2	853	648	0.3
Total	317,998	52,795	100.0	352,150	83,715	100.0	356,940	99,383	100.0	353,500	118,679	100.0	451,446	202,592	100.0

SOURCE: Ministry of Agriculture

before sliding off in 1976. That an increase in the volume of production requires an increase in acreage is plausible in the light of the level of technology. The use of fertilizer was minimal in these years. (Table 1-13)

The makeup, in terms of major groups, of domestic food crops may be seen in Table 1-14. Yams are at the top of the list in terms of the value of production accounting for \$61.8 million in 1977 or 30.5 percent of the total. Second on the list is vegetables with a value of \$54.1 million or 26.7 percent of the total. Other tubers are third with a value of \$20.6 million or 10.3 percent of the total. Yams have held fairly steady in terms of acreage and the volume of production during the past seven years (except for the increases in 1977), and as a result, have lost place in terms of share of value of production. The value of yam production had reached 44.2 percent of total domestic food production; in 1977 it had slid to 30.5 percent.

On the other hand, vegetables have shown significant increases in acreage, and in the volume and value of production over the past decade and a half. Acreage reaped increased from 6,814 in 1965 to 24,226 in 1977 (second only to yams). The volume of production rose from 25,333 tons in 1965 to 105,259 in 1977 for an overall increase of 315.5 percent. (This was exceeded by legumes, condiments, fruit, cereals and plantains which started from a much lower base.) Value of production rose from \$12.4 million in 1973 to \$54.1 million in 1977, the relative shares being 23.4 percent and 26.7 percent, respectively. (Table 1-14) See also Figures 1 through 4 for the trends in acreage reaped and production of domestic food crops by major groups.

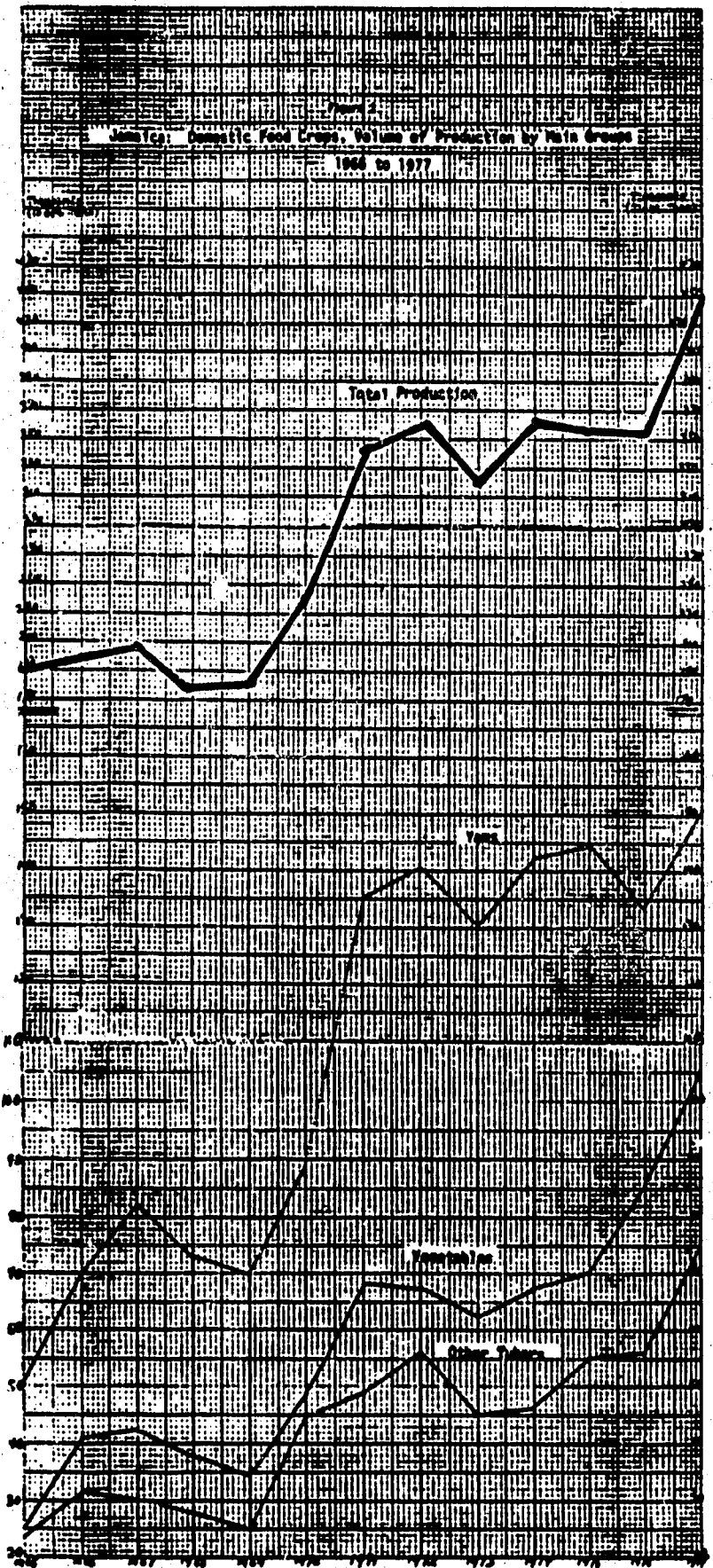
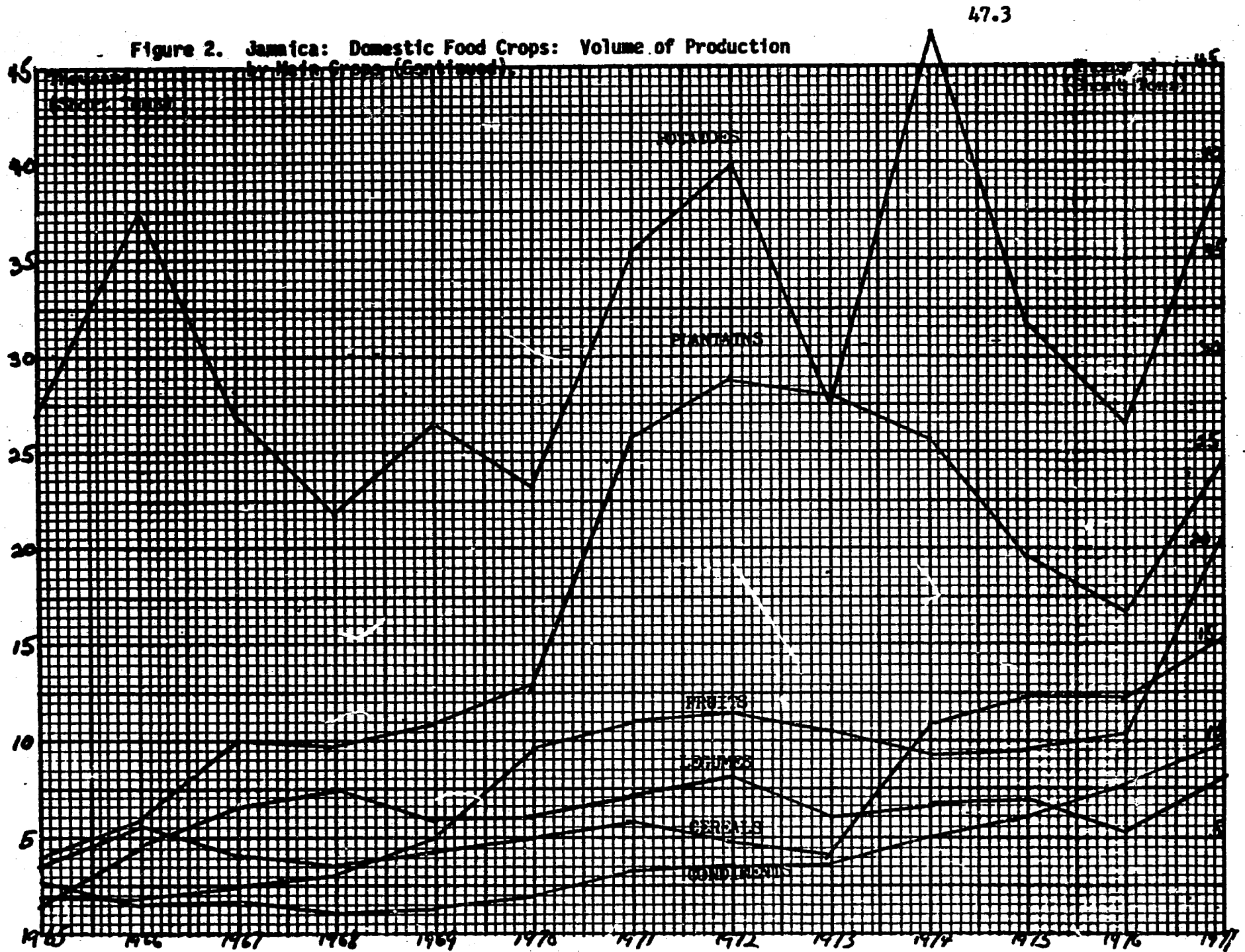


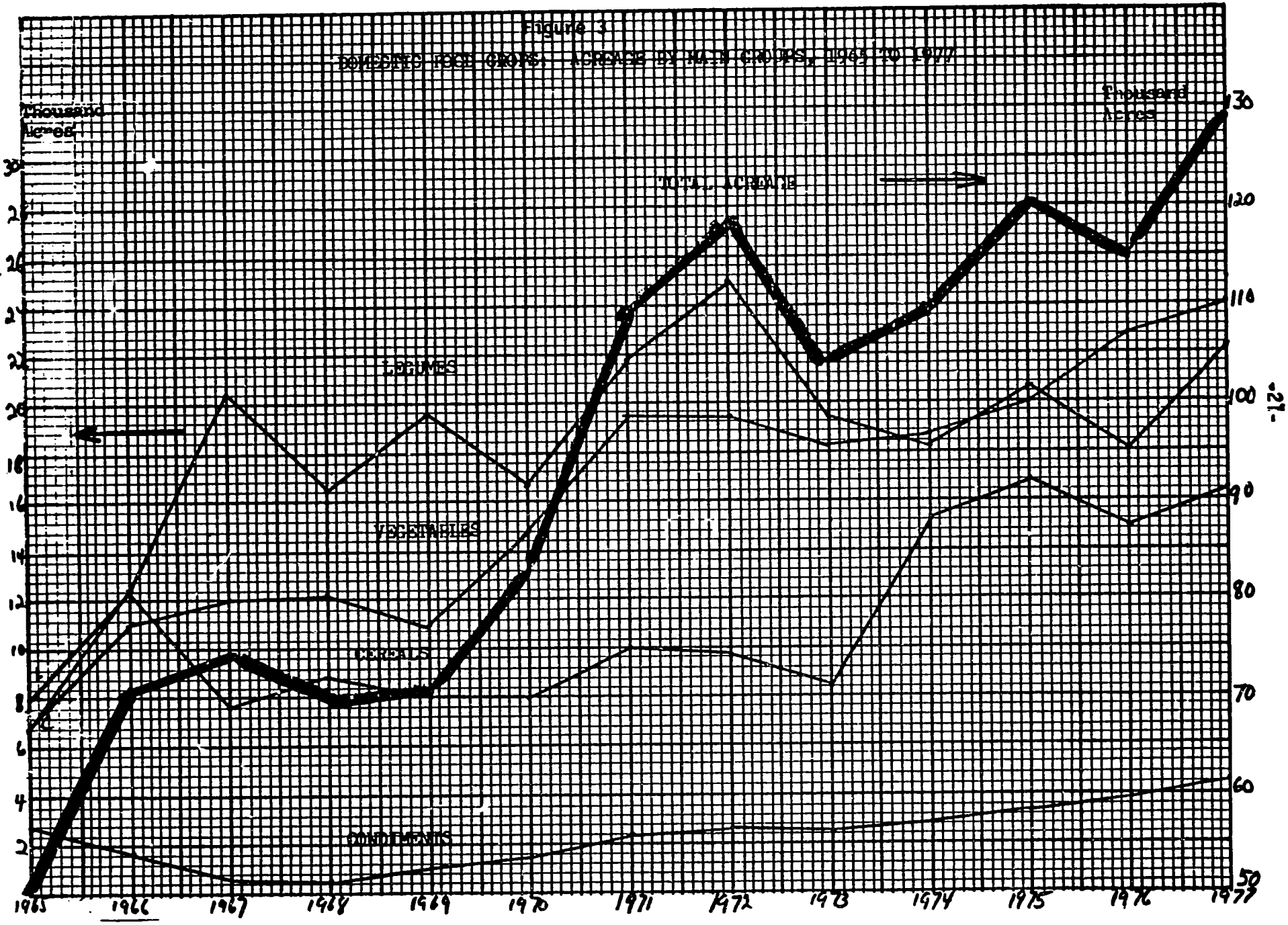
Figure 2. Jamaica: Domestic Food Crops: Volume of Production
by Main Crops (Continued).

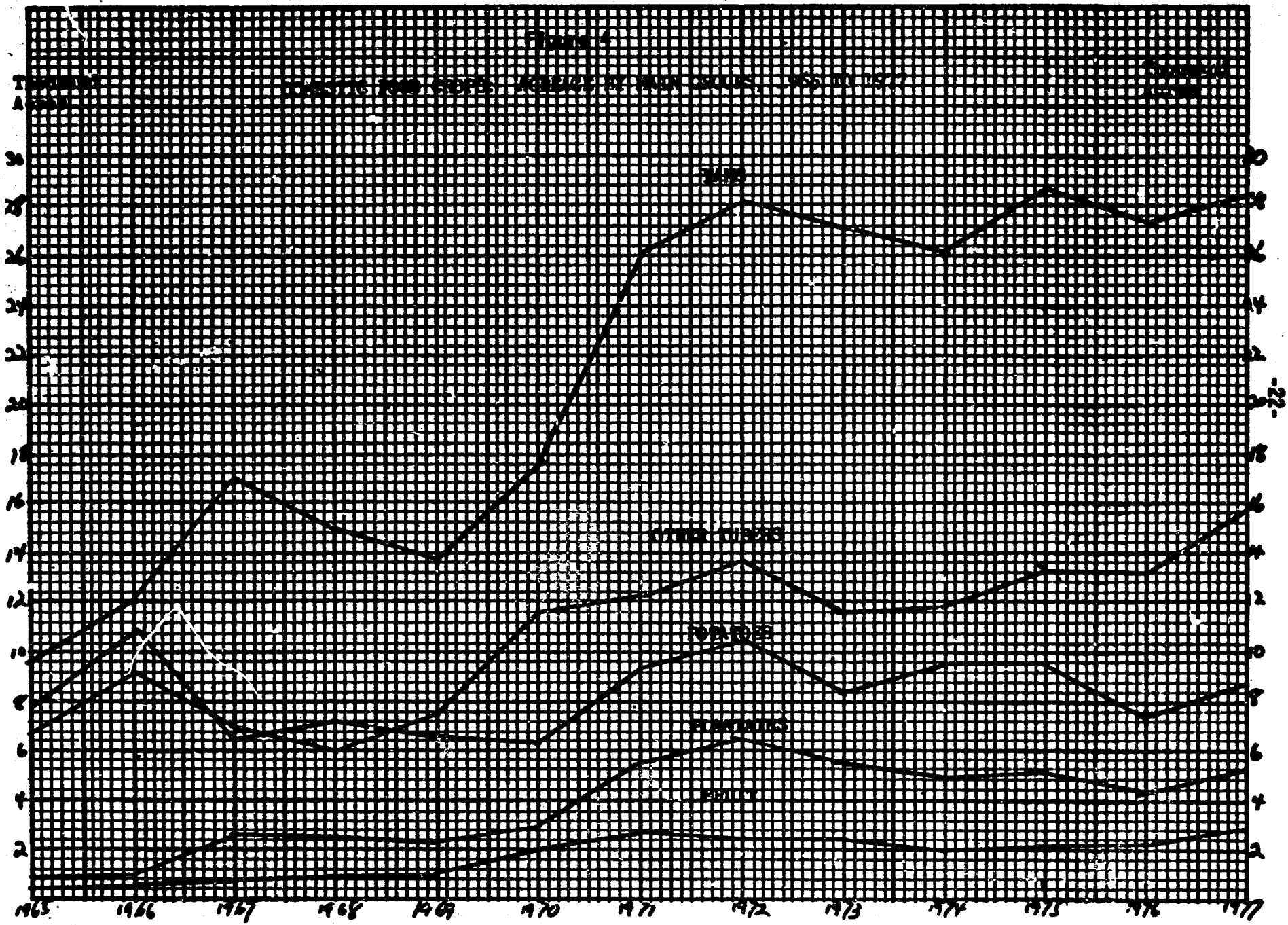


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Figure 3

DOMESTIC FOOD CROPS: ACREAGE BY MAIN CROPS, 1965 TO 1977





1.6 Prices and Price Policy

During the period 1972 through 1976, the small farmer was subject to contrary signals--to sharply rising farmgate prices on the one hand, and on the other, to "stagflation"--to an economy in recession accompanied by swiftly rising consumer prices. The result of the race between these two sets of prices may be seen in Table 1-15. The year 1975 serves as a benchmark, since farmgate prices trebled (from 34.6 to 100.0) in this period, while consumer prices doubled (from 54.7 to 106.0) in the same period. Since 1975, however, the picture seems to have changed the rise in consumer prices has run ahead of farmgate prices, but not by much.

The small farmer's response to this situation seems to have been, understandably, a cautious one of maintaining his acreage until the situation became clearer. During the four-year period, 1973-1976, there were three years when acreage reaped was below that of 1972 (then the peak year), and one year when it barely exceeded it. The average increase in acreage for the four-year period was only slightly over that of 1972. Even if he were prone to increase production by increasing his yields, he would have had a difficult time doing so in light of the fact that fertilizer was difficult to obtain. For most of this period, imports and the production of fertilizer was on the decline. Consumption of fertilizer was around 80,000 tons in 1971, and it declined in successive years to less than 40,000 tons in 1977. One may ask: If the signals to the small farmer had been clearer--if the rise in farmgate prices matching that (or exceeding) consumer prices were accompanied by the 'knowledge'

that the economy was in a period of growth, then, feeling that the risk was comparatively small, would he have sought to increase both his acreage and his yields through the best means available?

As may be seen from the indices of acreage and production of food crops in the period 1967 through 1977 (converted to a common base), these moved in step with each other in apparent disregard of the swiftly rising movement of farmgate prices. (Table 1-16) On the other hand, it might be inferred that the rise in farmgate prices at least sustained the resolution of the small farmer to keep producing even though the incentive aspect of rising prices was 'wasted' in the absence of the means available to the small farmer to increase yields as well as acreage.

Small farmers did increase acreage and production in 1977 following the introduction of the Crop Lien program by the Ministry of Agriculture. But the situation remains ambiguous in light of the high rate of delinquencies in the repayment of the credit. Is he withholding payment because he feels uncertain about the future? Sustained 'high prices' without the promise or prospect of economic growth is limited in its capacity to bring more acreage into production. Indeed, it may even turn into its opposite--the 'backward-bending supply curve.' The farmer, uncertain as to the duration of high prices (in a depressed economy) may respond cautiously by maintaining, rather than increasing, his acreage and holding back on any investment until the picture clears.

Table 1-15. Jamaica: Farmgate Prices and Consumer Prices, 1970-1977.

Year	Farmgate Prices Domestic Food Crops (1975 = 100)	Consumer Prices (Mean Annual)
1970	34.6	54.7
1971	42.9	57.6
1972	43.7	60.7
1973	59.7	71.4
1974	73.2	90.8
1975	100.0	106.6
1976	108.4	117.1
1977		131.1

SOURCE: Adapted from Ministry of Agriculture data,
Statistical Department.

Table 1-16

Domestic Food Crops:

Relationship of Acreage, Production, and Farmgate Prices, 1967-1977

1972 = 100

Year	Acreage	Production	Prices
1967	62.9	-	-
1968	59.1	-	-
1969	59.8	-	-
1970	69.9	67.2	79.2
1971	92.3	91.2	98.1
1972	100.0	100.0	100.0
1973	87.7	91.7	136.6
1974	92.3	98.2	181.3
1975	101.4	99.1	228.6
1976	96.8	98.1	247.8
1977	109.0	109.7	335.2

SOURCE: Ministry of Agriculture.

1.7 Geographical Distribution of Domestic Food Crops Production

Certain aspects of Table 1-17 are worthy of comment. First, two parishes stand out, head and shoulders above the rest of the country, with respect to acreage devoted to domestic crops: St. Elizabeth and Clarendon. They are also the two parishes with the largest value of production--\$36.2 million for St. Elizabeth and \$30.5 million for Clarendon in 1977. Indicative of their first rank status is the distance between them and the next two parishes--St. Catherine and Manchester--where the value of production falls \$10.2 million and \$19.0 million, respectively. As might be expected, the "urban parishes" of Kingston and St. Andrew are last with a value of production of \$7.0 million.

The results of a ranking based on value per acre manifest a "bunching up" of the parishes to a degree not expected from the value of production. Although the parishes of St. Elizabeth and Clarendon remain at the top of the list with a value of \$1,800 and \$1,752 per acre, respectively, Westmoreland, the last parish, comes up with a value of \$1,236, or 68.7 percent of the top parish. Likewise, although St. James parish's acreage is only 20.5 percent of St. Elizabeth's, in terms of value per acre, it reaches to 91.5 percent.

The proximity of the value per acre figures seem to suggest that the level of technology applied to domestic crops throughout the country is very much the same from the dry-farming parish of St. Elizabeth to the rainy parishes of Portland and St. Mary. Surprisingly, the relative standing of the parishes of Hanover and Trelawny improves considerably: from being the lowest in terms of overall value of production, they rise to the rank of third and fourth, respectively. Portland, which ranked in the middle with respect to value of production, falls to the bottom of the list, except for Westmoreland, in terms of value per acre.

Table 1-17

VALUE OF PRODUCTION, ACREAGE, AND VALUE PER ACRE
OF DOMESTIC CROPS BY PARISH 1977

<u>Value Per Acre Rank</u>	<u>Parish</u>	<u>Value of Production (J\$)</u>	<u>Acreage</u>	<u>Value Per Acre (J\$)</u>
1	St. Elizabeth	\$ 36,249,940	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	<u>10,360,460</u>	<u>8,385</u>	<u>1,235.59</u>
	TOTAL	\$203,607,120	128,283	\$1,587.17

SOURCE: Data from Ministry of Agriculture.

1.8 Capital Formation

Imports of agricultural machinery and implements declined sharply from J\$10.0 million in 1975 to J\$2.9 million in 1976, undoubtedly due to the balance of payments crisis. A further decline occurred in 1977 to J\$2.4 million (mixed rate) or to J\$2.0 million (basic rate).

The main items among these imports were: horticultural, poultry-keeping and bee-keeping equipment, dairy milking machines, soil preparation equipment, and plough parts. See Table 1-18 for a list of the main items.

Data covering the years 1965 through 1969 indicate that the shortfall of capital formation in this sector is of some duration. Agriculture, Forestry and Fishing were not holding their own in real terms even during these relatively boom years. Fixed capital formation in this sector rose from J\$11.7 million in 1965 to J\$13.0 million in 1966 and then declined to J\$10.8 million, J\$9.8 million, and J\$10.9 million, respectively, during the next three years. In light of the inflation over this five-year period, real investment probably declined by a quarter or more.

Seen as a percentage of total fixed capital formation in this period, the share declined from 9.4 percent in 1965 to 4.3 percent in 1969 (Table 1-19)

Table 1-18. Imports of Agricultural Machinery and Equipment, 1977.

Item Number	Description	Value
6951020	Forks	\$ 59,173
6951030	Hoes	8,858
6951040	Axes	15,668
6951050	Shovels and Spades	27,027
6951090	Other Hand Tools Used excluding Forks, Hoes, etc.	23,382
7127010	Ploughs, including parts	93,416
7121020	Harrows, including parts	62,092
7121090	Other Agricultural and Horticultural Machinery for soil preparation	327,289
7122090	Harvesting and Threshing Machinery, Straw and Fodder Presses, etc.	71,354
7123100	Cream Separators	10,651
7123900	Dairy Machinery, including Milking Machines	370,720
7125010	Other Tractors for use in Agriculture	0
7129900	Other Agricultural, Horticultural, Poultry-Keeping, Bee-Keeping Equip- ment	425,202
7196420	Mechanical Appliances for Projecting, Dispersing or Spraying Liquids or Powders for use in Agriculture	102,747
	TOTAL	J\$1,597,579

SOURCE: Department of Statistics (unpublished).

Table 1-19. Fixed Capital Formation by Sector: 1965-1969. (Current Prices)

Sector	1965	1966	1967	1968	1969 (prov.)
Agriculture, Forestry & Fishing	11.7	13.0	10.8	9.8	10.9
Mining, Quarrying & Refining	11.4	21.0	47.5	79.4	89.3
Manufacturing	15.4	17.4	20.2	21.8	24.7
Construction & Installation	9.2	10.2	7.6	9.8	11.9
Electricity, Gas & Water	2.1	3.1	10.3	13.7	15.2
Transport, Storage & Communication	16.9	17.4	12.9	16.7	19.5
Distribution	10.0	10.5	10.0	7.9	9.2
Financial Institutions	2.0	2.3	3.4	2.9	3.3
Ownership of Dwellings	19.6	20.2	14.9	16.3	18.1
Public Administration	19.2	23.2	27.1	36.3	41.3
Miscellaneous Services	<u>6.6</u>	<u>7.2</u>	<u>5.3</u>	<u>6.9</u>	<u>7.6</u>
TOTAL	124.2	146.0	170.0	221.4	251.2
Agriculture, Forestry & Fishing as Percent of Total	9.4	8.9	6.4	4.4	4.3

SOURCE: Economic and Social Survey, 1971.

2. Physical Environment

The greater part of Jamaica is mountainous. Approximately 60 percent of the land surface stands between 500 and 3,000 feet in elevation, as can be seen on Map 1. The pattern of lowlands can be seen from the topographic map and the corresponding estate cropland use is evident on Map 2. In general there is a central hilly core and a coastal fringe of lowland, but when conceived in more detail, it can be seen that in many areas the mountains reach the sea and that there are major interior valleys such as Queen of Spain's Valley and St. Thomas of the Vale. Most of the interior valleys are karstic features called poljes, which are solution collapse features in the white limestone plateau.

2.1 Hilly Uplands and Plateau; Other Land Forms

Within the area which stands between 500 and 3,000 feet, most of the land is in slope and varying from moderate to steep. The plateau surface is dissected and is mostly in slope. These hilly uplands and plateau are the domain of the small farmer as these lands were historically and currently unsuited to plantation operations which developed the areas of quality soil and access. Small farmer occupation of the hill lands began generally with the slave emancipation in the first half of the 19th Century.

It is difficult to generalize about an area of such size and diversity without over-simplification. Edwards in his book on the economics of small farms describes nine characteristic small farming areas, and his descriptions of the six from the hilly uplands are quoted below.¹

The approximate locations may also be seen on Map 3.

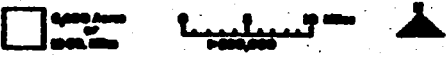
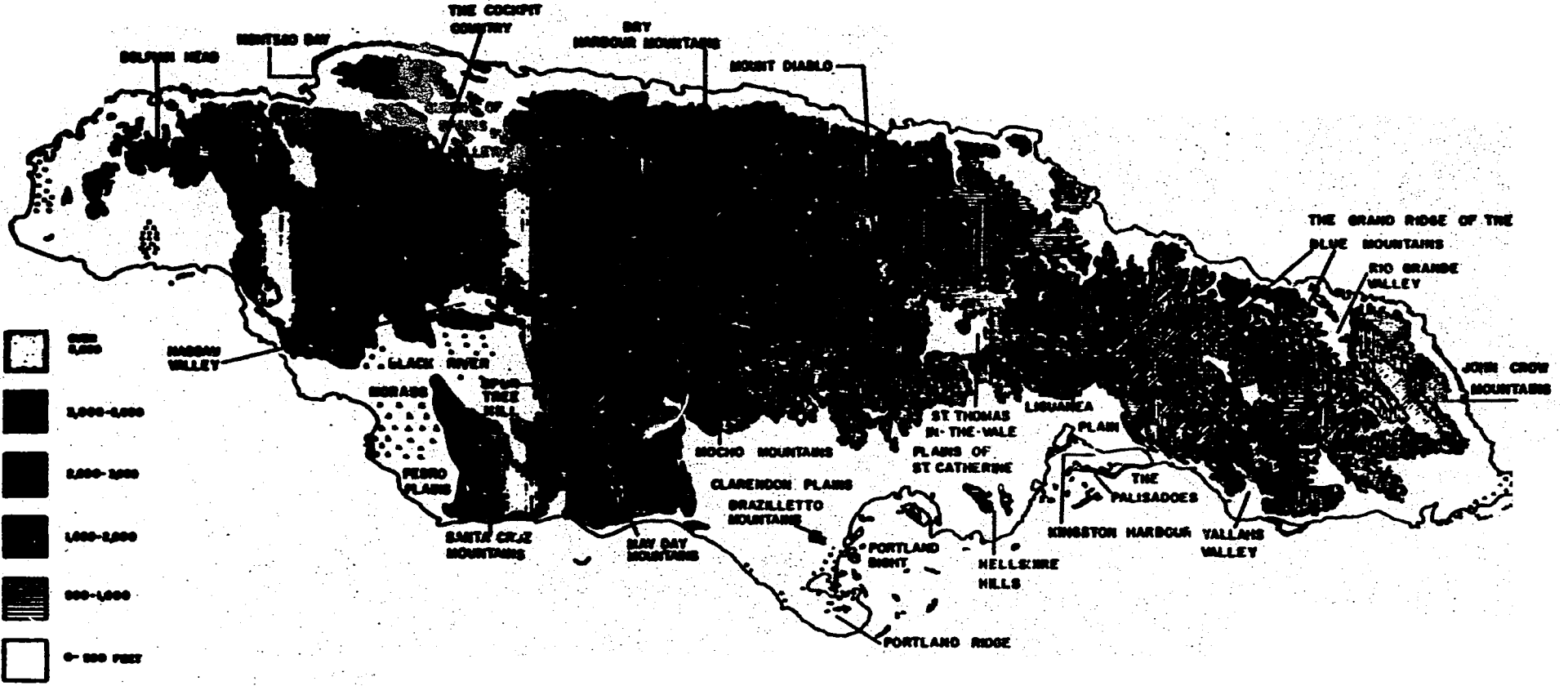
1. Edwards, David. An Economic Study of Small Farming in Jamaica, Institute of Social and Economic Research, University of the West Indies, Kingston.

Areas

- A. Topography: Gently to steeply sloping rounded hills with few abrupt changes of slope. Soils: Belfield-Highgate-Marymount clays, fertility is moderate to high. Erosion is moderate and topsoil is speedily replaced by the rapidly weathering parent material of the Richmond Bed series. Climate: Moist and equable with an annual average rainfall of 70"-80". Humidity ranges between 60 percent and 100 percent. Altitude: 500'-1,000'.
- B. Topography: Rocky hills. Soils: Bonny Gate and St. Ann clay loams and clay soils with limestone rock outcrops. Drainage is rapid, fertility moderate. Phosphate is rapidly fixed. The soils are not very liable to erosion, but when the topsoil is lost, the effect is very serious because the subsoil is so deficient in organic matter. Climate: Moist, rainfall averages about 80" per year and is reasonably well distributed. Altitude: 250'-500'.
- C. Topography: Ridges with moderate to steep slopes. Soils: Killancholly-Nonsuch-Belfield-Highgate clays, thin and generally poorly drained. Erosion appreciable. Climate: Moist, with a rainfall of over 100" per year and well distributed. Altitude: 250'-500'.
- D. Topography: Moderate to steep hills. Soils: Belfield-Marymount, Wait-a-bit, Halifax and various other clays derived mainly from shales with occasional limestone outcrops, conglomerates and tuffaceous rocks. Fertility is generally medium to low. Much of the soil is appreciably eroded. Climate: Generally moist or fairly moist; rainfall about 80"-100" per year. Altitude: 500'-1,000'.
- E. Topography: Rolling ridges with long steep or moderately steep slopes. Soils: Halifax-Donnington and Wait-a-Bit clays, are derived from conglomerates, tuffs and shales. These soils are extremely erodible and low in nutrients, but they are easily cultivated. The soils are generally very badly eroded, but the harm is reduced by the rapid breakdown of the subsoil. Climate: Generally cool and moist by tropical standards. Average annual rainfall is about 70"; December to March (inclusive) is usually dry; during the rest of the year there is normally sufficient rain for crop growth. Winter night temperatures are quite low and control growth. Altitude: 2,000'-3,000'.
- F. Topography: Youthful mountainous topography ranging from precipitous to hilly terrain. The area is deeply dissected and slopes normally range from 25 degrees to 40 degrees with most of the slopes outside the range being steeper. Soils: Halls' Delight-Channery clay loam. Erosion is severe but a state of equilibrium has been reached so that under present conditions the low yields are unlikely to decline further provided gully erosion does not occur. Drainage is excessive. Climate: Moderately dry, 60"-90" of rain per year, highly seasonal and unreliable except for 'October' rains. Altitude: 3,000'-4,000'.
- 44

TOPOGRAPHY

MAP 1

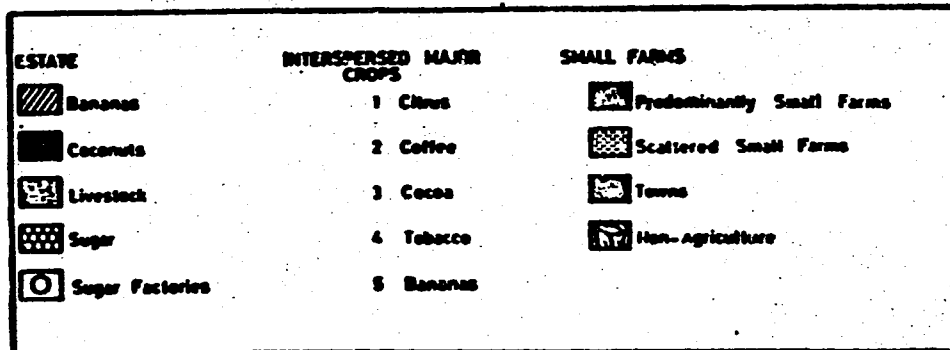
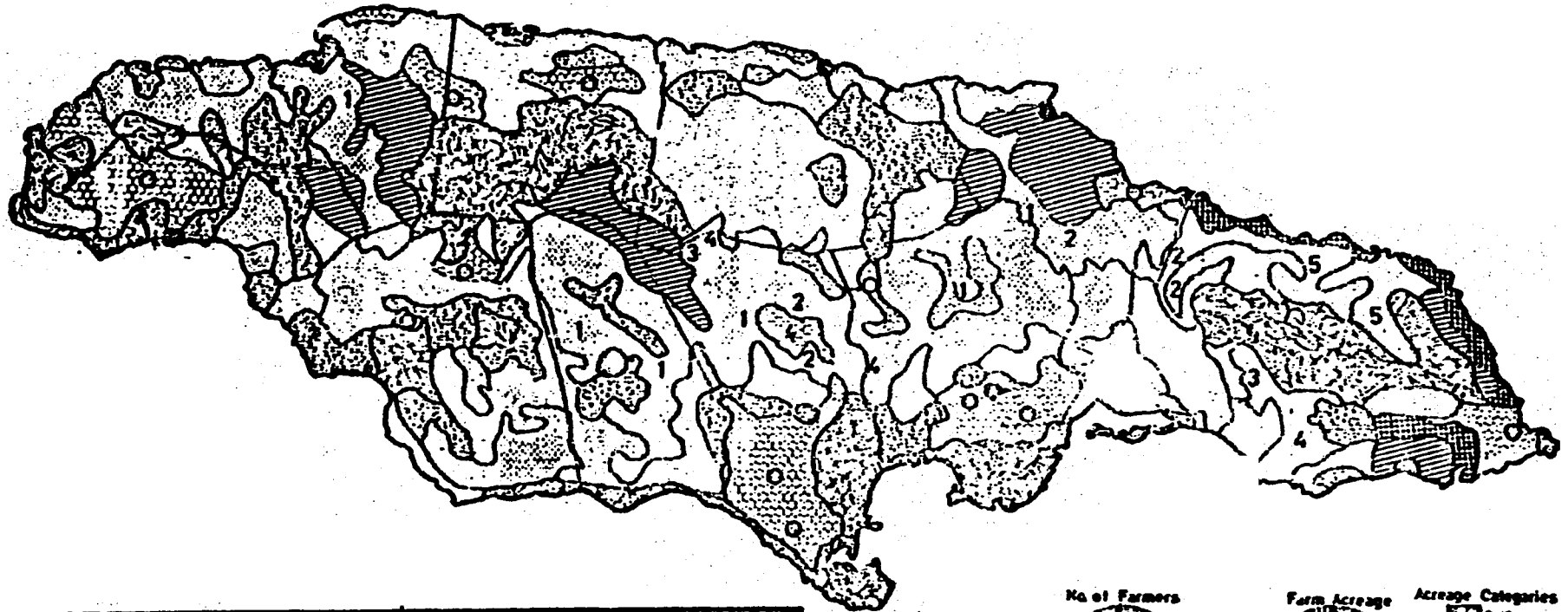


Source: The National Atlas of Jamaica 1971

45.

JAMAICA: LAND USE MAP

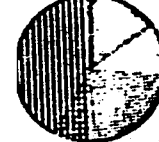
MAP 2



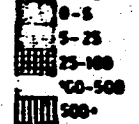
No. of Farmers



Farm Acreage



Acreage Categories

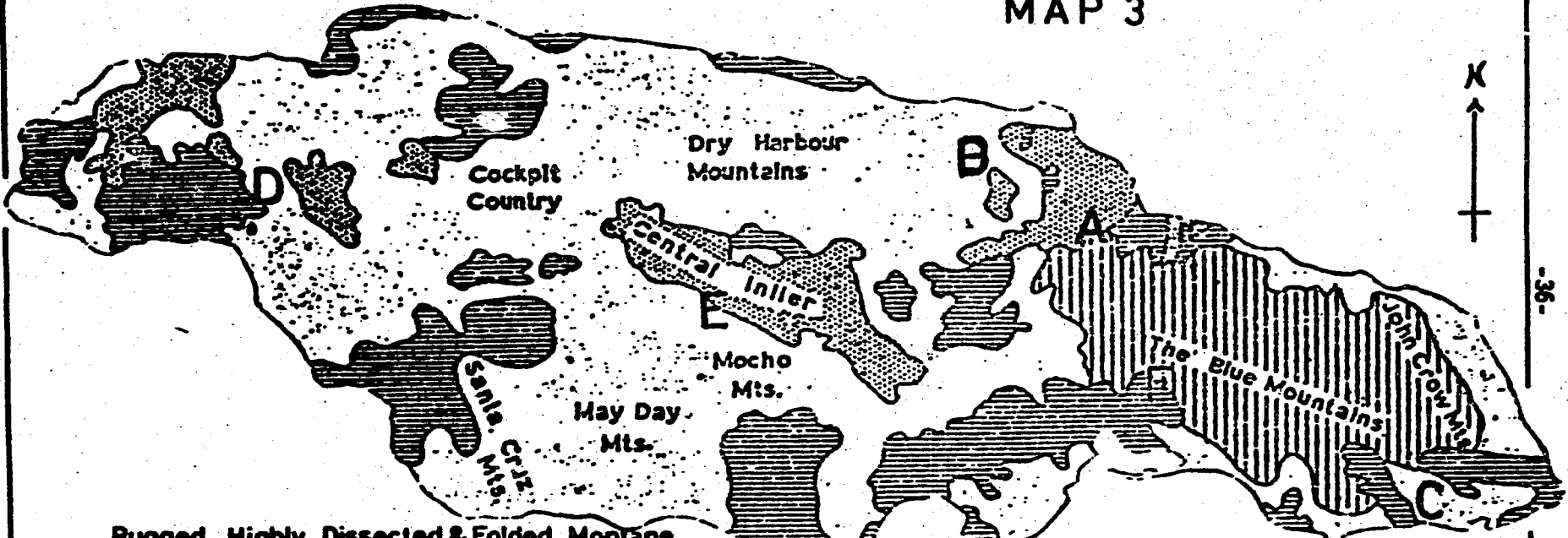






Source: Ministry of Agriculture, Forestry and Fisheries, Census of Agriculture, 1969

Miles 10 5 0 10 20 30 40

by Laurence Collyer

LANDFORMS OF JAMAICA MAP 3



-  Rugged, Highly Dissected & Folded Montane Uplands (Igneous, Metamorphic, Sedimentaries, e.g. Conglomerates, Shales, Limestones)
-  Less Rugged Hilly Uplands (Shales Conglomerates Tuffs etc)
-  Dissected Karstic Plateaus & Hills With Steep to Moderate Slopes (White & Yellow Limestones)
-  Interior Basins & Lowlands (Recent Alluvium Sands Gravels Coral)

0 5 10 15 Miles



1/1

The primary factors which differentiate the internal characteristics of the hilly uplands are altitude (temperature), slope angle, rainfall conditions, soil depth, and soil parent material. Altitudinally induced temperature differences affect the competition between crops for land, the development of soil, evapotranspiration rates, crop spoilage rates, and animal/human health and vigor.¹ Lower average temperatures will tend to provide a niche for certain crops such as potato, dairy, pines, coffee, and to discourage true tropicals such as the banana which begin to experience longer growth cycles above 500 feet. In mature soils, organic matter content should increase with altitude and therefore soil quality.

The high proportion of land in significant slope combined with generally large amounts of high intensity rainfall create a major soil erosion hazard in much of the hilly upland area. However, erosion control techniques are available and adapted to small farming. Indeed, small farmers with hand tools and labor-intensive methods are able to grow crops on slopes with little hindrance. Cultivation by large machinery in a large-farm commercial operation will likely remain outside the realm of possibility on these same slopes.

Of the 33 major watersheds in Jamaica, 18 have been identified as containing severely eroded or disturbed areas (Map 4 and Table 2-1).

1. Climate averages as well as daily temperature conditions show a decline of about 3.3 F per 1,000 feet increase in altitude (in still air). The major domestic animals all come from the mid-latitudes and can be shown to thrive in cooler than tropical conditions. Assertions about human health and vigor are weighted with much controversy and misunderstanding. Because the human condition is affected by a great many social, economic and physical factors, no climatically determined limits could possibly be supported. While lower temperatures may offer some protection, temperatures of the lowlands in no way limit human activities in these areas.

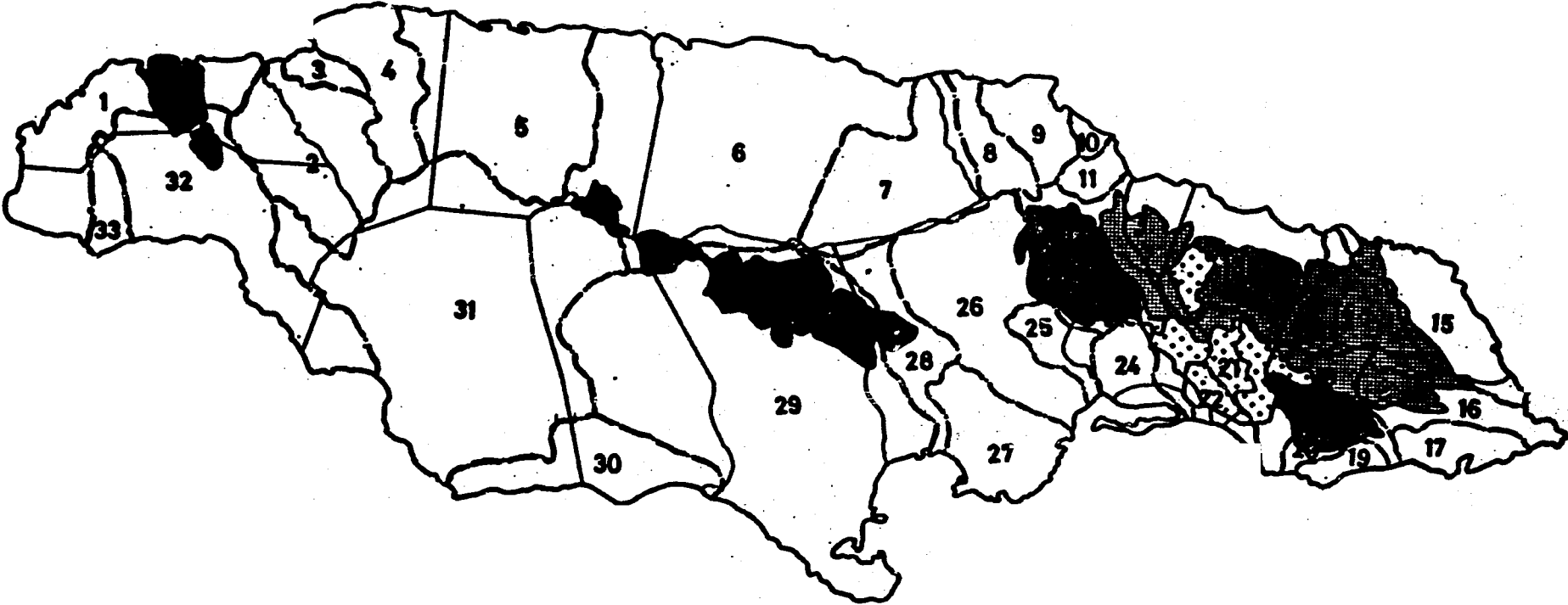
Table 2-1
Watersheds of Jamaica






Watershed No.	Name of Watershed	Approximate Acreage (Acre)	Critical Watersheds First and Second Priority
1	Northwest Coast	99,000	Second priority - Lucea River, 17,000 acres
2	Great River	100,200	
3	Reading	12,200	
4	Montego River	59,000	
5	Martha Brae		
6	St. Ann	311,600	
7	Moneague	98,200	
8	Rio Nuevo	29,000	
9	Oracabessa	36,100	
10	Fosters Cave	6,000	
11	Water Valley	17,000	
12	Wag Water	62,000	Second priority, 47,700 acres.
13	Buff Bay River	112,000	
14	Rio Grande	66,000	Second priority - Upper Rio Grande at Alligator Church, 19,200 acres.
15	Northeast Coast	67,300	
16	Plantain Garden	46,000	
17	Port Morant	26,000	
18	Morant River	47,000	Second priority - Negro River, 26,900 acres
19	White River	12,000	
20	Yallahs Town	8,000	
21	Yallahs Valley	44,200	First priority, 30,000 acres.
22	Cane River	18,200	
23	Hope River	19,000	First priority, 13,000 acres.
24	Liguanea	29,000	
25	Fresh River	22,300	
26	Rio Cobre	158,000	First priority - Rio Pedro, 20,100 acres.
27	Salt Island Creek	65,000	
28	Coleburns Gully	44,300	
29	Rio Minho	430,000	First priority - Pindars River, 19,200 acres; Second priority - upstream area, 41,700 acres.
30	Bull Savannah	66,000	
31	Black River	378,200	
32	Cabaritta River	155,000	Second priority - upstream 6,000 acres
33	New Savannah River	17,400	

SOURCE: Henry Stinnet's office, MOA, private correspondence.

MAIN WATERSHED & ERODED AREAS

MAP 4



-  Area Severely Damaged-(Man-made causes mainly)
-  Area Severely Damaged-(Natural causes mainly)
-  Area Severely Damaged-(Man-made & Natural)
-  Watershed Number
-  Watershed Boundary



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Other types of landform in Jamaica are currently underutilized or in some cases unutilized. Most of these do not now have populations of small farmers, but under the right conditions, some could be used more than currently. The greatest underutilized potential is to be found in the extensive swamplands found mainly at the extreme ends and southern parts of the Island. These swamps, if drained, offer the potential of flat land, high soil fertility and abundant water supplies. Several are in fact in the process of development (Map 5) and the major limitations have been capital, technology, and management for concerted action. Swamp drainage is not very amenable to individual effort

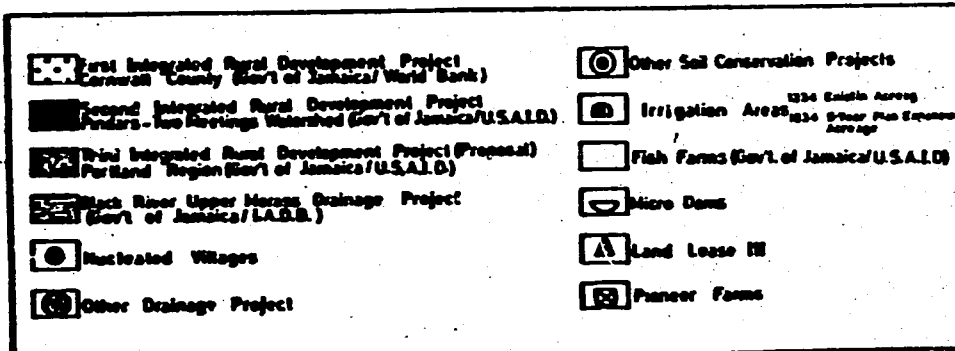
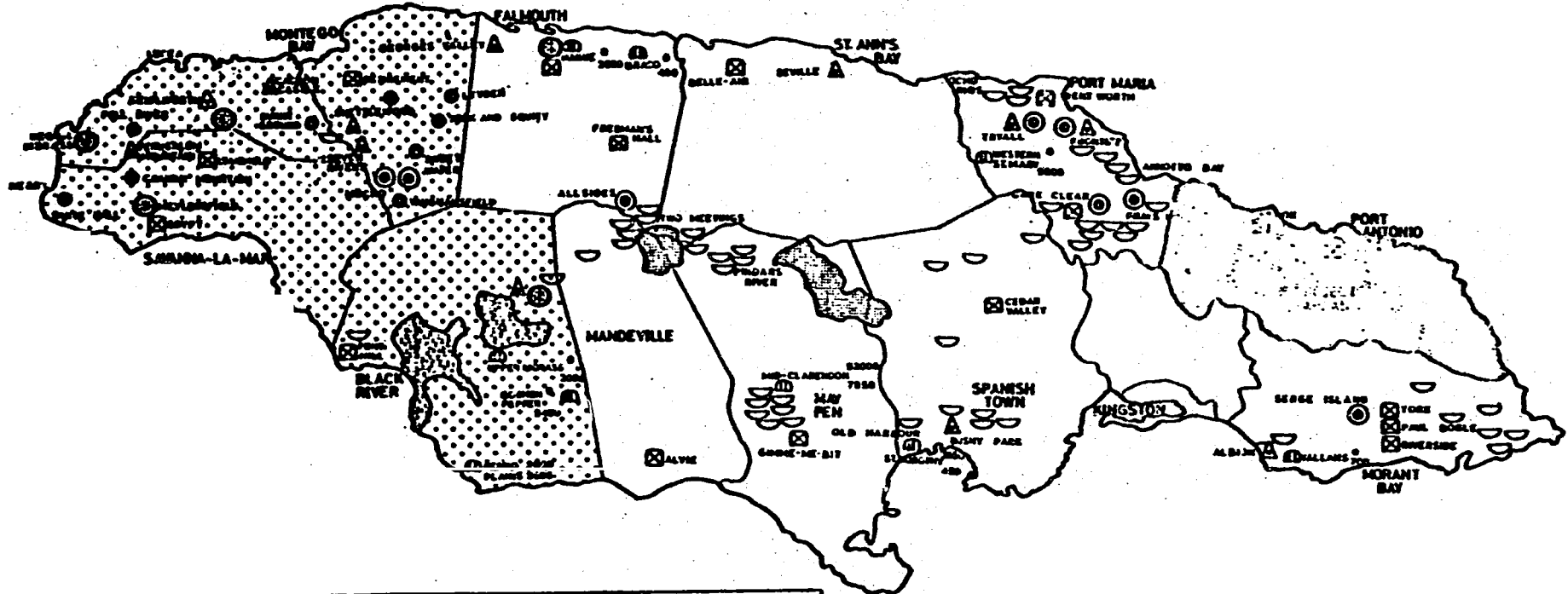
A less tractable problem is offered by the coastal areas of salt damage, either natural or man-caused. A number of coastal swamps have salt problems as do irrigated fields near sea level, for example, those of the Bernard Lodge Estates which can be seen from the air before landing in Kingston airport. Techniques have been developed in other places to remove salts from such lands. A related problem is that of salt water incursion into wells in the coastal zone which is a problem in the Saint Dorothy area.

Dry zones, currently unused or offering only sparse goat graze, may have potential. Various species of drought tolerant plants with commercial value are grown in similar areas in nearby countries. Examples of dry zone crops are: henequen, prickly pear cactus, olive, grape, dates, figs, as well as many somewhat more exotic plants which are being heavily researched currently in many places.

The high mountain zone in the eastern portion of the island, including the Blue Mountains, is an area of land abandonment and population

AGRICULTURAL PROJECTS

MAP 5:



Source: Ministry of Agriculture & Town Planning Department.



by Laurence Calderon

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decline. Programs already underway in this area include pine plantations on Crown Lands and coffee expansion schemes. Portions of the area may also have potential for various other tree crops and ground provisions.

2.2 Soils

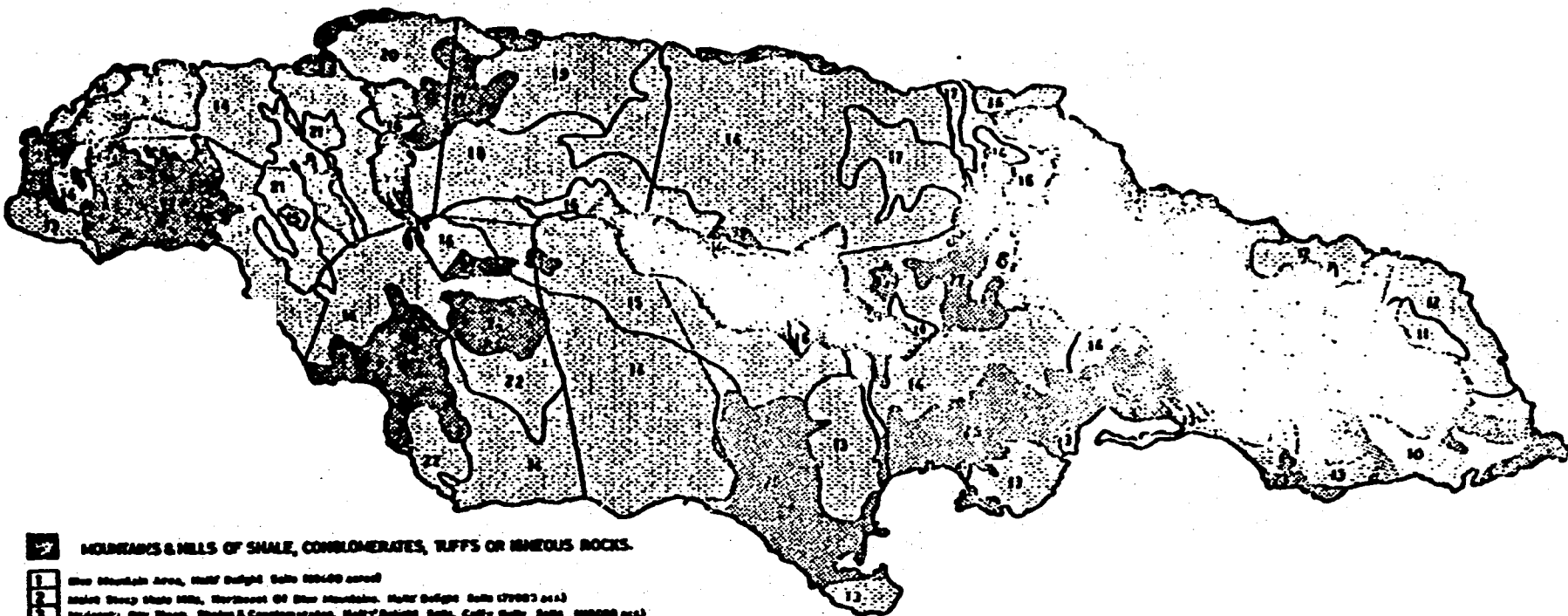
The soil association map (Map 6) emphasizes the influence of parent material on soil type and characteristics. The limestone based soils of the upland plateau are the most areally extensive and related to the conditions of small farmers. Reduced to its essence, there are two types of soils on limestone, the terra rossa derived from the more easily soluble white limestone and the rendzinas or black marl soils from yellow limestone.

The terra rossa are the bauxite soils, coarse in texture, leached acid, phosphate fixing and highly porous with little water retention capacity. The surface zone has a high content of organic matter upon which much of its agricultural potential--fertility and moisture retention--depends. The unweathered white limestone also is generally filled with solution channels which rapidly drain the surface horizons, removing the groundwater table below the root zone of all economic plants. The lack of surface streams or ponds in these areas is another manifestation of the karst topography.

1. The karst topography which develops over soluble limestone exhibits many forms and varieties, depending upon the solubility of the limestone, the thickness and placement of the beds and the factor of time and rainfall. Some karstic areas, such as the Cockpit country in Trelawny or the John Crow Mountains in eastern Portland, have a badlands kind of surface which has rendered them unusable and impenetrable. Also in some of the drier zones, the dryness is emphasized by the low water table of the karst and areas such as the Hellshire Hills and the Portland Ridge stand as almost unutilized scrub wasteland with much rock exposed at the surface.

SOIL ASSOCIATION MAP

'MAP 6'



1-27 MOUNTAINS & HILLS OF SHALE, CONGLOMERATES, TUFFS OR SIMILAR ROCKS.

- 1 The Mountain Area, Half Bright Soils (20400 acs)
- 2 Steep Shale Hills, Northwest of the Mountains, Half Bright Soils (77000 acs)
- 3 Moderate Dry Slope, Shales & Conglomerates, Half Bright Soils, Colly Cuty Soils (20000 acs)
- 4 Steep Hills & Mountains, Brecciated Purple Shale Soils (20000 acs)
- 5 Steep Hills or Steep Weathered Granite Rocks, Flat River Soils (20000 acs)
- 6 Moderately Steep Well Drained Soils on Shale of Richmond Beds, Goshute, Higate, Marymount Soils (37000 acs)
- 7 Moderate to Steep Shale Hills of Valley- Limestone Formations, Well-erud Soils (27000 acs)
- 8 Generally Wet Area of Conglomerates, Tuffs & Shales; Hutton, Donington, Wet-r-bd Soils (140000 acs)
- 9 Soils from Shales, Tuffs & Conglomerates, Goshute, Marymount, Wet-r-bd Soils (20000 acs)

10-27 MOUNTAINS, HILLS & MODERATE SLOPES OF LIMESTONE

- 10 Moderate Sloping Soil of Soft Limestone or Shale, Shoshone, Hutton, Goshute, Soils (20400 acs)
- 11 John Cane Hills, Steep Hills of Limestone, Wet Climate (70000 acs)
- 12 Limestone Hills, West Climate, Sunny Soils, Shoshone, Hutton Soils (12000 acs)
- 13 Dry Limestone Hills, Sunny Soils, Shoshone, Dry Climate (20000 acs)
- 14 Dry Limestone Hills, Red Soils on Slopes & in Valleys, Sunny Soils, St. Ann Linn (20000 acs)
- 15 Dry Limestone Hills, Brown Soils on Slopes & in Valleys, Sunny Soils, Chidgah (27000 acs)
- 16 Moderately Steep Slopes of Soft Limestone- Valley-Canyon Hill Soils (20000 acs)
- 17 Gentle or Moderate Slopes of Soft Limestone, St. Ann, Sunny Soils (24000 acs)
- 18 Limestone Hills & Soils, Cool PM Country, Sunny Soils (27000 acs)
- 19 Limestone Hills, Well Drained Soils, Dry Climate (20000 acs)
- 20 Dry Limestone Hills (40000 acs)
- 21 Moderate Sloping Soils, Fluffy Limestone Poor Drainage
- 22 Red Soils, Gentle or Moderate Slopes, Dry Climate, St. Ann Sunny Soils (24000 acs)

23-27 PLAINS BASINS & VALLEYS

- 23 Broad Alluvial Plains (40000 acs)
- 24 Swamp & Adjacent Plains (12000 acs)
- 25 Gravity Sloping Alluvial Plains Moderately Dry (20000 acs)
- 26 Gently Sloping Plains, Poorly Drained Dry Climate (27000 acs)
- 27 Gently Sloping Basins, Imperfectly Drained (247000 acs)



By Lawrence Calderon

The black marl soils are characterized by having finer particles, a heavy clay texture and poor drainage. Alluvial soils are found on the broad southern plains, coastal lowlands, river valleys, and limestone solution valleys (poljes). The water lain soils of loam and clay texture are the best agricultural lands and seldom do small farmers have access to them.

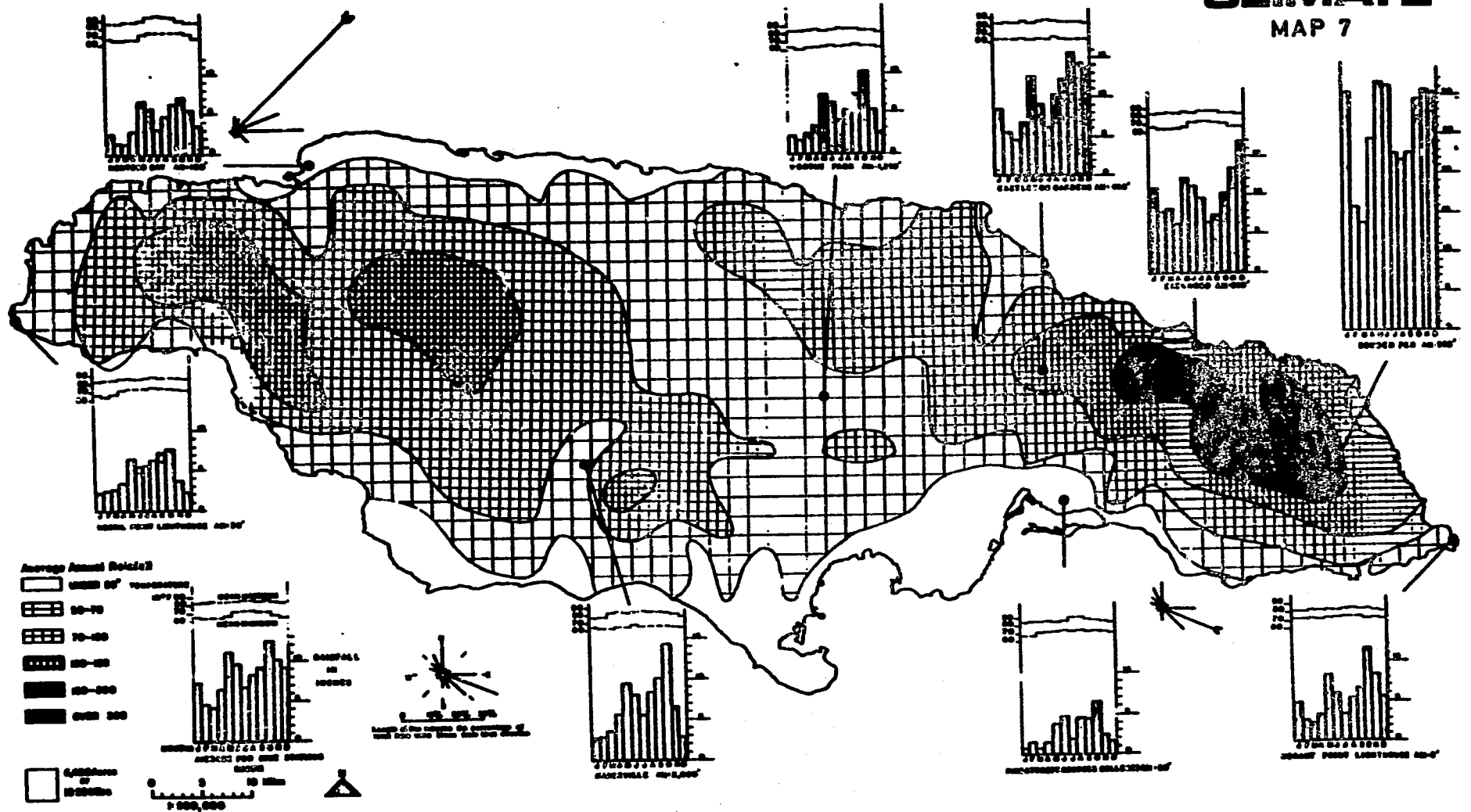
The soils of the highlands above 3,000 feet are derived from old igneous, metamorphic and volcanic deposits. One basic type of highland soil is the clays based on shales. Drainage is generally slow, erodability and slumping are major constraints, but where the soil horizon is intact, the upper humus layer can be quite fertile. The other upland soil is the lithosol; porous, acid, and generally low in nutrients. Under a forest cover, the humus layer can be quite rich in nutrients, but is quickly lost to erosion after clearing.

2.3 Climate

Climatic conditions and annual/monthly variations are major factors in crop production everywhere. Rainfall is the major climatic variable for any tropical station, and Jamaican farmers must adjust to both expected seasonal changes and to unpredictable deficiencies in annual and/or monthly precipitation receipt. For the past 15 years, Jamaica has suffered, or at least some parts have suffered, recurrent drought. Map 7 shows the general rainfall pattern as well as monthly patterns for representative stations. Major features from the map are the wet zones of the Blue Mountains and the central hilly uplands region, the relative dryness of the southern coastal region and the west-central north coast. The irony has not been missed by those planning development

CLIMATE

MAP 7



Source: The National Atlas of Jamaica 1991

that 75 percent of the population, agriculture and industry is in the south central portion of the island which receives only about 25 percent of the moisture. (Table 2-2)

Jamaica has a tropical marine type of climate, controlled by its latitudinal position (18° N), its location on the eastern side of its adjacent continent (western edge of the Azores Subtropical High), the northeast trade winds and its own mountainous topography.¹

The year-round pattern of northeasterly winds brings heavy rainfall to windward coasts and mountain exposures. The leeward or rain shadow side of the Island and individual mountain systems create a pattern of southern and southwestern dryness. The pattern is not that simple because the winds can change in direction seasonally, or be deflected as they are around the southern part of the Blue Mountains, bringing easterly and divergent airflows to Kingston. The orientation of topographic features in relation to the wind and to one another creates a pattern of rainfall of some complexity.

The seasonal rainfall pattern is bimodal, with a primary maxima in October and a secondary maxima in May. The minima generally occur in January-March and a secondary minima in June. There are some variations; in Hanover-Westmoreland, for example, May-October is a single maxima and November-April the minima.

Despite a generally humid environment with an average rainfall of 78 inches, significant portions of the island are subhumid to semiarid and show marked seasonal and irregular moisture stress. Map 8 depicts the moisture balance by mapping the number of months which show a moisture

1. The eastern side of continents at this latitude are humid while west coasts are arid. The weak descent of air under the western edge of the subtropical high plus high sea surface temperatures, sea to the windward and atmospheric patterns such as Easterly Waves along the inter-tropical convergence zone all combine to create a humid environment.

surplus. Most of the south central area with its major populations and industrial concentrations have less than six months when there is a positive balance. A major explanation for this is seen in the very high rates of potential evapotranspiration. In the portions of the island receiving less than 60 inches of rainfall, the potential evapotranspiration is 78 inches of moisture.¹ Somewhat less, but still high levels of evapotranspiration would prevail in the wetter half of the island. Table 2-3 shows another aspect of moisture balance. The station at Frome with 85.5 inches of total rainfall has a continual moisture deficit from November to April.

2.4 Other Weather Effects

"Northers" are periods of generally strong, gusty northerly winds which blow during the winter, bringing cool, cloudy conditions, especially to the north coast. Northers are the result of polar high pressure systems from the North American Arctic and the winds can be damaging to banana trees along the north coast.

The land-sea breeze has considerable effect of modifying temperatures in the coastal areas and also contributes to the development of precipitation as the warm, humid sea air is drawn onto the land and rises up the mountain slopes. The afternoon cloudiness caused by this same phenomena reduces solar heating and ambient air temperature. The reverse breeze, from land to sea in the evening, is normally weaker and has fewer effects. The coastal zones experience the moderating effects of the sea's temperature stability and therefore experience much less diurnal temperature range than do interior stations. This particularly

¹ The Climate of Jamaica, Climatology Branch of the Jamaican Meteorological Service First Edition, 1973, p. 3.

MOISTURE BALANCE JAMAICA
NUMBER OF MONTHS WITH POSITIVE BALANCE

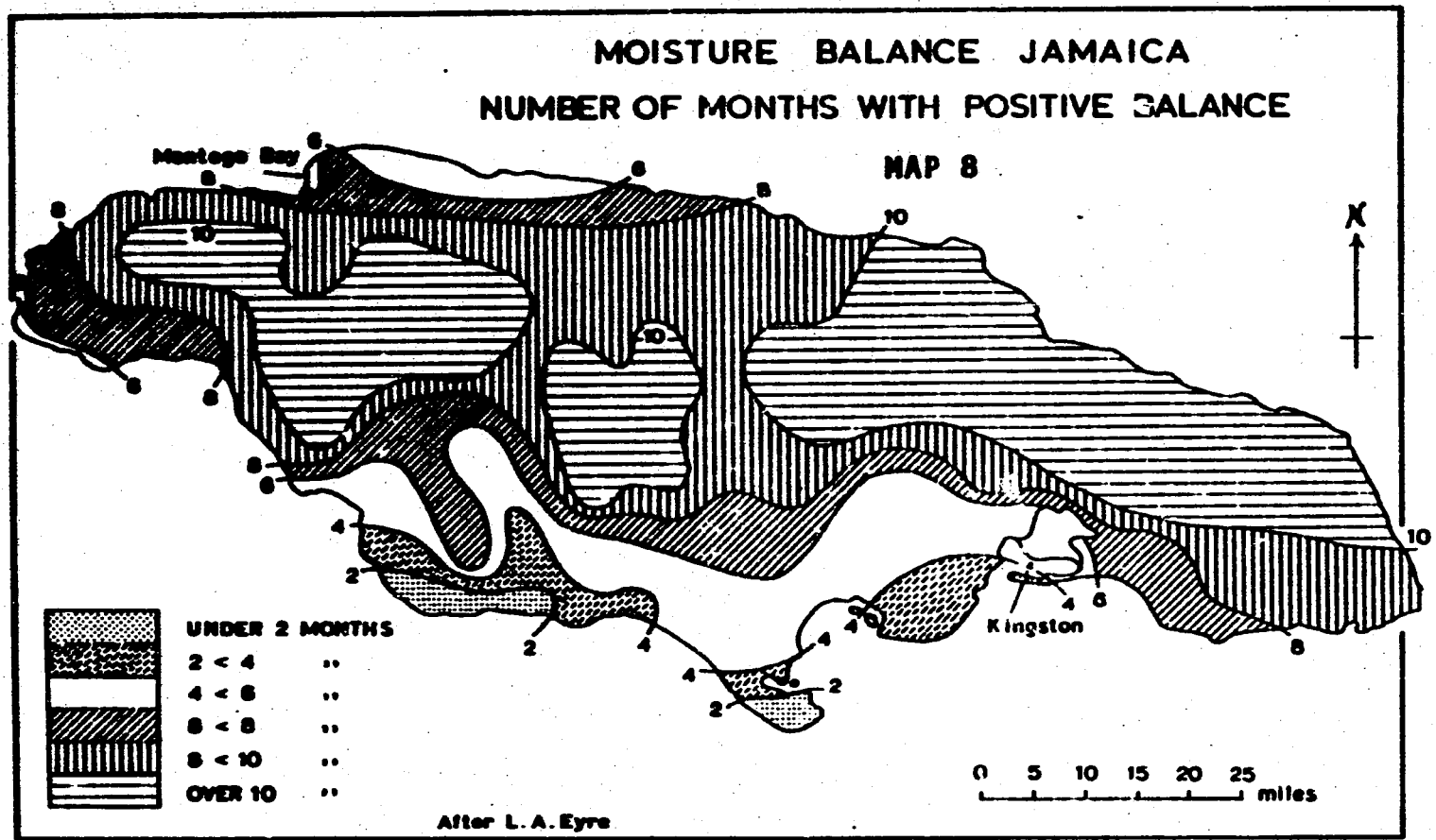


TABLE 2-2

PARISH	Mean Annual Rainfall by Parish: 1966 - 1976											1931-60 Ave.	Ave. 66-76
	(2)	(4)	(5)					(3)	(1)				
	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976		
Jamaica	80.71	56.48	67.73	83.00	84.54	71.10	75.31	81.99	77.74	63.13	55.38	78.00	72.46
Kingston and St. Andrew	(6) 59.07	(1) 31.01	(3) 41.06	64.31	64.71	66.32	(5) 59.38	62.71	79.09	(4) 53.18	(2) 37.27	74.14	56.19
St. Thomas	80.83	(2) 61.91	(4) 88.26	107.16	88.66	80.12	81.94	96.30	107.02	(3) 82.16	(1) 61.38	104.25	85.07
Portland	172.51	(1) 109.15	(5) 117.21	146.59	154.38	(3) 123.70	(6) 132.83	126.36	158.60	(4) 114.33	(2) 100.05	153.50	132.13
St. Mary	77.65	(2) 47.91	(4) 69.54	82.98	90.37	65.22	73.46	79.87	84.89	(3) 66.79	(5) 55.77	84.90	72.22
St. Ann	67.68	(2) 48.38	(4) 57.29	65.71	89.36	62.82	69.01	65.53	55.03	(5) 58.52	(3) 47.05	61.40	61.70
Trelawny	73.80	(1) 45.00	53.24	65.32	67.25	55.97	62.91	72.72	60.93	50.89	43.70	65.46	59.20
St. James	74.31	(1) 48.57	77.06	72.18	86.59	73.40	79.66	92.46	74.25	75.68	(3) 72.32	70.00	75.15
Hanover	86.01	(1) 74.11	105.63	77.94	80.96	91.23	95.09	104.38	80.61	93.93	(2) 79.55	91.81	88.13
Westmoreland	99.16	69.36	(3) 84.06	87.08	87.95	83.91	(4) 89.38	95.23	85.77	(2) 85.50	(1) 70.73	89.52	85.30
St. Elizabeth	70.78	(4) 69.52	(3) 55.96	77.86	89.84	72.	66.32	73.44	61.21	(1) 51.93	(2) 48.65	76.40	67.09
Manchester	68.93	(2) 59.72	(3) 58.10	89.14	82.10	(4) 64.73	68.59	77.35	64.28	(6) 46.45	(5) 48.64	74.37	66.18
Clarendon	44.31	(2) 31.39	(3) 34.25	64.98	50.81	34.26	50.23	60.50	43.55	(5) 37.38	(4) 30.98	59.00	43.88
St. Catherine	74.23	(2) 38.58	(3) 38.94	77.71	66.10	50.13	50.13	58.98	54.83	40.62	(1) 23.85	56.90	52.19

NOTE: Numbers in parentheses show rank in dryness for dry years.

SOURCE: Meteorological Division, Ministry of Public Utilities and Transport.

TABLE 2-2

A Comparison of Evaporation with 30 Year Mean Rainfall

<u>Station</u>	<u>Period</u>	<u>Elevation Ft.</u>	<u>30 Year Mean Rainfall (1931-60)</u>	<u>Mean Annual Evaporation</u>
Palisades 17° 56' N 76° 46' W	1969 - 72	19	35.3 inches	100.3
Frome 18° 17' N 78° 09' W	1968 - 71	90	85.5	71.4
Worthy Park 18° 08' N 17° 09' W	1958 - 71	1,250	60.8	55.8
Duckenfield 17° 55' N 76° 15' W	1951 - 63	50	81.0	60.9
Hogymusk 17° 44' N 77° 16' W	1951 - 63	30	37.5	69.9
East Albion 77° 53' N 76° 35' W	1966 - 72	120	63.3	84.7
Long Pond 18° 25' N 77° 30' W	1967 - 71	700	57.4	73.6

SOURCE: Ibid. p. 55.

affects the daily minima. For example, the average daily maxima at Kingston and Worthy Park (1250') are 88.1° and 81.9° while the respective minima are 72.2° and 63.1° . The range in the maxima is 6.2° while the minima show a difference of 9.1° . Also the average daily temperature range increases from 15.9° to 18.8° . At Empire Nursery with an altitude of 2130' the daily range becomes 20°

Drought is a major agricultural issue as its occurrence is claimed to have had a major impact on production both overall and in some region of Jamaica almost every year since 1963. The occurrence of drought is difficult to define and identify and its impact may vary greatly with soil type, farming practice, duration, etc., but some measures of the situation in Jamaica can be considered here.

An analysis of five-year moving averages by the meteorological service has identified a cycle of dryness in the 1920's, somewhat less dry in the mid-1940's and a downtrend in averages since 1963.¹ For the period since 1963, we can look at the individual years and the differential impact in different parts of the island. Table 2-2 shows mean rainfall by parish for the period 1966-1976. We can note from inspection of this table two sets of two dry years, 1967-68 and 1975-76, which impacted most of the island and two less dry years, 1971-72, which affected only a few parishes. The figures are not yet available in comparable form, but 1977 seems to be another dry year and 1978 relatively wet to date. In the less dry years of the two major drought periods (1968 and 1975) the three westernmost parishes, St. James, Hanover and Westmoreland, did not experience any drought at all, and in fact most of the time had above average

1. Climate of Jamaica, Op. cit., p. 5.

rainfall. If one were to inspect individual station data for these periods, even more local anomalies would be noted. In the Portland individual station data, for example, it is not uncommon for one station to report very low rainfall totals (on a monthly basis) while other parish stations are experiencing far above normal totals.

From Table 2 it can also be noted that all but two parishes show below normal means for the period since 1966 and that these western parishes have escaped any serious drought impact during this period.

For other information on wind speeds and directions, relative humidity and more depth on the measures given, see The Climate of Jamaica, published by the Meteorological Service and available at the Ministry of Agriculture Library.

Jamaica receives some heavy rain and winds almost every year from the passage of tropical storms. In the past 93 years, there have been 48 of hurricane force which passed within 150 miles of Jamaica. Only 11 (one every 8 or 9 years) have inflicted major damage and the last one was Flora in 1963. Hurricanes are a particular threat to tree crops as their destructive effects may persist for many years or even totally alter the economy of a region permanently from a one-day episodic encounter. The hurricane of August 1944 is estimated to have destroyed half of all of the coconut trees on the island. Banana and cacao are particularly vulnerable to wind damage and even coffee plantings in entire regions have been destroyed by hurricanes. There does not seem to be any effective way to plan for such a catastrophic impact, but one can be certain that destructive hurricanes will strike Jamaica again.

2.5 Water

Water has many uses and aspects for every society. For the purposes of this report, we will consider regional water resources and facilities for control and use, both for agricultural use and domestic/ industrial supply.

Jamaica has a number of rivers, all relatively short, none with any navigational potential and few with significant hydroelectric potential. Among the problems of use of the rivers are the extreme variation between high and low flows and the often permeable rock layers (limestone) which preclude reservoir filling. Some streams also carry a heavy silt load. There are several small hydroelectric plants which currently supply about 8 percent of total electricity demand. If all of the potential were to be developed by 1987, it could only supply 25 percent of the demand projected for that year.¹ However, little of this potential is likely to be developed because of its extremely high cost, even measured against current \$16 per barrel for petroleum, which is now used for thermal power generation.

With a mean rainfall of 78", Jamaica is not short of water overall, but like most places its concentration of supply bears no areal relation to its pattern of demand. As has been previously noted, most of the population, industry and irrigated agriculture are in the south-central area which is relatively dry (though served by several rivers) while the major supply is in the wet north and northeastern area.

1. The Daily Gleaner, August 5, 1978.

There is currently more land of gentle slope and good soil than water available to develop it. The most ambitious project proposed is to divert water from the Swift River in Portland at the 2,000' contour level by a tunnel through the Blue Mountains to the Upper Yallahs Valley at Mahogany Vale. This water would be used to fill a reservoir on the Yallahs and generate electricity (largest potential of any scheme) and then be led to Kingston as a part of its municipal supply. If the project were successful and the water needed, other Portland rivers would be diverted to the Swift as part of the scheme.

Underground water supplies vary from abundant to non-existent. A generalized map of the supply conditions can be found in the National Atlas. The major problem areas are the higher elevation areas of the center and east. In some areas with deep limestone strata, ground water tables can be very deep, as in the Mandeville area. In areas where the underground rivers and springs of the limestone areas emerge, they form major sources of supply for communities and in some cases agriculture. In the deep alluvial deposits of the southern plains, wells are a major source of irrigation water. In some of the near coastal areas, overpumping has created problems of salt water incursion into the ground water supply.

2.6 Constraints

Within the hilly uplands it is estimated that there are approximately 186,000 small farms and 280,000 acres of land which require protection from erosion. Many of these lands are already seriously degraded

by erosion.¹ The loss of the upper soil horizon through erosion results in a major loss of soil fertility and generally in its water retention capacity. This loss of fertility and available soil moisture represent an important constraint on increases in small farm production and income, and it increases the need for soil inputs.

It should be noted that all of the 18 areas of severe erosion hazard are in non-limestone bedrock areas. Erodability is closely related to soil and parent material characteristics. Of the first priority areas listed in Table 1, two, Pindars and Two-Meetings, have a USAID-sponsored project aimed at controlling erosion. The parent materials in these two watersheds are volcanic in origin. The interrelationship of erosion as a farm problem with other water needs is shown by the concern in this watershed for protecting the quality of urban water for Christiana and the problems of rapid siltation of a proposed reservoir.

Moisture deficit is repeatedly mentioned as a major constraint to agricultural production in Jamaican development literature and by farmers and agricultural agents. Irrigation or moisture saving techniques such as mulching, terracing and other runoff controls make possible higher yields, shifts to more intensive crops, increased crop cycles per year and a reduction of risk. Even the very wettest areas, such as the north slope of the Blue Mountains, may show moisture deficits over sandy soils and in months when little or no rain falls.²

1. Ibid.

2. "Coffee Rehabilitation Development Project," T.P.D. 1114/10, (no author), (no organizations reference, but obtained from the Ministry of Agriculture), (mimeo) September 1977, p. 12. Also farmer interviews in the area bear this out.

3. The Small Farmer

3.1 The Jamaican Small Farmer in a Transitional Economy

The Jamaican small farmer shares a number of the characteristics of the traditional small farmer, but there are also notable differences. On balance, it might be fair to say that he is cautious about abandoning the practices of a traditional agriculture to embrace those of a more modern agriculture. On the one hand, he is moved by the example at home of progress in other sectors of the economy, by the reports of progress abroad received from relatives who have emigrated to the United Kingdom, Canada, and the United States, and by the continuing efforts of successive Governments to 'do something' for the small farmer. But, on the other hand, he is reluctant to stray from traditional ways when, anytime, he may be confronted by erratic conditions of climate, credit, prices and government commitment. Since no element of the population has lived so long and continuously 'at the margin,' his willingness to progress toward a more modern agriculture often takes the form of 'two steps forward and one step back.'

The numerous descriptions of the traditional small farmer throughout the developing world, despite the considerable differences and variations, has taken on a 'standard' form.¹ According to John W. Mellors, the small farmer works a few acres of land. The farm is both home and enterprise. He divides his scarce resources between them, and the results are often inadequate to one and the other. He applies his labor to the land with a few, simple hand tools: occasionally he can count on the

1. John W. Mellors, see chapter "The Farm in a Traditional Agriculture," in The Economics of Agricultural Development, Cornell University Press, Ithaca, New York, 1966.

assistance of an animal for heavier farm work. He must count on his own labor and occasionally on members of his family or a hired hand. His income is barely above the subsistence level. He is caught in the familiar 'vicious circle' in which his income is too low to provide him with the margin needed for savings and investment, in the absence of which his production and income remain at a recurrently low level.

Compare the above with David Edwards' "differences between large and small farms" in Jamaica:¹

1. The small farmers rely largely on family labor while the large farmers use large quantities of hired labor.
2. Most of the small farms are to be found on hillside land where the soils of moderate natural fertility have been badly eroded.
3. Little experimental work has been undertaken on crops produced for local consumption, which form an important part of small farm output and an unimportant part of large farm output. The large farmer is also favored by his greater formal education and social contacts which make it easier for him than for the small farmer to obtain and use what information is available.
4. The managerial function on a large farm is discharged by a man or men who are engaged exclusively in this activity while the small farmer manages his farm in conjunct with his work on his farm and in employment outside.
5. The goals of the large farmer are very different from those of the small farmer. The small farmer is preoccupied with the consumption needs of his household and the need to provide for himself and his family in later years.
6. The small farms produce a large number of products; some are exported, but the others constitute most of the food locally produced for consumption in Jamaica.

1. Edwards, David. An Economic Study of Small Farming in Jamaica. University of the West Indies, 1961, pp. 27-28.

7. Hand tool methods rather than mechanized cultivation are typical of the small farms.

While the Jamaican small farmer falls within the 'standard' description, there are also important differences--enough, indeed, to move his standing somewhere in between. To begin with, he is a citizen of a country whose per capita income-- U.S. \$1,070 --is relatively high among the developing countries. The absolute level of this figure is less important than what it implies: namely that he finds himself in an environment--economic, social, cultural, and psychological--which is considerably removed from the traditional, and he perceives the difference.¹

A high proportion of small farmers are actively involved in commercial agriculture; indeed, most of them do not consider themselves subsistence farmers. While mixed farming, some food crops and some export crops, is the typical orientation of the small farmer, he recognizes the necessity for cash purchases to meet both household and farm necessities.

Related to the above is the concern shown by successive governments about the small farmers' condition, manifested in various aid and assistance programs. These have included land reform schemes, subsidies, and technical and financial assistance. While these have undoubtedly helped the small farmer, they have often come upon the scene "too little" if not late, piecemeal, without complementary and supporting schemes. Still, the small farmer knows, especially in the last few years, that his interests have not been abandoned.

1. William Demas and Owen Jefferson make an important distinction between the level of per capita income and 'structural changes' in the evolution of a developing country. A developing country with a fairly high per capita income is not necessarily one that has undergone the structural changes that give it the flexibility to withstand stresses from without or the intricate linkage of enterprises and institutions that can provide a basis for self-sustaining growth. See W. E. Demas, The Economics of Development in Small Countries with Special Reference to the Caribbean, 1965, and O. Jefferson, The Postwar Economic Development of Jamaica, 1977.

The Jamaican small farmer thus finds himself in the anomolous position of laboring essentially in the traditional way, but in an overall environment which is anything but traditional. The differences are stark, and this has contributed to attitudes and expectations which require understanding so that they can be properly channeled into an improvement of both his productive capacity and living conditions. Underlying the study of the condition of the small farmer is the continuing state of transition of Jamaican agriculture from the traditional to the modern state.

3.2 The Importance of the Small Farmer in Jamaican Agriculture

In summary form, we can say the following about the part played by the small farmer in Jamaican agriculture:

1. He produces most of the nation's domestic food crop, and this includes: legumes, vegetables, condiments, fruits, cereals, plantains, potatoes, sweet potatoes, yams and other tubers. This had a value of J\$115.0 million in 1976 and J\$129.4 million in 1977.
2. He produces a substantial part of the nation's foreign exchange originating in agricultural exports. This includes most of the coffee and cocoa, pimento and ginger, and smaller percentages of bananas and sugar cane. It is estimated that he contributed 25 percent of the value of agricultural exports in 1977.

The small farmer (under five acres) numbered 24,984, or 94.4 percent, of the banana growers registered for spraying in 1977, and they cultivated 36,795 acres of the 68,278, or 54 percent, of the total acreage sprayed. The small growers' yields are less than that of the larger growers, so their contribution in terms of tonnage is much less, perhaps equivalent to about 25 percent of production. The estimated percentage of distribution of coffee growers by size of coffee plantings, based on a sample survey of the Coffee Industry Board (1977) indicates that of the 25,000 to 30,000 farmers currently growing coffee in Jamaica, 74.6 percent do so on less than one acre, and another 18.1 percent cultivate land between one and one-and-a-half acres. Cocoa is also largely produced by small growers. Of the approximately 24,000 growers who in 1977 had a total of about 33,000 acres of cocoa in production, about three-fourths had less than two acres of cocoa. The situation is similar with respect to pimento, coconuts and citrus.

3. He does all of this using marginal, hillside lands for the most part, using simple hand tools, and little in the way of agricultural chemicals.

4. By way of contrast, his production of J\$129.4 million of domestic food crops in 1977 required 129,450 acres, while the production of sugar cane in the same year had a value estimated at J\$68.0 million and required 132,000 acres. Thus, the value of production of domestic food crops was twice that of sugar cane, and it required less acreage. True, the foreign exchange earned from the processing of sugar cane into unrefined sugar amounted to J\$55.9 million in 1977, but it is not known what the foreign exchange earnings might be from the processing and export of domestic food crops and other tropical fruits and vegetables.
5. Among agricultural assets, he owns most of the goats, sheep, pigs, mules and donkeys, and small percentages of chickens, beef and dairy cattle. Although egg and broiler production has become considerably commercialized, he produces most of what he and his family consume, and also offers a supply for sale.
6. The category of one to under five acre farmer is more important statistically than meets the eye. The 93,961 such farmers (1968 Census) represented 48.6 percent of the total number of farmers, and they occupied 13.0 percent of the farm acreage. The total included, however, 4,768 landless and 52,976 less than one acre farmers. If these are excluded from the total, then the relative standing of the one to five acre farmer rises to 69.3 percent of the total number.

Adding the five to ten acre farmer increases the significance of the 'small farmer' in numbers and acreage. The sum of the two groups is 119,198, and they represent 87.9 percent of all farmers (119,198/135,618). The acreage of the one to ten acre group rises to 372,385, or 25.4 percent of the total. (Table 3-1)

Table 3-1. Number and Acreage of Farms by Size Groups, 1968.

Size Group (Acres)	Farms		Land in Farms	
	Number	Percent	Acreage	Percent
Landless	4,768	2.47	-	-
Less than 1	52,969	27.40	22,736	1.53
2.55 AC. 1 < 5	93,961	48.58	206,480	13.87
5 < 10	25,237	13.05	165,905	11.14
10 < 25	12,370	6.40	174,852	11.74
25 < 50	2,280	1.18	74,718	5.01
50 < 100	775	.40	52,490	3.53
100 < 200	379	.20	51,116	3.44
200 < 500	320	.17	96,932	6.52
500 up	293	.15	643,959	43.20
All Farms	193,359	100.00	1,489,188	100.00

SOURCE: Agricultural Census, 1968/69.

3.3 Number of Small Farms

The size and distribution of farms in Jamaica in 1968-69 (year of the agricultural census) has been modified by developments of the past five years. The fluctuations in the number of small farms since 1954--down sharply between 1954 and 1961, followed by a rebound between 1961 and 1968--have probably stabilized since 1972. If so, this would have been the net result of contrary cross-currents, the tendency for the number of small farms to diminish as a result of the play of market forces, on the one hand, and the increase in the number of small farms resulting from the Land-Lease Program, on the other. Some further growth may be expected with the projected expansion of the Land-Lease Program under the Five Year Plan (1978-1983). (Tables 3-2, 3-3)

Map 9 shows the location of Land Settlements and major areas of Government land holdings up to 1968. The lands depicted include Land Settlements, Crown Lands (Government lands, generally forested, rough or dry and remote), and Soldiers' Lands (an old land access scheme for veterans). The Land Settlement program dates to 1929. They allowed small holders to gain title to granted lands after meeting certain use and occupation requirements. There was a limit of 15 acres per holding and the Government holds a 25-year mortgage. Land Settlements are still maintained as entities, though no new ones have been formed since 1968.

Few evaluations of Land Settlements have been made. Major problem areas were: 1) lands distributed were marginal in quality, 2) there was poor selection and control of who was given land and much ended in the hands of speculators, 3) some lands not occupied or abandoned,

**Table 3-2. Jamaica: Number and Acreage of Farms by Size Group.
(1954, 1961 and 1968)**

Year	0 <5	5 <25	25 <100	100 <500	Over 500	Total
			(Number of Farms)			
1954	139,043	53,024	5,603	881	332	198,883
1961	113,239	40,768	3,803	778	350	158,938
1968	151,705	37,607	3,055	699	293	193,359
			(Acreage)			
1954	249,074	502,924	232,178	214,131	716,068	1,914,375
1961	198,000	389,441	167,607	185,596	770,786	1,711,430
1968	223,818	333,548	125,104	148,501	676,426	1,507,397

SOURCE: Agricultural Censuses 1961/62 and 1968/69

Table 3-3. Jamaica: Percentage Distribution of Number and Acreage of Farms by Size Groups, 1954, 1961, and 1968.

Year	0 <5	5 <25	25 <100	100 <500	Over 500	Total
(Number of Farms)						
1954	69.9	26.6	2.8	0.5	0.2	100.0
1961	71.2	25.6	2.5	0.5	0.2	100.0
1968	78.4	19.4	1.6	0.4	0.2	100.0
(Acreage)						
1954	13.0	26.3	12.1	11.2	37.4	100.0
1961	11.6	22.8	9.8	10.8	45.0	100.0
1968	14.9	22.1	8.3	9.9	44.9	100.0

SOURCE: Agricultural Censuses, 1961/62 and 1968/69.

4) generally inadequate roads, housing, credit, and infrastructure were provided, and 5) no extension services were initially available. Land Settlements are administered by the Ministry of Agriculture with responsibility for their internal roads, and today have their own extension agent and other services. There seems to be a generally minimal level of group or area management.

On the other hand, the Land Settlement Program did provide land to large numbers of small and medium scale farmers and made a significant contribution to agricultural production. An accounting made of data supplied by the Land Development and Utilization Commission shows that approximately 235 Land Settlements were established between 1929 and 1968. The total acreage is a very substantial 208,000 acres and a very rough approximation of 38,000 farm units. (Table 3-4)

Table 3-4. Land and Farms in Land Settlements.

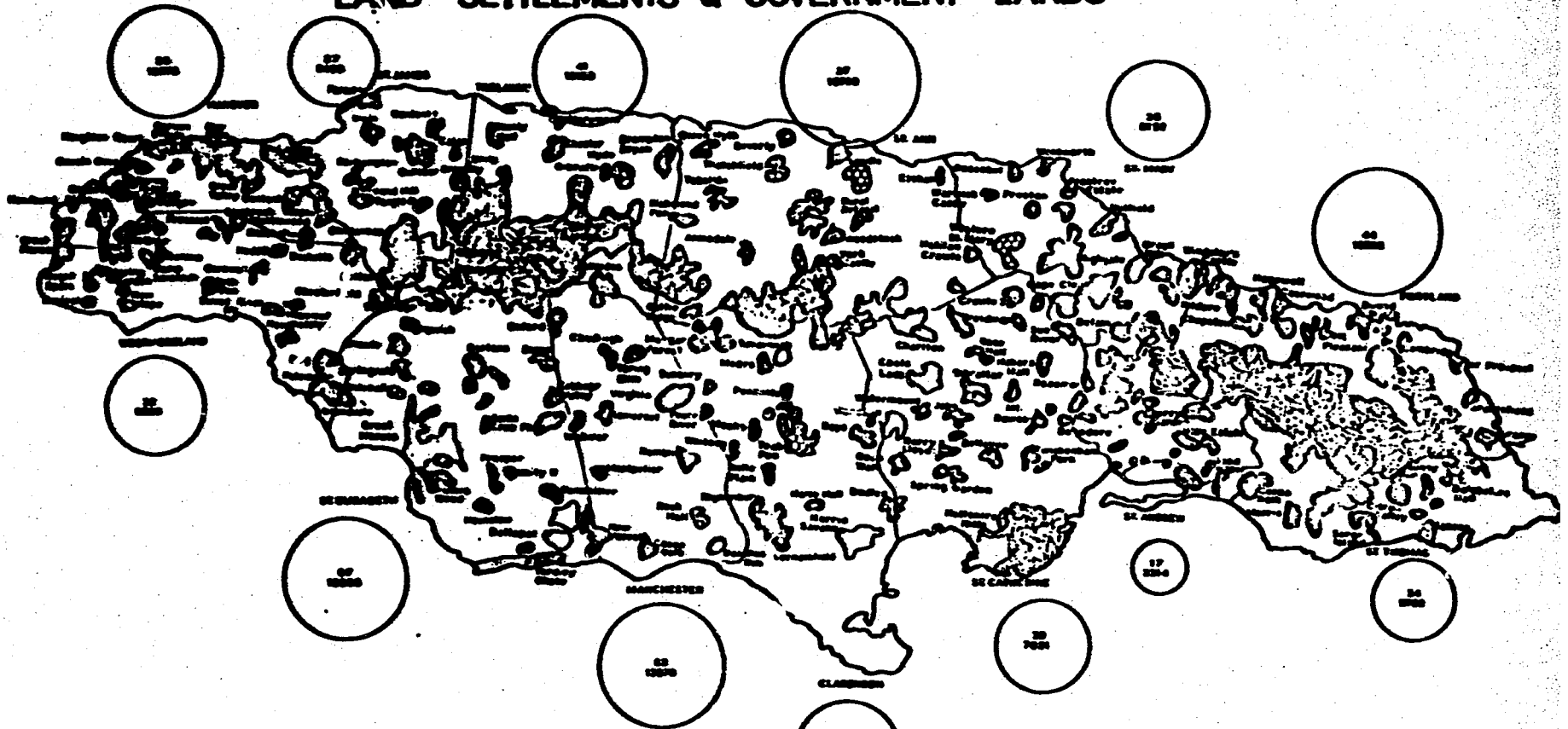
Parish	Number of Settlements	Number of Farms	Total Acreage
Portland	24	4,149	17,274
Clarendon	18	6,295	32,671
Manchester	14	2,079	12,978
St. Elizabeth	22	1,885*	21,028
St. Andrew	24	1,895	9,477
St. Thomas	23	3,780*	18,897
St. Catherine	20	2,764*	14,651
St. James	17	2,436	16,131
Hanover	14	4,101	13,658
Westmoreland	14	2,278	11,360
Trelawny	9	2,278	11,360
St. Mary	23	3,174	15,550
St. Ann	<u>13</u>	<u>2,036</u>	<u>12,453</u>
Total	235	38,663	208,021

*Gross approximations.

The major successor to the Land Settlement concept has been Project Land Lease. Begun in 1973, some Government lands, even moribund portions of Land Settlements, were turned over to this program. However, the major source of lands has been the bauxite companies and lands declared idle. No land has yet been seized through the courts, but considerable amounts of land declared idle have been turned over or sold to the Government. Properties of over 50 acres have been the source of idle lands for Project Land Lease.

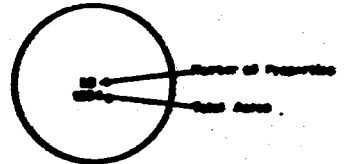
There are three sub-programs or phases of Project Land Lease. Under Phase I, supplemental tenancy is provided for farmers within a reasonable distance (two miles) from their homes. The tenancy is given for a period of five years in the first instance, provision being made for an extension for a further five-year period based on the farmer's performance. Lands leased to farmers under this phase are primarily privately owned lands which have been leased by the Government for a period of six years in the first instance. As of March 1978, some 24,238 farmers were placed on 43,227 acres of arable lands, giving an average of 1.8 acres per farmer. It may be said that Phase I increases the number of small farms in two ways--to the extent that the beneficiaries had been landless previously and by bringing the less-than-one-acre farmers into the one- to five-acre group. If it is assumed that half of 12,000 of the 24,238 farmer-beneficiaries of Phase I (supplemental acreages) were moved into the one- to five-acre category, this would signify an increase of 13 percent in the number of small farmers over the 1968 figure; in terms of acreage, the distribution of 22,000 out of 43,227 acres of arable land would mean an increase of 10.7 percent.

MAP 9
LAND SETTLEMENTS & GOVERNMENT LANDS

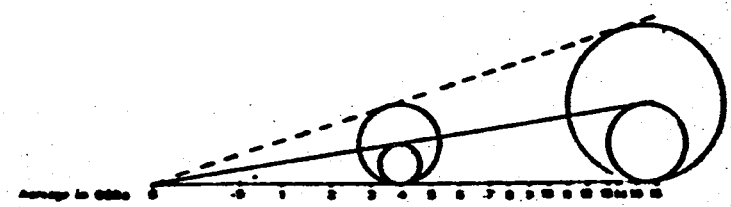


- | | |
|-------------------------|------------------------|
| Crown Lands | Government Owned Lands |
| Ex-soldiers Settlements | Land Settlements |
| Forest Reserves | Water Commission |

Average to Land Use Reports by Parts



Source: Ministry of Agriculture, Lands Department



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Under Phase II, supplemental lands were provided on a leasehold basis for 49 years in the first instance, with inheritance rights. Included were a minimal infrastructure (mainly roads) and credit-in-kind for financing agricultural projects. As of March 1978, 8,958 farmers were awarded 17,361 arable acres.

Under Phase III, leaseholds are for 49 years with more complete infrastructural facilities, including roads, housing, water supply and electricity in some cases. Some 1,006 farmers were placed on 4,552 arable acres. Not many of these almost 10,000 farmers placed under Phases II and III were previously landless or had less-than-one-acre. If it is assumed that half of the 20,000 new Land Lease farmers projected for 1978-83 would be landless or less-than-one-acre farmers, and adding these to the 12,000 (half of 24,000 under Phase I) in the same category 1973-78, then the increase in small farmers through the Land Lease Program for the period 1973-83 would be 22,000 or 24 percent of the 93,000 one- to five-acre farmers existing in 1968. (Table 3-5)

According to the projections of the Agricultural Five Year Plan, another 20,000 farmers are expected to be placed under the Land Lease Program (Table 3-6).

Land-Lease projects by parish are shown in Table 3-7.

Table 3-5. Number of Small Farmers Benefiting from Land-Lease, 1973-1983.

1973-1978 (as of May 31)	Number	Arable Acres
PLL - I	24,238	43,227
PLL - II	8,958	17,361
PLL - III	<u>1,006</u>	<u>4,552</u>
Total	34,202	65,140
Five-Year Plan Projections 1973-1983	20,000	40,000 (est.)
	<u>54,202</u>	<u>105,140</u>

SOURCE: Ministry of Agriculture.

Table 3-6. Land-Lease Placement Projections: 1978/79 - 1982/83.

Region	1978/79	1979/80	1980/81	1981/82	1982/83	Total
Southern	2,800	1,800	1,750	925	441	1,716
Northern	2,000	2,000	1,400	1,080	740	7,220
Western	<u>2,065</u>	<u>1,177</u>	<u>700</u>	<u>540</u>	<u>500</u>	<u>4,982</u>
All Regions	6,865	4,977	3,850	2,545	1,681	19,918

SOURCE: Jamaica's Five Year Development Plan.

Table 3-7

PROJECT LAND LEASE: STATUS APRIL 26, 1978

<u>PARISH</u>	<u>NO. OF PROPERTIES</u>	<u>ACREAGE</u>		
		<u>LEASED</u>	<u>ARABLE</u>	<u>GROWING</u>
Portland	44	13,588	8,017	4,150
St. Mary	35	8,152	6,014	4,057
St. Ann	37	15,760	6,757	1,800
St. Thomas	34	5,702	4,403	1,028
St. Catherine	30	7,021	4,361	1,394
St. Andrew	17	2,314	1,193	376
Clarendon	49	9,625	6,227	2,655
Manchester	62	13,070	8,344	1,522
Trelawny	41	10,100	3,472	930
St. James	27	6,490	3,401	1,448
Hanover	26	10,075	5,325	1,644
Westmoreland	32	8,300	4,473	861
St. Elizabeth	67	12,285	5,705	1,944
TOTAL	501	122,483	67,692	23,809

SOURCE: Ministry of Agriculture

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All of the bauxite companies* have recently turned over to the Government substantial amounts of land to utilize under Project Land Lease, land which will eventually be returned for mining. As of May 1978 about 24,588 acres had been turned over to Project Land Lease, of which 37 percent are considered arable. The summary of Reynolds Company operations is instructive of the general situation. Total ownership is 59,070 acres, of which 28,020 (47 percent) is tenanted, 1,170 is timbered (2 percent) and 2,917 (5 percent) is to PLL. Kaiser Company buys much of its land from small farmers, and it has established several planned resettlement communities in St. Ann, such as those at Hermitage and Lilyfield.

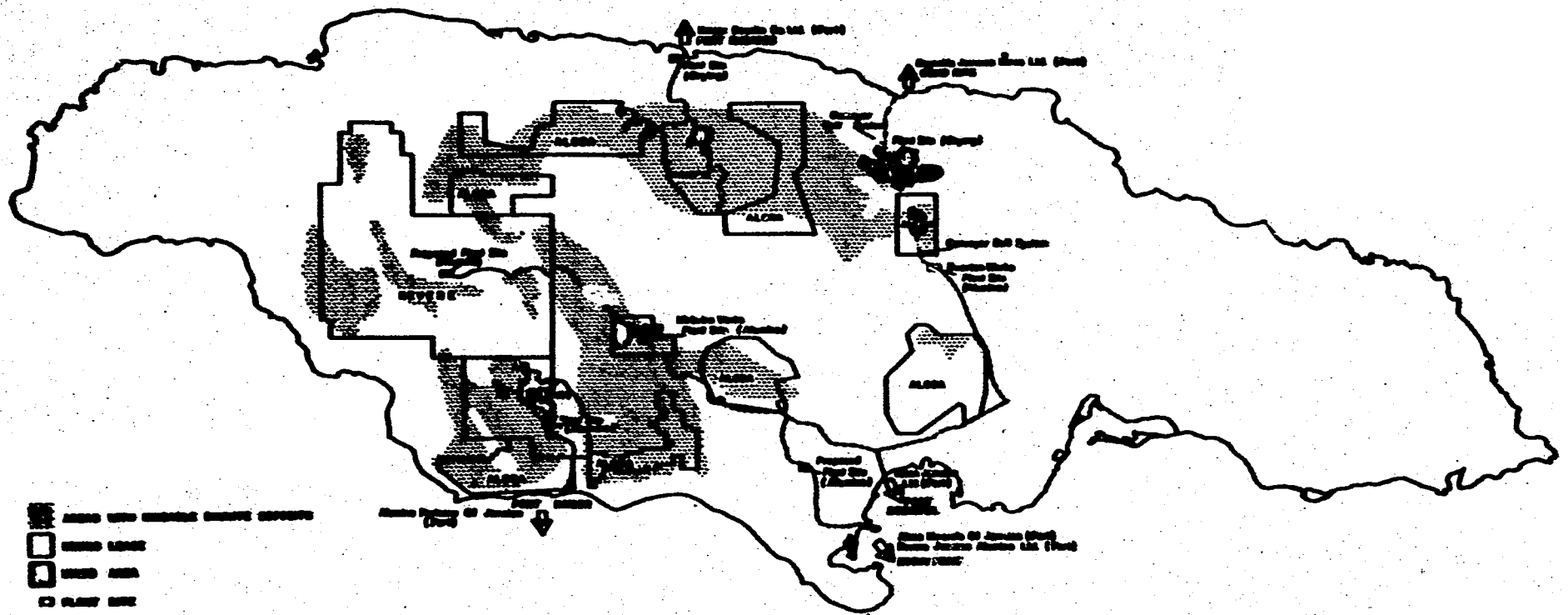
Alcan has 4,600 tenants on its leased lands, farming some 17,000 acres (3.7 acres per tenant) and the length of lease averages five to seven years. Thus, this one company deals with as many small farmers as live in a large constituency. Most Alcan lands are managed in large units by the company itself. Livestock and citrus are the favorite crops for large unit management. Land which has been mined and restored is generally retained by the company for its own management. The leasing to small farmers occurs on lands 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 small farmers with an active and dedicated extension service which facilitates the farmers' access to fertilizer, planting materials, plowing services, marketing services, credit and export advice. (Map 10)

* Bauxite is the principal mineral resource and export of Jamaica. It occurs as a surficial deposit which is mined by large machines in the open cast method. The five large North American companies (Alcan, Kaiser, Alcan, Reynolds, Alparts) own some 200,000 acres of land, 7 percent of the total area of the island. A new ownership arrangement has been initiated under the terms of which the Government of Jamaica will own all bauxite lands and lease back to the companies the land needed for mining.

25

BAUXITE

MAP 10



- AREAS WITH SIGNIFICANT BAUXITE DEPOSITS
- BAUXITE GRADE
- BAUXITE TYPE
- BAUXITE ZONE
- BAUXITE DEPOSIT (Peak of Deposit)
- BAUXITE DEPOSIT (Foot of Deposit)
- 0 100 200 300 400 500 600 700 800 900 1000
1:100,000

Revised by Richard Allen of American Bauxite

26

Table 3-8. Pioneer Farms, Summer 1978.

Parish	Constituency	Farm	Acreage	Number Pioneers on Farm	Potential Pioneers	Month Launched
Farms Already Launched						
St. Mary	W. Central	Wentworth	126	21	32	November '77
St. Mary	E. Central	Cape Clear	140	32	40	November '77
Clarendon	S. West	Giime-me-bit	60	13	20	November '77
St. Thomas	West	Springfield	72	17	30	April '78
St. Thomas	West	York	310	50	75	April '78
St. Thomas	East	Paul Bogle	275	19	50	April '78
Westmoreland	West	Meylersfield	80	21	25	May '78
Trelawny	North	Hague	17	16	16	July '78
Portland	East	Darley	160	42	50	August '78
Subtotal				231	338	
Farms Undergoing Planning to be Launched August/September 1978						
St. Ann	Northwest	Bellaire	400		60	September '78
St. James	W. Central	Retirement	60		15	September '78
Subtotal					75	
Farms Identified to be Planned and Launched						
Portland	West	Lennox	60		25	
Westmoreland	Central	Llandillo	200		60	
St. Elizabeth	Southwest	Fonthill (Luana)	200		60	
Trelawny	South	Freeman's Hall	100		40	
St. Catherine	E. Central	Cedar Valley	200		40	
Subtotal					225	
Farms Being Investigated						
Portland	East	Castle/Comfort			40	
Portland	East	Hectors River			35	
Portland	West	Terra Nova			25	
St. Ann	Northeast	Roaring River			40	
St. Catherine	Southwest	Thatford			50	
Subtotal					190	
TOTAL					858	

SOURCE: Ministry of Agriculture.

The third and most recent leg of the Government's land reform program is the Pioneer Farm (PF) scheme. This is mentioned for sake of completion, although it will not add to the number of small farms. Pioneer Farms are collectively operated and professionally managed new farm units operated by youths, aged 18 to 25, male and female. The typical size of a Pioneer Farm is 100 to 200 acres with 50 participants. PF's are part of an overall scheme of Community Enterprise Organization aimed at relieving unemployment and oppressive social conditions of rural and urban youths. Originally operated by the Social Development Commission (SDC), PF are now administered by the Ministry of Agriculture. (The SDC is still involved in recommendations and initial organization.) Three Government managers as well as Government investment in facilities, credit and even labor payments are to help during the establishment phase of these communities. The program began in 1977 and nine farms are already established, two more being currently organized and ten others in various stages of planning. These farms operating and planned represent about half the eventual target of 1,600 farmers on 4,000 acres envisioned for the Five Year Plan 1978-1983. The location of these PF can be found in Table 3-8.

3.4 Location of the Small Farmer

About 60 percent of the Jamaican population lives in rural areas. The fairly even spread of the rural population over the Jamaican countryside may be seen from Table 3-9 and Map 11. The dark areas on the map represent constituencies¹ where more than 50 percent of the population is rural. These cover the whole country with the exception of the Kingston metropolitan area and Montego Bay. Ten of the 43 constituencies (not counting the ten purely urban constituencies of Kingston and St. Andrew) are 100 percent rural, and they are found in the west (the constituencies of Southeast and Northeast Westmoreland and East Hanover), in the south (Southeast and Northwest St. Elizabeth and North Clarendon), in the north (Southeast St. James, South Trelawny) and east (Southwest St. Ann and West St. Mary). Among the parishes, St. Elizabeth has the highest rural population with 94.9 percent followed by Hanover with 93.8 percent. Excluding Kingston and St. Andrew, the parishes with the lowest rural population are St. James with 56.6 percent and St. Catherine with 6.3 percent. It is worth noting that the parishes with the highest rural population are furthest from Kingston, and the parishes with the lowest percentage of rural population are nearest the large urban agglomerations.

The location pattern of employment in agriculture is shown on Table 3-10 and Map-12. The data are from the 1970 population census and show the size of the total rural work force and compares this with the

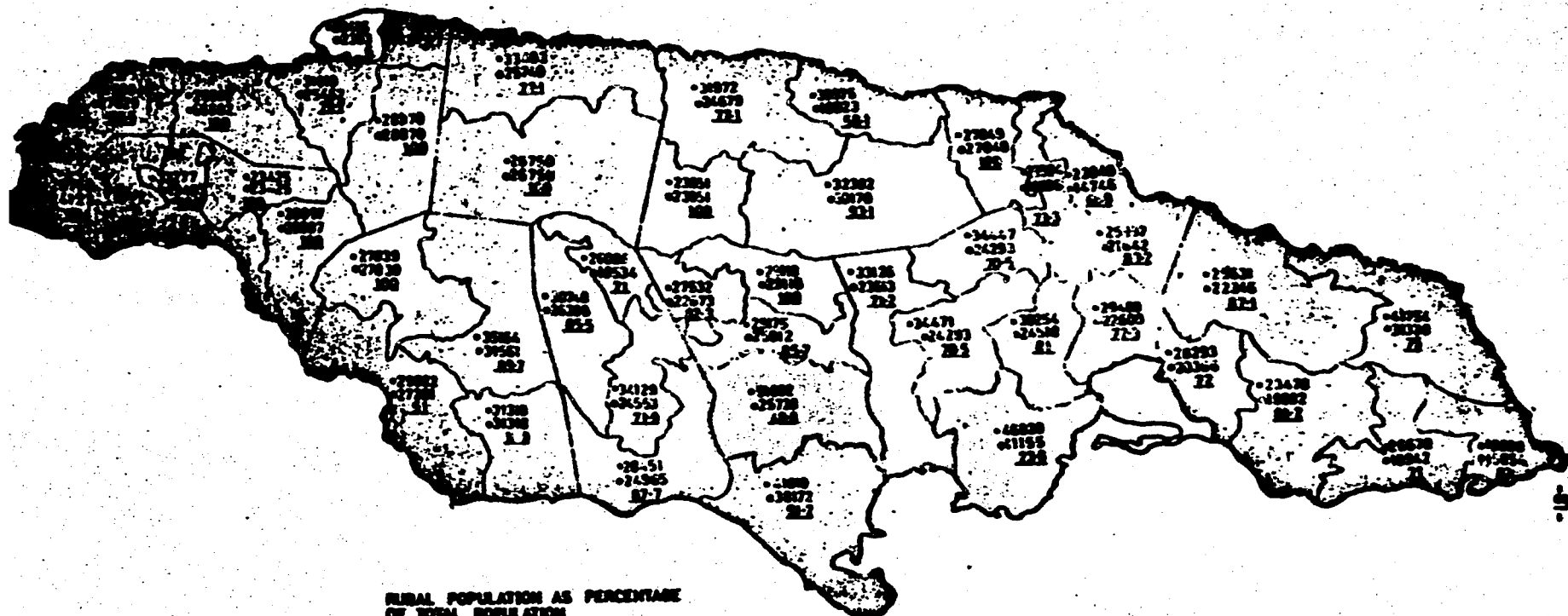
1. Constituencies are electoral districts and the intermediate census division between the parish and the enumeration district, the latter the smallest census division of which more than 4,090 exist across the island. The time and expense of obtaining and using enumeration district data precludes their use except for target area analysis in later phases of the project.

Table 3-9

JAMAICA: TOTAL URBAN AND RURAL POPULATION BY PARISH AND CONSTITUENCY, 1970

PARISH/CONSTITUENCY	URBAN	RURAL	TOTAL	PERCENT RURAL
KINGSTON	106,791	0	106,791	0
East	49,918	0	49,918	0
Central	31,679	0	31,679	0
West	25,194	0	25,194	0
ST. ANDREWS	366,908	43,166	410,074	10.5
East Rural	7,927	20,366	28,293	72.0
West Rural	6,680	22,800	29,480	77.3
Southeast	52,114	0	52,114	0
East Central	62,580	0	62,580	0
South	32,484	0	32,484	0
Southwest	54,627	0	54,627	0
West Central	66,462	0	66,462	0
North	84,034	0	84,034	0
ST. THOMAS	15,545	53,678	69,243	77.5
East	3,435	15,654	19,089	82.0
Central	7,734	18,942	26,676	71.0
West	4,396	19,082	23,478	81.2
PORTLAND	13,711	53,674	67,385	79.6
East	10,426	31,328	41,754	75.0
West	3,285	22,346	25,631	87.2
ST. MARY	17,647	79,943	97,590	81.9
Southeast	4,355	21,642	25,997	83.2
North	7,294	14,746	22,040	66.9
Central	5,998	16,506	22,504	73.3
West	0	27,049	27,049	100.0
ST. ANN	22,457	96,823	119,280	81.1
Northeast	12,952	18,023	30,975	58.1
Northwest	7,292	24,679	31,972	77.1
Southeast	2,212	30,170	32,382	93.1
Southwest	0	23,951	23,951	100.0
TRINIDAD	7,663	52,490	60,153	87.2
North	7,663	25,740	33,403	77.1
South	0	26,750	26,750	100.0
ST. JAMES	43,521	56,775	100,296	56.6
Northeast	37,063	2,353	39,416	6.0
Central	6,458	25,452	31,910	79.7
Southeast	0	28,970	28,970	100.0
MANOVA	3,579	54,221	57,800	93.8
East	0	26,592	26,592	100.0
West	3,579	27,629	31,208	88.5
WESTMORELAND	16,430	95,137	111,567	85.2
Southeast	0	28,097	28,097	100.0
Northeast	0	23,425	23,425	100.0
Central	13,784	19,493	33,277	58.5
West	2,646	24,122	26,768	90.1
ST. ELIZABETH	6,304	117,999	124,303	94.9
Southeast	0	31,318	31,318	100.0
Northeast	3,603	31,561	35,164	89.7
Northwest	0	27,839	27,839	100.0
Southwest	2,701	27,281	29,982	91.0
MANCHESTER	25,074	94,340	119,414	79.0
Northwest	4,440	26,288	30,728	85.5
Central	9,576	24,553	34,129	71.9
South	3,486	24,965	28,451	87.7
Northeast	7,552	18,534	26,086	71.0
CLARENDON	38,624	140,703	179,327	78.5
North	0	29,118	29,118	100.0
Northeast	4,859	22,673	27,532	82.3
North Central	4,163	25,012	29,175	85.7
South Central	25,944	25,728	51,672	49.8
South	3,638	38,172	41,810	91.2
ST. CATHERINE	62,448	116,670	179,118	65.1
East	5,736	24,539	30,275	81.0
Central	10,178	24,293	34,471	70.5
North	1,396	33,051	34,447	95.9
West	9,513	23,613	33,126	71.2
South	32,645	11,155	43,800	23.8
TOTAL	746,722	1,055,619	1,802,341	58.6

RURAL POPULATION MAP II



RURAL POPULATION AS PERCENTAGE OF TOTAL POPULATION

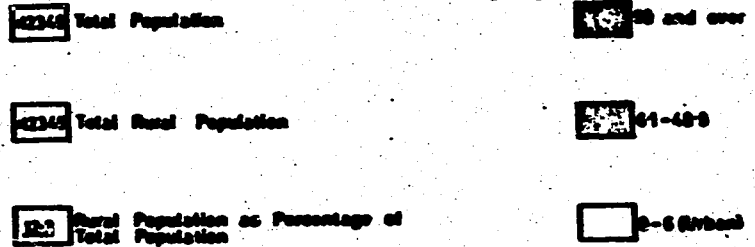
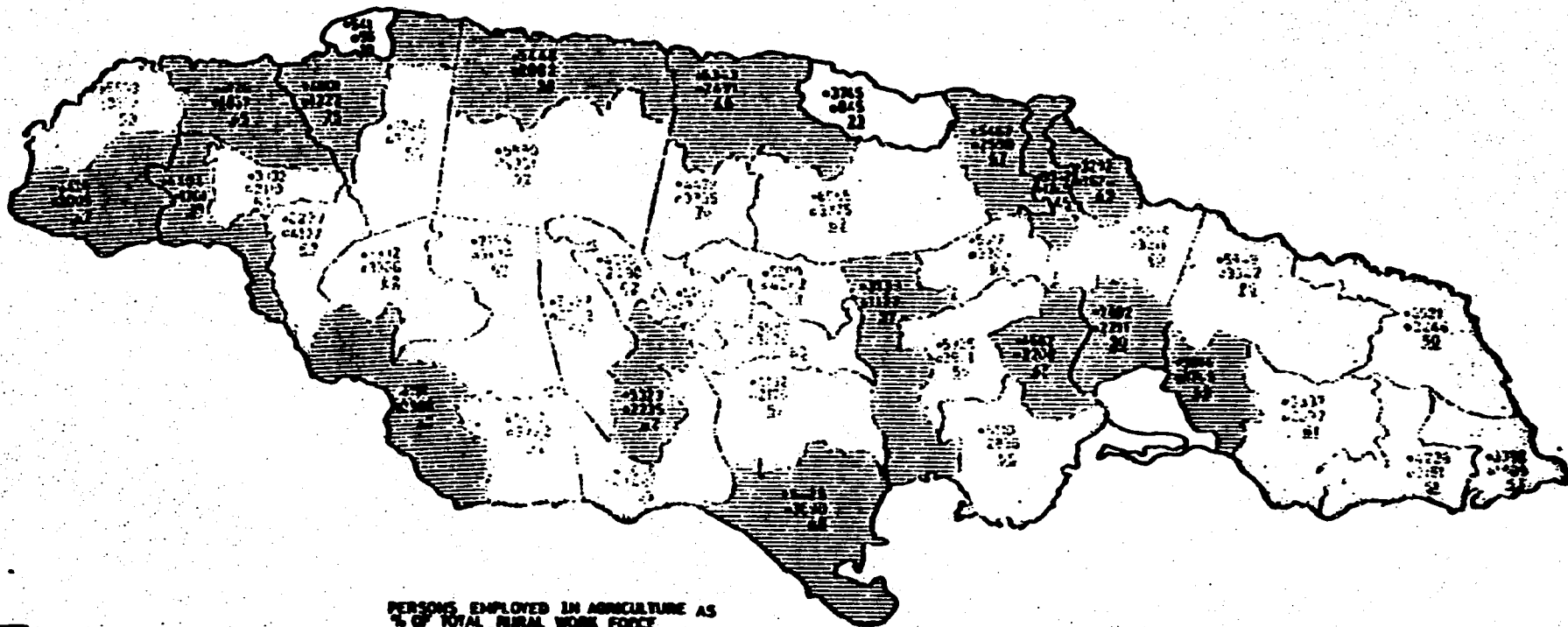


Table 3-10
TOTAL WORKING POPULATION AND WORKERS IN AGRICULTURE, FORESTRY,
HUNTING AND FISHERIES, 1970

PARISH/CONSTITUENCY	TOTAL WORKING POPULATION	WORKERS IN AGRICULTURE	WORKERS IN AGRICULTURE % OF TOTAL
KINGSTON	33,834	325	1
East	16,446	120	1
Central	9,797	102	1
West	7,591	103	1
ST. ANDREW	129,852	9,151	7
East Rural	8,077	2,023	25
West Rural	8,698	2,751	32
Southeast	18,602	120	1
East Central	22,504	162	1
South	9,248	66	1
Southwest	14,556	283	2
West Central	19,389	237	1
North	31,778	313	1
ST. THOMAS	19,046	8,683	46
East	5,851	2,862	49
Central	7,418	2,746	37
West	5,777	3,075	53
PORTLAND	17,940	8,472	47
East	11,107	4,416	40
West	6,833	4,056	59
ST. MARY	26,154	11,433	44
Southeast	7,030	3,609	51
North	5,935	2,376	40
Central	6,213	2,192	35
West	6,976	3,256	47
ST. ANN	28,668	11,935	42
Northeast	8,418	1,221	15
Northwest	8,042	2,951	37
Southeast	7,031	3,960	56
Southwest	5,177	3,803	73
IRELANBY	16,144	8,041	50
North	8,981	2,916	32
South	7,163	5,125	72
ST. JAMES	28,625	5,957	21
Northwest	12,954	305	2
Central	8,735	1,810	21
Southeast	6,937	3,842	55
HANOVER	14,599	6,262	43
East	6,180	2,413	39
West	8,419	3,849	46
WESTMORELAND	26,632	12,407	47
Southeast	6,664	4,341	65
Northeast	4,866	2,475	51
Central	8,185	2,162	26
West	6,917	3,429	50
ST. ELIZABETH	29,324	14,583	50
Southeast	7,151	3,750	52
Northeast	8,242	3,869	47
Northwest	6,656	3,893	58
Southwest	7,275	3,071	42
MANCHESTER	30,224	12,609	42
Northwest	7,159	3,067	43
Central	9,782	2,611	27
South	6,279	3,160	50
Northeast	7,004	3,771	54
CLARENDON	43,314	21,726	50
North	6,694	4,786	71
Northwest	6,375	3,982	62
North Central	7,044	4,450	63
South Central	12,640	3,892	31
South	10,541	4,616	44
ST. CATHERINE	45,819	16,355	36
East	7,618	2,721	36
Central	8,509	3,624	43
North	7,720	3,711	48
West	7,961	3,911	49
South	14,011	2,388	17
TOTAL	488,791	147,939	30

PERSONS EMPLOYED IN AGRICULTURE

MAP 12



0234 Total Rural Work Force

PERSONS EMPLOYED IN AGRICULTURE AS
% OF TOTAL RURAL WORK FORCE

50 and over

0234 Persons Employed in Agriculture

25-49

02 Persons Employed in Agriculture as Percentage
of Rural Work Force

0-24

93

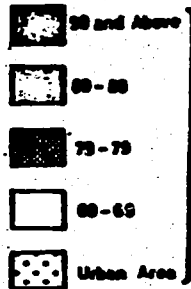
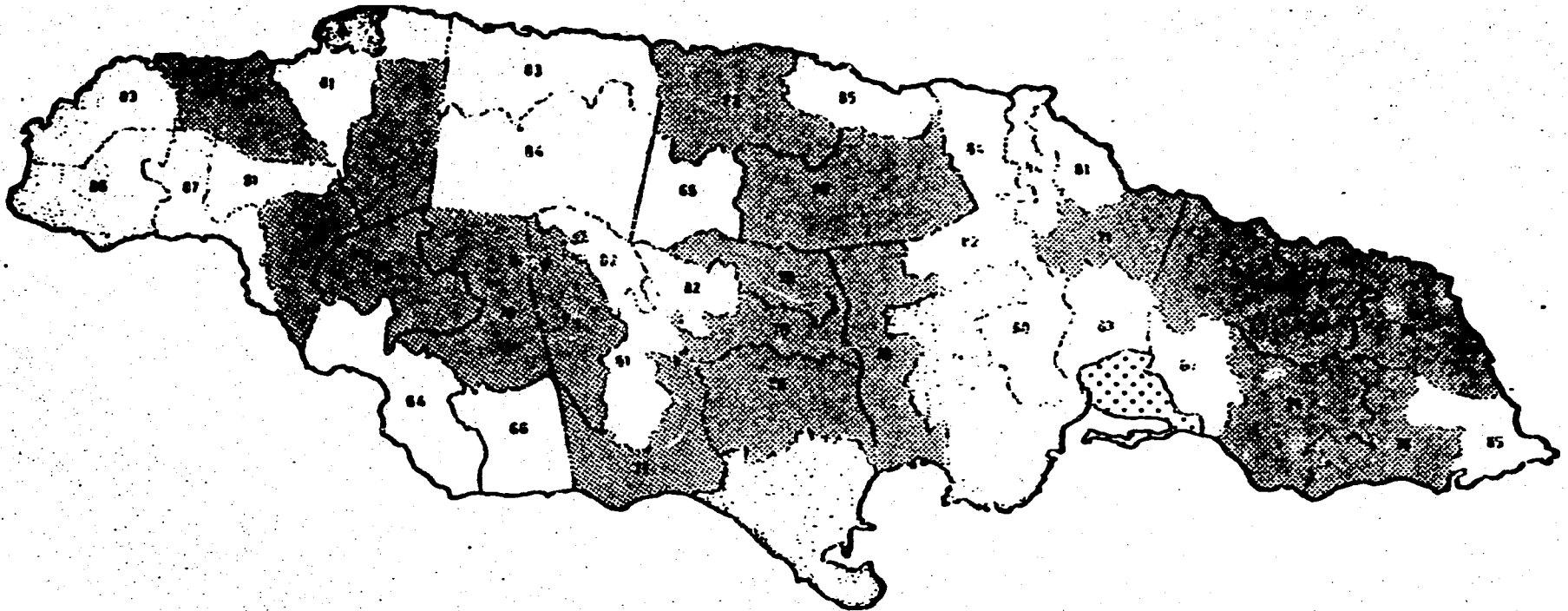
number of persons employed in agriculture. The shaded portions of the map emphasize the proportion of total rural work force which is employed in agriculture.

A high proportion of employment in agriculture is in part a measure of the lack of other employment opportunities in an area and indicates a generally low level of development. The darkest areas of the map show those constituencies where 50 percent or more of the work force is found in agriculture. The small farmer's occupation of the central hilly axis of the island, his primary domain, shows clearly on Map 12. He occupies the whole center of the island and the western and eastern extremities. The coastal areas are as a rule more urban or commercial, and the coastal constituencies thus show a somewhat lower percentage of agricultural employment. Of the island's total working population, about 30 percent are in agriculture, forestry, and fishing. The parishes of Trelawny, St. Elizabeth, and Clarendon have 50 percent of their total working population in agriculture, and at the other extreme (excluding the urban parishes of Kingston, St. Andrew and St. James) is the parish of St. Catherine with 36 percent. The majority of the parishes have percentages in the mid-forties. The parishes with 100 percent rural populations also contain high agricultural working populations: North Clarendon, 71 percent; South Trelawny, 72 percent; Southwest St. Ann, 73 percent; Southeast Westmoreland, 65 percent; Northwest Clarendon, 62 percent; and North Central Clarendon, 63 percent.

A third indicator of the small farmer's location is cropped acreage. Unlike Maps 11 and 12, which are population census figures which deal with number of persons, Maps 13 and 14 depict agricultural

LOCATION OF SMALL FARMERS (A)

MAP 13



Number of Farms Under 5 Acres as Percentage of Total Farms

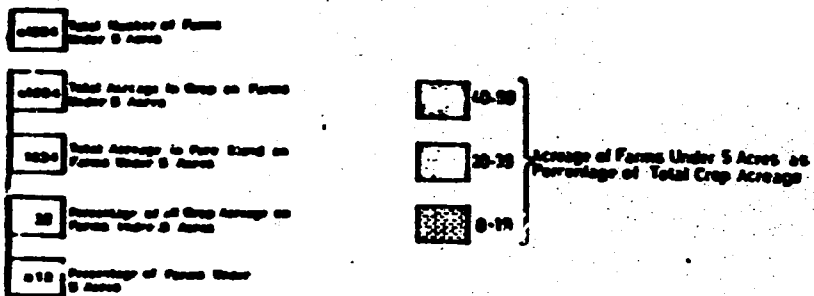
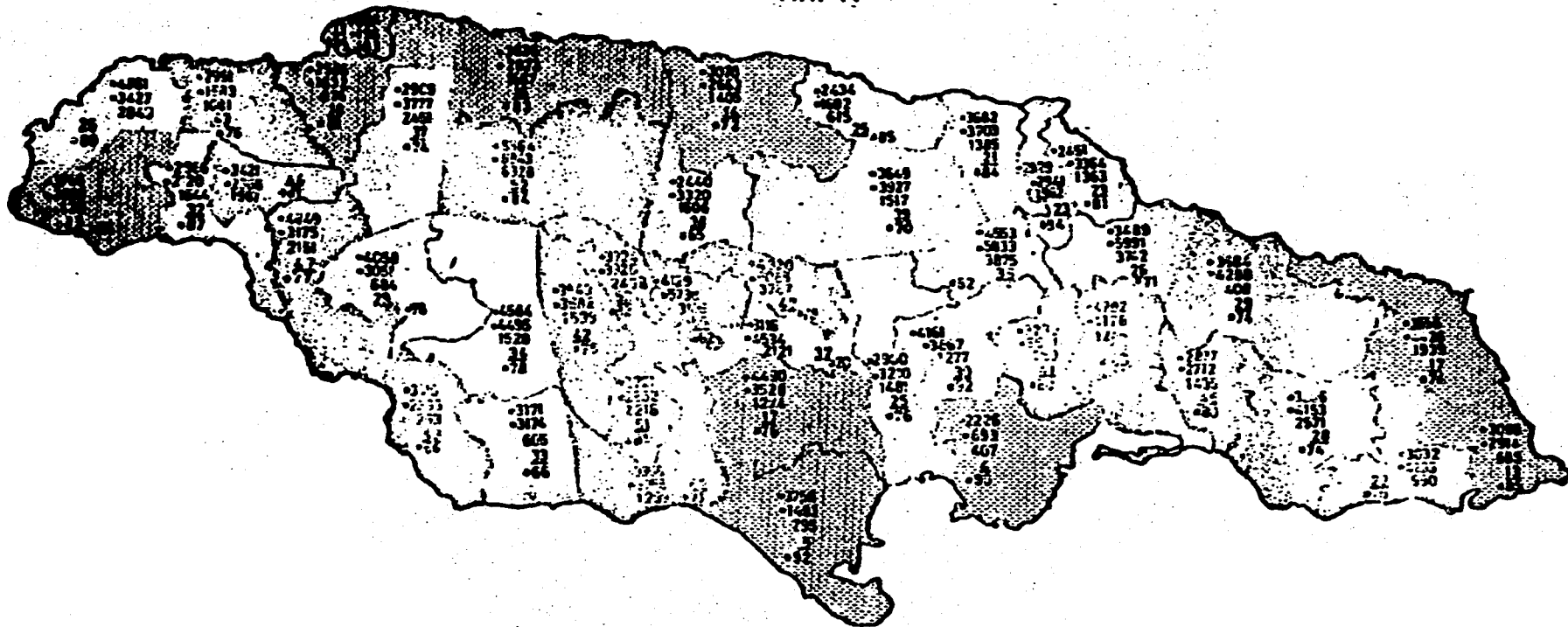
Source: *American Agricultural Census, Vol. 1, Part B, 1960.*



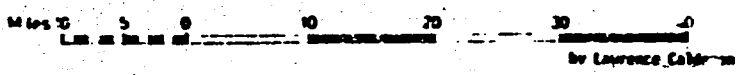
by Laurence Coldren

LOCATION OF THE SMALL FARMER (B)

MAP 14



Source: Jamaica Agricultural Census, Vol. 3, Part B, 1950.



by Lawrence Calder

Best Available Document

96

census data of 1968/69 and are concerned with the number of farm units and areas in crop. These show the small farmer to be widely spread across the Jamaican landscape. In no area of Jamaica is the farmer with under five acres of land less than 65 percent of the total number of farmers and is more generally near 80 percent. The highest proportion of small farms occurs in the constituencies which have large sugar estates (South St. Catherine, 90 percent; South Clarendon, 92 percent; East St. Thomas, 85 percent; West Westmoreland, 86 percent) and the lowest in the areas where grazing predominates (Southwest St. Ann, 65 percent). A logical explanation may be found in the relative presence or absence of medium-sized farms (10-100 acres). In the sugar areas, they are few in number and in grazing districts relatively many. The average number of small farmers per constituency is 3,452, while the extremes range between 5,564 in South Trelawny to 2,226 in South Clarendon. The standard deviation for the number of small farms by constituency is 834, i.e., 67 percent of all constituencies fall within the range of 4,286 and 2,618.

The total acreage in crop on small farms is a measure of the contribution which each area is making to food production. Cropped acreage is the most intensively utilized portion of the farm and most of the subsistence and income is derived from it. Total crop acreage includes crops raised in pure stands, mixed stand, and food forest, and for small farms accounts for over 70 percent of gross farm acreage (compared with 29 percent of gross farm area cropped on 25 to 50 acre farms). Generally, small total of cropped acreage by constituency and small average cropped acres per small farm occurs in the sugar, other plantation and urbanized

Table 3-11. Jamaica: Number and Cropped Acreage of Farms Under Five Acres by Constituency.

Parish Constituency	No. Farms Under 5 Acres	Percent Farms Under 5 Acres of Total Farms	Acreage in Crop on Farms Under 5 Acres	Percent Acreage in Crop on Farms Under 5 Acres of Total Acres in Crop
<u>St. Andrew</u>	<u>7,169</u>	<u>82</u>	<u>6,888</u>	<u>48</u>
East Rural	2,877	80	2,712	45
West Rural	4,292	83	4,176	50
<u>St. Thomas</u>	<u>9,513</u>	<u>78</u>	<u>11,170</u>	<u>19</u>
East	3,085	85	2,914	13
Central	3,032	76	4,103	20
West	3,396	74	4,153	28
<u>Portland</u>	<u>7,240</u>	<u>74</u>	<u>8,715</u>	<u>22</u>
East	3,556	74	4,426	17
West	3,684	74	4,289	29
<u>St. Mary</u>	<u>12,547</u>	<u>79</u>	<u>15,999</u>	<u>24</u>
Southeast	3,489	71	5,991	26
North	2,451	81	3,364	23
Central	2,925	84	2,941	23
West	3,682	84	3,703	21
<u>St. Ann</u>	<u>11,593</u>	<u>72</u>	<u>11,601</u>	<u>26</u>
Northeast	2,434	85	1,692	25
Northwest	3,070	72	2,662	14
Southeast	3,649	70	3,927	39
Southwest	2,440	65	3,320	38
<u>Trinidad</u>	<u>9,190</u>	<u>83</u>	<u>9,666</u>	<u>32</u>
North	3,626	83	2,823	16
South	5,564	84	6,843	52
<u>St. James</u>	<u>6,480</u>	<u>80</u>	<u>5,605</u>	<u>27</u>
Northwest	985	94	196	13
Central	2,586	81	1,632	18
Southeast	2,909	74	3,777	37
<u>Hanover</u>	<u>7,812</u>	<u>84</u>	<u>5,410</u>	<u>30</u>
East	2,951	76	1,983	43
West	4,861	89	3,427	26
<u>Westmoreland</u>	<u>15,002</u>	<u>81</u>	<u>10,521</u>	<u>26</u>
Southeast	4,849	77	3,178	47
Northeast	3,421	81	2,366	44
Central	2,966	87	2,120	32
West	3,766	86	2,860	13
<u>St. Elizabeth</u>	<u>14,829</u>	<u>72</u>	<u>13,613</u>	<u>34</u>
Southeast	3,171	66	3,174	33
Northeast	4,584	78	4,495	34
Northwest	4,058	78	3,051	29
Southwest	3,016	64	2,893	43

Table 3-11.(Continued)

Parish Constituency	No. Farms Under 5 Acres	Percent Farms Under 5 Acres of Total Farms	Acreage in Crop on Farms Under 5 Acres	Percent Acreage in Crop on Farms Under 5 Acres of Total Acres in Crop
<u>Manchester</u>	<u>13,650</u>	<u>77</u>	<u>13,718</u>	<u>46</u>
Northwest	3,849	75	3,682	42
Central	2,721	81	2,852	51
South	3,356	71	3,258	42
Northeast	3,724	82	3,925	52
<u>Clarendon</u>	<u>19,813</u>	<u>79</u>	<u>21,358</u>	<u>24</u>
North	4,320	78	6,065	47
Northwest	4,129	82	5,738	55
North Central	3,116	70	4,534	37
South Central	4,490	76	3,528	17
South	3,758	92	1,493	5
<u>St. Catherine</u>	<u>17,070</u>	<u>84</u>	<u>17,244</u>	<u>30</u>
East	3,230	80	3,641	41
Central	4,161	92	3,867	30
North	4,553	82	5,833	36
West	2,900	76	3,210	25
South	<u>2,226</u>	<u>90</u>	<u>693</u>	<u>4</u>
TOTAL	151,908		151,510	32

SOURCE: Agricultural Census 1968/69 (unpublished).

areas. The small farmer on the hilly upland is more numerous, has more total acres in crop and more average acres per farm in crop. In short, the areas of small farmer predominance make the major contributions to food supply.

The percentage of all crop acreage (not total farm acreage) found on small farms is approximately 32 percent, and in portions of the central uplands, such as northern Manchester and Clarendon, the proportion is on the order of 50 percent. The areas where small farmers operate less than 20 percent of the cropland are mainly plantation areas on the coastal margins. This suggests that small farms contribute a greater absolute value to total crop production than is generally perceived or derived from data presented on total farm acreage.

4. The Small Farm: Resources and Operations

4.1 The Small Farm: A Working Definition

Our working definition of the small farm will be the one- to five-acre farm. This is more restrictive than the census definition of a 'farm,'¹ but we believe it is more suited to the purposes of this study. Depending on the matter being analyzed, it may include farmers up to ten acres. The less-than-one-acre farmer is not included, because his is mainly a part-time activity and not necessarily his main source of employment or of subsistence. Some light is shed on this by the agricultural census figures of 1968/69. Less than half of the persons living on less than one acre indicated that farming represented their principal means of livelihood. Those claiming non-agricultural employment as their principal means of livelihood were almost as numerous as those who claimed farming as their principal means of livelihood. One may infer from this that their principal means of livelihood was in a nearby village or town, and that they used the less than one acre to grow some of their own food and for supplemental income.²

1. The Agricultural Census of 1968/69 defines a 'farm' as:
"All land occupied for agricultural purposes situated in a single parish irrespective of the terms of occupation, or the number of parcels of which it is composed . . . Minimum criteria for defining a farm are: (a) 1 square of cultivation, (b) 12 economic trees, (c) 1 head of cattle, (d) 2 heads of pigs, goats, or sheep, (e) 12 poultry, (f) 6 bee hives.

"A 'farm Operator' is 'a person who is financially responsible for the operation of the farm; who takes the profits or bears the losses directly resulting from the farming operations. He may be either the owner or a tenant, paying or non-paying.'"

2. The 1968/69 Census figures are:

Persons living on less-than-one-acre indicating that their principal means of livelihood was . . .

Farming	25,110
Agricultural Employment	10,522
Non-Agricultural Employment	22,032
Non-Specified	80
Total Respondents	57,744
Total Acreage	22,736 (1.5 percent of farming acreage)

4.2 Land

The point is repeatedly made in the literature that small farms are disadvantaged because they are predominantly located in hilly areas at a distance from roads and markets. As the Census did not report production or land values, it is not possible to compare yields or values with size of farm from that source. Information on land values obtained from the Land Valuation Department is being studied in relation to rural areas by the geographer on the sector team.

4.3 Tenure

About 68 percent of land on farms of one to under five acres is operator-owned, compared with 79 percent on farms of five to ten acres and an all-farm average of 86 percent (Table 4-1). In addition to rented land, use of rent-free land is of some importance on small farms. Some of this is from relatives, but some is public and occupied by "squatting." Most authorities feel that the rented portion of farms poses problems of farm management because of short tenures that inhibit good land use planning. Another problem arises from the tendency for farms to be made up of scattered tracts, the average for the country being about two tracts per farm unit. Such advantages as may accrue from diversification of climatic risks are more than offset by the diseconomies of small fields, increased travel time and additional hazards of praedial larceny. Even when the farmer owns the land his title often is imperfect and he finds it difficult to borrow.

Table 4-1. Proportion of Land Occupied Under Specified Tenures, 1968-69, by Size of Farm.

Size Group	Owned by Farmer (Excluding that rented out)	Rented In	Rented Free	Other	Net Total Occupied
1 5	67%	21%	11%	1%	100%
5 10	78%	14%	7%	1%	100%
All Farms	86%	9%	4%	1%	100%

SOURCE: Agricultural Census 1968/69.

4.4 Labor

According to the Census, about three-fourths of farmers are males. For larger farms, the proportion is considerably higher. The Census, and most studies of Jamaican agriculture, comment upon the age of Jamaican farmers, the modal ages being 46 to 55 for all farmers of both sexes and most size groups. Women farmers on the large farms tended to be somewhat older. The Pindars-Two Meetings Watersheds survey of 1976 found that more than half the farmers were more than 50 years old for all size categories except those under one acre.

There is little empirical evidence of the relationship of age of farmer and work done on the farm or on the quality of decisions made, but those with experience working closely with farmers usually conclude that older farmers do not work as much in the field and are more conservative in investments and planning decisions.

A complaint is frequently voiced that young people are not interested in farming and that when there are seasonal labor shortages there are at the same time underemployed people on farms. The Pindars survey found that the following proportion of farms had four or more dependents.

Farms of less than one-half acre	43%
Farms of one to two acres	59%
Farms of two to five acres	72%
Farms of five to ten acres	77%
Farms of ten to twenty acres	83%
Farms of twenty or more acres	87%

Moreover, few dependents were old. For the whole sample, 52 per cent were less than 20 years of age, 75 percent were below 40, and 11 percent were above 60. Many of the able-bodied farmers and dependents work

all or part time off their own farms as their principal source of income. Many of those who considered themselves primarily farmers also did off-farm work.

A surprising proportion of small Jamaican farmers reports that they hire labor, and that they have labor problems. In the Pindars survey, more than half the farmers with less than one acre complained of low labor efficiency, high wages, and undependable labor. For farms of one to two acres, the proportion of complaints ranged from 53 to 73 percent and for farms of two to five acres, such complaints were reported by 49 to 61 percent of farmers. It was shown earlier that the principal means of livelihood for farms of one to five acres in Clarendon (where Pindars is located) was reported to be in non-agriculture for 20 percent of farmers, and in addition, 14 percent had wage employment off their own farms as their principal source of income. It may be concluded as illustrated by the Pindars figures, that small farmer families are quite large with a substantial portion of young members, some of whom are not available for work on the farm, that work away from home is very common and that any program of expansion of output that requires additional labor is likely to encounter labor problems.

4.5 Equipment

Motorized equipment is virtually non-existent on small farms. Most field work is done with the fork and hoe or machete. There are, however, a considerable number of donkeys, mules or horses which carry hampers for transport of produce and supplies. About one-fifth of farms from one to five acres and one-third of farms of five to ten acres have

one of these animals. On hilly farms not on good roads, bicycles or motorbikes do not offer an attractive alternative. The Ministry of Agriculture had some tractor and machinery centers that offer custom services, but the service is expensive and said to not be readily available in most areas. The AMC hauls produce from motorable roads, but evacuation of produce from small farms is definitely a problem.

The number of small farmers on irrigated lands is few and concentrated on the flat, coastal lands.

4.6 Resource Allocation

Small farmers use of land differs from that on large farms principally because of differences in land quality and location, along with differences in labor supply. But even so, there is less difference in land use than one would expect. Even without the advantages of scale-economics, irrigation and level land, small farmers, for example, still grow sugar cane. To some extent this no doubt reflects the feeling of security offered by a staple crop of known technology and a dependable market. It may also be influenced by subsidies on transportation costs for some farmers. Bananas are grown on all sizes of farms. Here there is the advantage of a flow of income and an edible product throughout the year. Yams are grown with about the same technology on small farms as large, are a staple in most diets, and are bulky to transport beyond local markets.

Small farmers diversify their cropping through allocation of land among crops and by intercropping to minimize risk and to help even out the requirements for labor. Livestock also come in to utilize family

labor and forages from fallow and pastures. Off-farm work is an important enterprise on many farms; when entered into, it is because of lack of alternative.

It is an inevitable consequence of such diversification that some enterprises are not well managed. But it would be erroneous to assume that the farmer and his family have not come close to maximizing the combination of their limited resources to meet their own monetary and personal goals.

Few Jamaican small farms have patterned their farming around full utilization of the family labor force throughout the year. They apparently find it easier to adjust the labor force via off-farm work for family members in slack times and employment of seasonal hired workers in peak times than to adjust the farm program to the family labor supply.

It is generally felt that there is a capital shortage in agriculture, particularly for smaller farms. If one can assume efficient use of additional capital, this is no doubt true. Various studies (IBRD, IDB, USAID and others) have identified highly profitable uses for capital in land development, irrigation, farm to market roads, and improved farm practices. cursory examination of the Self-Supporting Farmers Program indicates that farmers are eager to get additional land but often have inadequate capital to utilize it fully. The initial judgment is that considerably more capital for small farmers would be profitable.

4.7 Product Utilization and Market Orientation

Small farmers would be expected to utilize a higher proportion of their production at home than would be true for larger producers.* The Pindars-Two Meetings study indicates that a high percentage of yams, coco, corn and bananas are consumed on farms where grown in that area (Table 4-2). The study furnished no information on family use of live-stock products, but the enterprises were small and probably almost entirely for home use.

Table 4-2. Percent of Production Retained for Home Use, Pindars-Two Meetings Area, 1976.

<u>Crop</u>	<u>Farmers Growing the Crop</u>	<u>Average Quantity Produced Per Farm</u>	<u>Percent Retained on Farm</u>
Citrus	41	34 boxes	31
Banana	31	12 counts	100
Coffee	28	4 boxes	10
Yam	36	10 cwts.	66
Sweet Potato	39	15 cwts.	35
Coco	30	2 cwts.	100
Corn	27	3 boxes	82

SOURCE: Socio-Economic Survey, Pindars-Two Meetings, Ministry of Agriculture.

For small producers, the higgler appears to be the principal marketer for all products except the export crops, where commodity boards are active. Table 4-3 indicates the most frequent outlets for small farmers in the Pindars area. Even farms of considerable size rely upon the higgler for marketing most of their produce in this area. Studies of higglers indicate that situation is general in Jamaica.

*Jamaica made a comprehensive household expenditure survey in 1975 that would provide information on this subject, but it has not been analyzed.

Table 4-3, Farmers Reporting Principal Major Market Outlets by Size of Farm, 1976, Pindars-Two Meetings Area.

Crops	SIZE OF FARM (Acres)					
	Less than 1 Acre	1-2	2-5	5-10	10-20	20-50
Yellow Yam	←—————		Higgler	—————→		
Red Pea	←—————		Higgler	—————→		
Coffee	←—————		Commodity Association	—————→		
Banana	Higgler	→/←	Commodity Association	—————→		
Sugar Cane	←—————		Commodity Association	—————→		
Irish Potato	←AMC	→/	Higgler / AMC	/ Higgler/	Commod.Assn./	AMC ←
Cocoa	←—————		Commodity Association	—————→		
Dried Corn	Higgler	←—————				Other
Ginger	Higgler	/	Local/ Parish /	Higgler /	Others	←—————→
			Consumer Market			
Pumpkin	Home Consumption	/	Higgler	←—————→		
Cabbage	←—————		Higgler	—————→		

SOURCE: Socio-Economic Survey, Pindars-Two Meetings, Ministry of Agriculture.

4.8 Yields and Income by Type of Enterprise

According to Ministry of Agriculture data, average per acre yields and prices and value for some important crops were as follows in 1977 (Table 4-4). These values are generally much higher than are estimated in various project appraisals. This is principally a result of the sharp increase in farmgate prices reported in 1977. Unusually high prices for such commodities as onions, carrots, and tomatoes reflect the influence of thin markets. They would not be good prices to use in farm planning and project analysis, but they do indicate the income potential at present for small acreages of high value crops, especially under conditions of good management. The dominant position of sugar cane, in acres and tons, is apparent. The moderate returns and labor requirements per acre from sugar cane as compared with more intensive crops, raise a question as to feasibility of more labor-intensive use of some cane lands. Farm management aspects of land use adjustments will be addressed more fully in a subsequent paper. (See Table 4-5 for more complete list of yields.)

Table 4-4. Acreage, Production, Price, Yield and Value Per Acre of Specified Crops, 1977, Jamaica.¹

Crop	Acreage ²	Production (short tons)	Yield Per Acre (tons)	Farmgate Price Per Ton J\$	Value Per Acre J\$
Sugar Cane	138,000	3,492,394	25.31	\$ 21 ³	\$ 531
Rice	2,623	6,141	2.34	300 ⁴	702
Carrots	2,331	8,611	3.69	620	2,288
Cucumber	1,926	8,012	4.16	260	1,082
Tomato	4,341	26,677	6.14	760	4,666
Onion	1,175	4,749	4.04	2,380	9,615
Horse Plantain	3,473	8,971	2.58	260	671
Irish Potato	2,337	9,283	3.92	620	2,430
Sweet Potato	6,422	30,259	4.71	340	1,601
Yellow Yam	9,199	52,117	5.67	460	2,608
Bitter Cassava	4,267	23,279	5.46	240	1,310
Sweet Cassava	3,258	13,710	4.21	240	1,010

¹MOA. Domestic Agriculture Farmgate Prices 1977, (mimeo). (Except cane, which is Sugar Industry Authority.)

²Acreages are on a "pure stand" basis.

³Average of \$18 to \$24 range, depending on sugar content.

⁴AMC August 12, 1977 for 13 percent moisture "brown type."

Table 4-5. Domestic Food Crops: Yields 1977.
(Short tons per Acre)

<u>Crop</u>	<u>Yield</u>	<u>Crop</u>	<u>Yield</u>
LEGUMES		PLANTAINS	
Broad Bean	.28	Horse Plantain	4.43
Sugar Bean	.26	Other Plantain	5.25
Cow Pea	.38	POTATOES	
Gungo Pea	.31	Irish Potato	3.97
Red Pea	.33	Sweet Potato	4.47
Peanut	.55	YAMS	
VEGETABLES		Lucea Yam	5.42
Beetroot	2.86	Negro Yam	5.56
Cabbage	3.66	Renta Yam	5.17
Calaloo	5.27	St. Vincent Yam	4.76
Carrot	3.69	Tau Yam	6.29
Cauliflower	2.70	Yellow Yam	5.57
Celery	2.85	Sweet Yam	4.02
Cho-Cho	3.07	Other Yam	5.15
Cucumber	4.15	OTHER TUBERS	
Eggplant	1.82	Bitter Cassava	5.45
Iceberg Lettuce	3.80	Sweet Cassava	4.20
Okra	1.83	Coco	3.59
Pumpkin	4.68	Dasheen	5.91
String Bean	2.11	OTHER	
Tomato	6.14	Sorrel	.56
Turnip	3.11		
CONDIMENTS			
Encallion	2.13		
Ginger	1.35		
Onion	4.04		
Hot Pepper	1.14		
Sweet Pepper	1.54		
Thyme	.53		
FRUITS			
Paw-Paw	4.52		
Watermelon	9.47		
Pineapple	5.54		
CEREALS			
Hybrid Corn	.81		
Ordinary Corn	.47		
Rice	2.34		

Source: Ministry of Agriculture.

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4.9 Agricultural Chemicals and Other Inputs

Small farmers have some knowledge of agricultural chemicals and purchased feeds, and use them in limited quantities. The rates of fertilizer application per acre of pure and mixed cropping for farms of one to five acres according to the 1968-69 Agricultural Census were:

Parish	Cwt. Fertilizer Per Acre	Parish	Cwt. Fertilizer Per Acre
St. Andrew	.17	Hanover	.49
St. Thomas	.25	Westmoreland	.66
Portland	.15	St. Elizabeth	1.63
St. Mary	.82	Manchester	2.78
St. Ann	1.51	Clarendon	.92
Trelawny	1.92	St. Catherine	.05
St. James	1.91	JAMAICA	1.07

The variations are influenced by crops grown and the extent of commercialization. Concentrated areas of sugar cane and other export crops tend to be heavy users, perhaps related to government subsidy programs that have operated over the years.

That yields have suffered from light use of fertilizer is suggested by the information that fertilizer consumption is down from 71,081 short tons in 1971 to 48,755 tons in 1977. For 1978 (through September), consumption was up only a little over the same 1977 period. The larger farmers have been the principal users of fertilizers. (Table 4-6)

For most crops, Jamaican farms of all sizes tend to buy their seed stock. This is especially true of the export crops except perhaps sugar cane and ginger. The commodity boards provide plants, clones or suckers for producers. Most Irish potato seed is said to be imported from Canada or Germany.

Table 4-6. Jamaica: Fertilizer Consumption.

Year	Use (Short tons)
1970	64,234
1971	71,081
1972	60,921
1973	68,248
1974	65,274
1975	63,061
1976	60,847
1977	48,775
1978 (to September)	36,721

SOURCE: Private Industry estimate.

4.10 Working Capital

Most studies conclude that small Jamaican farmers have a shortage of working capital. Low rates of fertilizer application and problems in procuring enough labor suggest there is some capital rationing. Even at present levels of farming, small farmers have to buy seeds, fertilizer, pesticides, hand tools, labor, livestock and feeds and finance their subsistence needs between crops. In the Pindars area, 88 percent of all farmers reported they did not borrow in 1976, and the proportion was about the same for small farmers. The proportion of farmers reporting they could not get loans were: For farms of one to two acres, 24 percent; two to five acres, 32 percent; five to ten acres, 30 percent. For all farms, the proportion was 27 percent. A negligible proportion of borrowers of less than two acres said loans were inadequate, but 24 percent of farmers between two and five acres said theirs were. Limited credit availability to carry on present farming activities appeared to be a problem for a substantial minority of small farms and similar conditions are said to exist elsewhere in Jamaica.

The problem would no doubt be worse if farmers were to make heavy improvements in their farming such as terracing or irrigation.

(See also Section 6.2 for more extensive comments on credit.)

4.11 Storage

Not much is known about the status of farm storage. The problem of storage for cash crops is largely taken care of by the commodity boards, the AMC, or higglers. Maintaining the family food supply appears to depend upon having a supply of product of some kind maturing throughout the year, buffered to some extent by storable crops such as cassava that can stay in the ground for awhile, and short-term storage of yams, sweet potatoes and pulses on the farm.

Information is scanty about the extent of field and storage losses of farm commodities, except for bananas and cane. For bananas many small farmers claim that up to 40 percent of their crop is rejected by the boxing plants. However, some of this produce may still have a local market. For cane, it has been estimated that small growers have considerable loss due to delays in getting their cane to the factory. Ideally, cane should be processed within 72 hours of cutting. In five days it will have lost a considerable part of its sugar, but some of the cane harvested in 1978 is said to have not been ground until three weeks later.*

*Daily Gleaner, June 10, 1978, p. 7.

4.12 Income

No recent island-wide survey exists with respect to small farmers' income; however, partial surveys based on the parish or locality and data with respect to income and expenditure of the small farmer provide the basis for an estimate. Probably the majority of the small farmers earned between \$1,200 and \$1,400 in 1977 including the food grown on the farm and consumed by the household. Cash income was between \$900 and \$1,000.

Partial studies or indicators referred to above are the following:

1. Western Portland*

The gross income of a 'composite' farmer in the Buff Bay Valley is estimated at \$1,341, cash expenses at \$440, and net cash income at \$901. Adding \$402 for the value of home-grown food consumed, his net income is \$1,303.

He has four acres of which 1.5 acres are in coffee and coco, one acre in banana, gungo peas and coco, 0.5 acre in red peas, and one acre in ruinate. The farmer has four dependents. This farm is fairly representative of farms growing coffee in hilly areas of around 1000'-2000', with around 90"-120" of rainfall, and with free-draining, deep soils of medium to high fertility. Prices for products and inputs are those of 1977.

A similar estimate for a small holding at low elevation in the Rio Grande Valley of Portland parish is \$1,596 gross income, \$620 cash expenses, and \$976 net cash income. Adding \$395 for food produced and consumed by the household, total net income is estimated at \$1,371. This was for a farmer age 55 with four dependents of which three were in school. Of the four acres, one was owned, and three rented. Coconut and banana occupied 1.75 acres, banana with gungo peas one acre, 0.25 acre in yams, and one in ruinate. There were also two pigs and ten hens.

*Agricultural Sector Assessment Study conducted by USDA for Jamaica Ministry of Agriculture/USAID, "Farm Resources and Resource Potentials on Small Farms in Central and West Portland and Eastern St. Mary." September, 1978.

2. Western Portland and Eastern St. Mary*

In this survey of 312 farms in the Buff Bay Valley, 82.7 percent reported incomes of less than \$20 per week, 13.8 percent \$20 to \$40, and 2.9 percent \$41 to \$60, 0.3 percent \$61 to \$80 and 0.3 percent \$81 to \$100. A farmer's gross annual income was \$1,040. Figures for 229 farms in the Enfield-Camberwell area of St. Mary parish are very similar; 82.1 percent had incomes under \$20, 15.7 percent \$20 to \$40, and 2.2 percent \$41 to \$60.

3. Census Data**

Unpublished data indicate that in 1970, 64.5 percent of farmers made under \$500 per year, 9.8 percent between \$500 and \$999, 2.6 percent between \$1,000 and \$1,499, and 23.1 percent more than \$1,499. Five hundred dollars translates roughly to \$1,200 in 1977 dollars. (The Consumer Price Index was 54.7 in 1970 and 130.2 in 1977 based on 1975 = 100.)

4. Employment Survey***

Agriculture, fishing, forestry, and mining income figures weekly for this sector indicate that 47.3 percent of the employed persons in this sector earned under \$20 in 1977 and that 22.7 percent earned between \$20 and under \$50. (Table 4-7)

*Gardner, Carleen. Uplands Forestry Development Project. Department of Forests, Ministry of Agriculture, March 1978.

** Agricultural Sector Assessment Study, conducted by USDA for the Ministry of Agriculture/USAID, "Regionalism and Rural Development," August, 1978.

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

Table 4-7. Income Groups: Agriculture, Forestry and Fishing Sector.
(1975, 1976 and 1977)

Income Group J\$ Weekly	1 9 7 5*		1 9 7 6*		1 9 7 7*	
	No.	%	No.	%	No.	%
No Income	22,050	9.4	28,850	11.5	31,100	12.0
Under \$20	141,000	60.2	123,600	49.1	119,350	47.3
\$20 <\$50	39,800	17.0	52,950	21.0	58,000	22.7
\$50 <\$100	5,150	2.2	6,050	2.4	5,600	2.2
\$100 & Over	3,700	1.6	4,450	1.8	4,250	1.7
Not Reported	<u>22,600</u>	<u>9.6</u>	<u>35,850</u>	<u>14.2</u>	<u>33,000</u>	<u>13.1</u>
Total	234,300	100.0	251,750	100.0	251,300	100.0

*Average of April and October surveys.

SOURCE: The Labour Force (97).

4.13 Constraints

At this point, the principal constraints to development of small farms appear to be:

1. Land of low productivity and on steep slopes,
2. Small and scattered holdings that are difficult to manage, that permit use only of simple tools and that may require considerable travel time,
3. Transportation problems associated with remote locations and difficult terrain,
4. Limited family labor resources to meet heavy seasonal labor requirements associated with needs for land cultivation,
5. Limited capital resources of small farmers,
6. Some institutional constraints. These will be examined below.

The prime target group appears to be the 50 percent of farmers that have from one to five acres. They have an economic potential and are being neglected by most programs. Farms of less than one acre generally have inadequate resources to become viable. Farms of more than five acres are within the ambit of the Jamaica Development Bank, Inter-American Development Bank, and World Bank programs.

Within the one to five acre spectrum, study should be made of programs to improve practices on crop lands and to make better use of non-crop lands now on these farms or that could be made available to them. Careful consideration is needed of rough feeds and roughage--consuming animals including cattle, goats and sheep. Alternatives to mechanical erosion control should be sought through forages and animals. Introducing better technology for small farms is an uphill struggle to capture such scale-economics as are within reach. All avenues need study including shared use of equipment, use of appropriate technology, and consolidation or exchanges of small tracts.

The average farm of one to five acres has only about 1.2 acres of cropland and an acre of non-crop land. That may not be enough to provide full-time farming opportunity. It may be necessary to think of full-time farms at the top of the size class, with smaller farms as part-time units.

With respect to location, small hill-farms exist in profusion in every parish. Choice of an area should involve examination of maps showing where small farm concentration is very high and where geographic factors indicate good prospects, along with consideration of areas in which there is Jamaican (including farmer interest) and no great competition with other programs. Emphasis should be on an area approach, in which the emphasis is placed on small farms, but without neglecting the inter-relations among farms of various sizes, local non-farm resources and other key elements in the system within which small farmers function.

5. Rural Infrastructure

Basic infrastructural services are spread throughout the island and reflect the high degree and relative evenness of rural population dispersion. This can be readily seen in the maps of roads, electric service, water supplies, marketing facilities, market towns, schools, medical facilities, and other public services. (Exceptions are inaccessible areas such as the Cockpit Country and certain parts of the Blue Mountains.) But they are spread thin. Certain rural, and especially mountainous, areas are deficient in facilities in terms of population density and production requirements. Needless to say, they fall considerably short of urban standards.

5.1 Roads

Jamaica has 1.6 miles of road per square mile of land, which is high by international standards and is a measure of the high degree of accessibility of all regions of the country. On the other hand, the road system maintains traces of a dendritic network; that is, one where goods destined for export and a wide variety of provisions for the urban population are gathered up in or near rural markets bulked or processed in a few strategic markets and moved to port cities. This vestige of the former 'sugar economy' has been considerably modified by improvements and extensions of the road system; nevertheless, it falls short of the 'ideal' of rural/urban integration on a region-by-region basis.* The primary roads of Jamaica connect all parts of the island with a maximum of about five and a half hours' driving time from Kingston to any other point. There are about 1,300 miles of hard surface roads and an additional

See Johnson, E.A.J. Organization of Space in Developing Countries, pp. 83-92 for an elaboration on this point.

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1,400 miles of unsurfaced "main roads," which are maintained by the national Ministry of Works and Communications. This network is all-weather and while the roads may be narrow, winding and sometimes congested, they do form an adequate transport system for all towns and cities.

Individual parish councils, 235 Land Settlement schemes, the Land Lease project and the Forestry Department maintain a secondary road network of some 6,500 miles of which 4,500 are suitable for vehicular traffic and an additional 2,000 miles are "bridle paths."* The 2,000 miles of secondary and tertiary roads not suitable for vehicular traffic are not always the same roads, i.e., a piece of road may be closed for six months by a landslide or storm erosion and after its repair another section, formerly passable, may be lost due to some similar occurrence.

By inspection of the 1:50,000 scale map of the entire island (Survey Department), one can ascertain that it is difficult to find any place more than two miles (map distance) from a road, except in the Cockpit Country or the Blue Mountains, which are unpopulated regions of exceptionally rugged terrain. It can also be observed from this map and from the larger scale 1:12,500 series that very few communities or houses are more than a quarter to a half mile from roads. Agricultural holdings exist two to three miles from roads, but few people live away from road access. It should be noted that human and animal portage is slow and very expensive and a two-mile map distance could be somewhat further by actual routes and vertical differences/ruggedness of the terrain can have considerable impact on travel difficulties.

* Jamaica - Rural Feeder Roads Loan, Capital Assistance Paper, AID-DLC/p-978/USAID, June 1971, p. 1.

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5.2 Electric Service

Although all regions of the island and all significant communities have electric service (Map 15), the provision of services to the rural areas has lagged behind. The Jamaica Public Services (JPS), a private company, regulated by the Utilities Commission, initiated the first rural electrification scheme in 1967 with the extension of twelve rural lines, and it included a credit scheme for house wiring expenses. The second JPS program, 1975-76, built 75 new extensions and 220 miles of rural lines to service 4,560 new customers.

An Inter-American Development Bank loan in 1974 financed a survey for a larger program of electrification, and in 1976 a new agency, the Rural Electrification Commission (REC) was established to plan and build rural lines. After completion, the lines of the REC are turned over to the JPS to provide power and maintenance.

The 1974 survey of rural electrification found that the then installed network brought 119,565 rural households within reach of electric service out of a total 235,870 rural households. The survey also revealed that 26,181 of rural households in serviced areas were actually connected to electric service. Thus, 11.1 percent ($26,181 \div 235,870$) of total rural households actually had service. When urban areas are included, then 73 percent of the Jamaican population lived in areas where electric service was available and 50 percent of urban households were actually connected.*

*Government of Jamaica, Rural Electrification Study, (Draft of final report) Vol. 1, October 1974. Surveyor, Nenniger and Chenevert in joint venture with Caribbean Engineering Management, Kingston. Data on recent programs was supplied by private correspondence and interview with Miss Lake of the Rural Electrification Service.

Table 5-1 summarizes the current and planned programs for expansion of rural electrification which developed from the 1974 study. Map 15 shows the even geographic dispersal of existing and planned service.

Table 5-1. Rural Electrification Program.

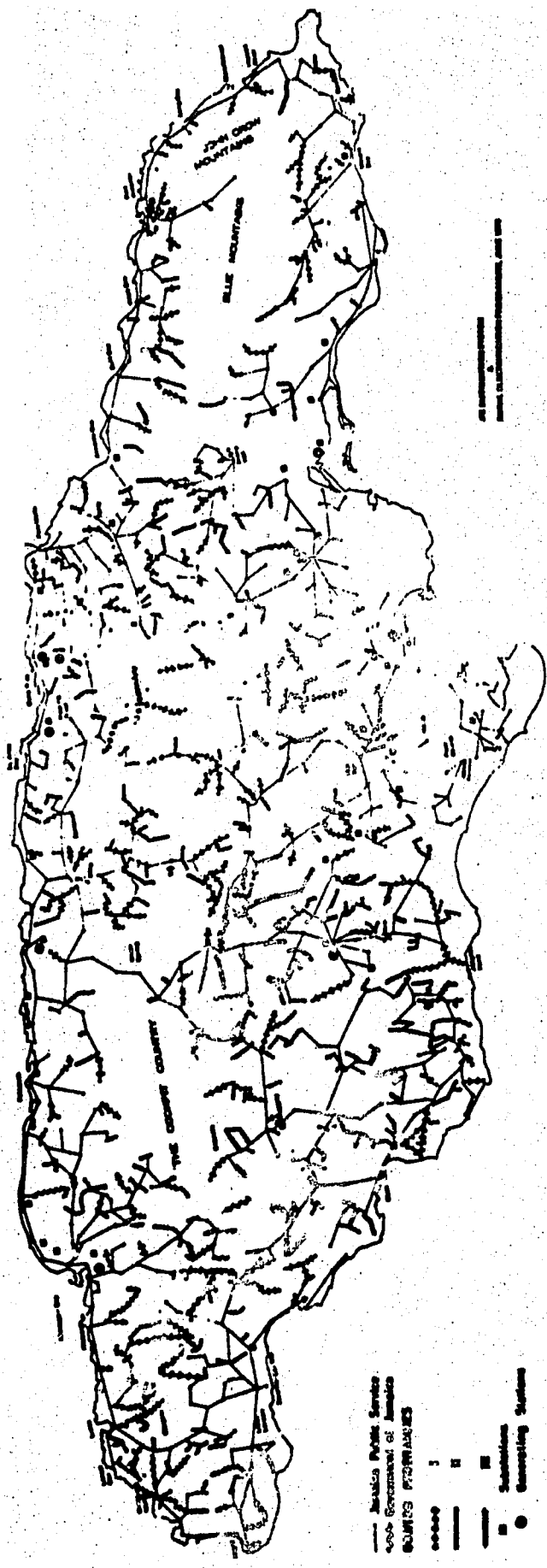
<u>Agency</u>	<u>Years of Program</u>	<u>Number of Households Served</u>
JPS	Existing as of 1968	23,661
JPS Expansion Program	1968-1972	2,500
GOJ	1976-1977	4,560
REC/IDB Program I	1978	12,000
Program II	1979	3,800
Program III	1980-82	<u>17,500</u>
	Total	64,041

SOURCES: Op.cit.

With completion of planned programs an additional 40,380 connections will have been installed in rural areas to bring the total service to 64,041 rural households, or 25.8 percent of the projected (at 0.5 percent increase per year) 247,826 rural households in 1982. It is estimated by the 1974 survey that service will be available in areas where 66 percent of the total rural population resides.

According to the REC, of the total 1,000 miles of lines which were surveyed for Program II and considered currently accessible and economically feasible for service extension, Program III would service 800 of these miles. Thus, 200 miles of lines and approximately 6,600 potential customers will still exist.

MAP 15



— Mexico Public Service
- - - 1950 Government of Mexico
... TOURS PROGRAMS
○ 1
□ 2
△ 3
● Substations
● Connecting Station

5.3 Water

Based on data summarized in the 1970 National Physical Plan, most of the urban areas of the country are supplied, in various degrees, with piped water.

It's quite another matter in the rural areas. Actually, information is scarce on the extent and precise location of water service in the rural areas. Typically, in rural areas, the population is served by one or a few roadside standpipes with no water piped into buildings. Many villages are served by small hillside catchments feeding a small tank with no piped distribution of the water. There are still households which depend solely on individual roof catchments or hand carrying of water from a river or spring.

In many of the hillside areas, depth to water level exceeds 1,000 feet, and pumping lifts are costly. Apart from this, there is the hazard of predicting the amount of water that can be expected from the perforation. An alternative to meet the water needs of the population of these areas is rain-water harvesting by surface catchments and storage tanks. As of August 1978, a detailed survey is being commissioned by the National Water Authority to cover the entire island, and all domestic water systems are being mapped and described at a scale of 1:12,500. A four-page descriptive questionnaire is being prepared on each community and system. The survey is to be completed by the fall 1978.

5.4 Transportation and Communication

Most communities are served by some form of public or private transportation system.

Telephone service is sparse in rural areas. In 1970, 40 towns outside Kingston and Montego Bay had some service, though often just one telephone at the post office.

Postal and telegraph services are much more widespread. In 1976 there were 313 post offices, 459 postal agencies and 34 postal sub-agencies. These serve over half of existing towns and villages. Of the existing post offices, 320 include telegraph services. In the absence of telephones, these are vital for rapid personal communications.

Radio and television signals are beamed island-wide. There are two government-owned radio stations and since the advent of battery-powered transistor radios, even the most remote household is in immediate and constant contact with a variety of information. Unfortunately, little agricultural programming is carried on the radio. Television has some agricultural programming, but the rural dwellers' access is likely to be limited to the set in the community center, if any.

5.5 Constraints

1. It is fairly safe to assert that there is no significant population anywhere in Jamaica without any road access or any large area which is being significantly underutilized because of poor access. Having said that, one can recognize that numerous local scale situations exist where short ($\frac{1}{2}$ to $1\frac{1}{2}$) new roads or road maintenance, as in the feeder roads program, can still aid development of the area and bring about an intensification of land use.

The main constraints are: absence of up-to-date information with respect to road (particularly secondary and tertiary) conditions, improper design, and lack of maintenance.

Information about roads which is not available in any systematic way includes the current condition of specific roads, particularly

parish council roads. This information is ephemeral as road conditions constantly change, but it is significant and is needed by a number of agencies.

No centralized body seems to know what the condition of a given road is at a given time. The Agricultural Sector Team was told, for example, by the Rural Electrification Commission, that when they had tentatively selected a community or area for extension of electrical service, it was their practice to send out one of their trucks to drive the road to see if it was currently passable. If not, or in portions not passable, the community would not be included in the project. Thus, road quality determined the extent of electric service and the agency had to resort to the expensive and not very accurate (one-shot observation by the inexperienced) expedient of looking for themselves.

The definition of whether a road is passable depends upon the type of vehicle contemplated, the weather conditions and the skill of the driver to name a few factors. Even roads which are passable but seriously degraded can be a major problem. The labor and energy costs of very slow passage are high, as are the costs of vehicular breakdown and repair and the damage of goods in transit. The damage to bananas in transit in Portland can be cited as a particular example. Two particular problems of the tertiary roads are non-maintenance and improper design, e.g., lack of drainage structures and the accretion of erosional gullies into the roadbed. Major investment needs for roads include new construction, hard surfacing, drainage structures and repair of flooding and erosional damage.

Most agricultural produce moves by trucks for hire. Larger farmers, co-ops and the AMC may own or contract trucks for full loads. Service is also readily available for smaller operators to buy passage for their goods and also generally themselves. Small to intermediate quantities of produce also move by bus, accompanied by its owner. It has become common for larger higglers to own vans/pickups for transporting produce to markets anywhere on the island. Vehicles used for transport of agricultural goods and persons include private

trucks, trucks for hire (small lots, including passengers), buses, public vans, and private vans/pickups.

The benefits of a good road system are well stated in the Rural Feeder Roads document:

"Nearly everywhere a by-product of improved transport for agriculture is the gradual transformation of rural society itself. Changes in the cropping pattern that raise income per acre, introduce a greater variety of consumer goods, more frequent travel to the nearest town, medical and veterinary services, electricity, postal service, newspaper delivery, the extension of bus routes, the improvement of local teaching staffs, and access to more distant high schools. These transport-induced social changes all contribute to the commercialization of agriculture."

2. Planned programs and likely minor additions to the system beyond 1982 will bring electric service to additional areas. The approximate one-third of rural households that will remain outside potential access are living in a pattern of dispersal along roads and/or away from road access which makes the delivery of electric service or any public or private service difficult and expensive. The lack of electric service in these areas may be a constraint to their development. In local areas the extension or improvement in roads may make some areas feasible for service. General improvement in the rural economy and the continuing availability of credit for house wiring should, through time, lead to a greater proportion of households served within areas which have service. Relocation of population towards agglomeration and into areas of better access would also affect the proportion of households served.
3. Rural dwellers share the handicap that domestic water and electricity service are not generally regarded as basic necessities to be integrated into the agricultural systems on small farms. Water service is often regarded as largely household and community amenities, with the result that the farm's productive uses, such as stock watering and irrigation (even of dooryard gardens) are underemployed. During times of drought, which are common in specific areas for short but critical periods, crop losses are commonly incurred. Much working time is lost by rural households in seeking water from distant springs.

6. Agricultural Support Activities: Commercial

Estimates vary as to the extent to which the small farmer is dependent on domestic food crops and on export crops for his income and subsistence. It would not be far off to say that, on average, it's 55 percent domestic and 45 percent export, allowing for local variations. The distinction is of some importance, because it 'simplifies' to some degree the task of analysis by reducing the sources of the small farmer's income from many enterprises to basically 'two.' The distinction has further basis in the fact that differences exist in the methods of marketing, in the determination of prices to the grower, in the sowing, reaping, and cultivation practices, in the assembly of inputs, in the transport and disposal of outputs, in the extent of cooperative activity, in the relationship (or its absence) to market towns, and in other ways. The following discussion on marketing follows this differentiation.

6.1 Marketing: Domestic Food Crops

Domestic food crops come largely from the hilly upland region and are produced by small to medium sized farms. Approximately 75 to 80 percent of the product is bought, handled and sold by small private traders, higglers, and about 15 percent by a government agency, the Agricultural Marketing Corporation (AMC). The remainder is accounted for by institutional buyers, food processors, exporters and green grocers/supermarkets who deal in contract sales with medium sized farms.

6.1.1 Public Markets - The Higglers

A major part of the infrastructural facilities of marketing is the public markets, generally operated by the parish councils. There are approximately 100 such markets, varying in size and function from insignificant

(two to three sellers on a concrete slab with a roof) to large and very important (over 500 sellers in a large, differentiated structure). Their major function is retail trade, but many of the larger ones also have wholesale and transfer functions. The major agents at the parish markets are the higgler who handle most of the food trade.

Coronation Market in Kingston dominates the trade in domestic food and performs major wholesaling functions for the entire island. A considerable degree of cross-hauling is practiced; for example, tomatoes produced in St. Elizabeth may move 100 miles into Coronation Market and then move back 80 miles along the same road to be sold in Mandeville Market.

The higgler (most of whom are women) dominate the retail distribution of domestic food crops, selling in small lots either in the public markets or on the curbside. Higgler likewise do much of the small lot food procuring. In 1977, half of the higgler went directly to the farm gate for their supplies, which they either wholesaled (mainly at Kingston) or retailed themselves.

Estimates put the total number of higgler from 14,000 to as high as 20,000 to 30,000, including those who operate only seasonally or part time. The 1977 Ministry of Agriculture survey found that some small fruit and vegetable higgler might sell less than \$10 per week, and half had sales under \$50 weekly. With the bulk of the domestic food crops produced on small or medium sized farms, this adds up to an uncoordinated, disorganized system of marketing, that is time consuming, with a minimum

of grades, dealing in small lots, has considerable wastage and loss, and results in high markups from producer to consumer. The market lacks streamlining, with products frequently going from outlying parishes to Kingston and back again.

The higgler system as it now operates does get the job done of gathering the domestic food crops from a large number of small lots from producers scattered all over the island, concentrating them in the Kingston market and then dispersing them again in small lots to consumers in Kingston and over the island.

Whether the higgler system is up to the demands of a more modern system of production and distribution is moot. Differences of opinion vary from an adamant 'yes' to a definite 'no' with numerous shades in between. Those who believe in the higgler system assert that it is the perfect counterpart of the existing system of production--'who else but the higgler can take those crops out of the hills?'--the face-to-face trading of the farmer and higgler is seen as the essence of the free market system; and it is believed the small farmer-higgler combination can be raised to higher levels of activity by means of modernized parish markets and information systems.

At the other end, the higgler system is seen as a weight on the existing system of production; it is said to be inefficient (social costs are high, volume is small) and parasitic (private margins are excessive), but most important, it is said that it keeps the small farmer tied to the existing system of traditional, low-productivity agriculture. The marketing debate is not simplified by the lackluster performances of the other participants in the marketing place--the AMC, the supermarkets, the

hotels, and others (the so-called 'super-higglers').

Our own view is that for the present and for some time to come, there is no alternative to the use of the existing set of pieces. It is entirely possible that the individual and separate parts of the marketing system can rise to a higher level of performance as the whole system of information (crop reporting and spatial arbitrage of prices) and rural infrastructure (roads, transport) improves, including the more extensive use of other elements now being used far below their potential (e.g., marketing cooperatives).

6.1.2 Agricultural Marketing Corporation

The Agricultural Marketing Corporation (AMC) is a statutory body established by Parliament in July, 1963. Its purpose was to provide Jamaica with an efficient marketing system for: 1) the products grown primarily for domestic consumption; and 2) the non-traditional export crops. It also has responsibility for importing food products where needed to supplement domestic food supplies.

The AMC has attempted to achieve these objectives by actions designed to:

1. Encourage production by providing farmers an assured market at prices related to cost of production and a fair return,
2. Hold down the cost of food to consumers,
3. Make available nutritious foods at reduced prices to low income consumers,
4. Provide produce to institutions.

Its functions developed generally in three broad areas: Purchasing of commodities, distribution of commodities, and providing ancillary market services. As a consequence, the AMC has found itself with duties relating to farm price support, holding down general consumer food costs, and welfare activities for low-income consumers. Often these functions conflict.

The AMC's method for restraining consumer food costs has been to set up retail operations. In mid-1978, there were 19 AMC Green Groceries, 43 basic shops and 75 mobile routes charged with the responsibility for balancing food distribution and bringing low-cost food to the poor throughout the island. Plans called for establishing more Green Markets including one in Port Antonio. The Green Markets, however, have tended to handle more of the more expensive vegetables.

Through these retailing efforts, AMC hoped that sufficient competition would be injected to hold down consumer prices by cutting the higgler retailing margins. But the AMC has never controlled enough of the retail business to be an effective price-setter. Although approximately 15 percent of the domestic food output has been handled by AMC, much of this is supplied to institutions or wholesaled to higglers, supermarkets, hotels, restaurants, wholesalers, or distributors. These buyers turned to the AMC as a wholesale source because the AMC price often was lower and more convenient than alternative sources of supply--particularly when supplies became scarce.

AMC Sales by Type of Outlet, 1976

Hotels and Restaurants	5 percent
Supermarkets	3 percent
Wholesalers and Higglers	29 percent
Government Institutions	15 percent
Retail	
AMC Stores	26 percent
Special Shops	15 percent
Branches	1 percent
Export	<u>6 percent</u>
TOTAL	100 percent

The AMC method for encouraging production by assured grower prices is carried out through eight regional branches, where products are assembled, cooled, stored, graded, and packaged, and move to a central warehousing and wholesaling operation in Kingston.

To these are linked 207 buying stations in the country and all are joined together by radio communication. Through this mechanism, the AMC attempts to maintain adequate marketing outlets for products grown by

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Jamaican farmers primarily for domestic consumption. Currently minimum support prices related to cost of production are published for 18 products

All told, AMC has buying prices for the some 115 products on its list which are transmitted weekly to all offices and buying points. Since these prices generally are based on no less than was paid the preceding year, they constitute a fairly well-defined floor. At times the buying prices for the products specifically guaranteed are above the published support level. In order to assure adequate supplies, to hold down food costs to consumers and supply food to low income consumers and fill its institutional obligations, the AMC will contract production with large growers at above the guaranteed price.

In the peak harvest period of a bumper crop, the AMC becomes a residual buyer and maintains the floor price by taking the excess off the market. Then when the supply gets short, the higglers get most of the product since they base their prices on supply and demand and go to the farmer's gate for their supplies. At times the higglers offer the grower credit and may also buy his crop in the field and harvest it. The AMC, in turn, encourages growers to deliver to it when supply is short, but when there is a surplus, it sometimes will limit purchases by quotas

Although AMC has grade specifications for its purchases, they frequently are not closely adhered to. More training and closer supervision are needed for the buyers. Cooling and storage facilities at some of the branch stations are inadequate, and management of storage often falls short. Despite the weekly radio communication between all offices, the spatial distribution of products over the island frequently leaves much to be desired.

Most of the studies of the higgler system agree that the AMC has not been successful on the national level in consumer price regulation. It has had questionable effect on higgler margins; its main success has been in eliminating the former frequent periodic farm price depressing market gluts by becoming a buyer of last resort, although this has been at the expense of the AMC absorbing the gluts. There has been no demonstration that AMC distribution methods are less wasteful than the higglers, although AMC has brought cheaper food to some of the low income areas where it retails food at lower prices.

All this, plus problems of excessive spoilage, waste, shrinkage, pilferage, and procurement of unsalable foodstuffs, result in the AMC operating in the red. AMC purchases in 1977 totaled \$7.9 million with sales of \$6.6 million. The 1976 FAO-IDB study of agricultural marketing found AMC suffering from problems of shortage of management, poor sites, inadequate facilities and conflicting political objectives--and that in general AMC was over-extended both in crop coverage and in management.

The 1976 FAO-IDB study recommended that the AMC get out of retail distribution, concentrating on agricultural price stabilization as its role. The April 1978, IICA study, "Brief Overall Diagnosis of Hillside Farming in Jamaica," concluded that one of the AMC mistakes is to compete and try to put the higglers out of business. It found AMC to be a very large organization and because of its complexity, faces many problems such as bureaucratic inefficiency, labor unrest, heavy financial losses, poor distribution, high operating costs, and lack of proper research into market intelligence.

6.1.3 Supermarkets

In 1970, a FAO report, "Food Crops Development and Marketing Feasibility Study," found a lack of interest by the supermarket sector in produce trading due to inability to ensure a steady supply of quantity, variety and quality of products.

Since then there has been a definite increase in supermarket activity in merchandising domestic food crops.

Estimates by two Kingston supermarkets put domestic fresh food crop sales at 5 to 10 percent of their total weekly sales, and meats at 28 to 30 percent. Supermarkets that merchandise fresh food crops mainly are located in shopping centers in mid- to upper-income areas. Storable food crops, such as peas, beans, and rice, are found here as well as in the small so-called "supermarkets" (but which really are neighborhood stores) in the lower income areas. Many of the latter carry few fresh items.

Prices of fresh produce in the supermarkets are higher than in the central market, but often lower than on the street. Consumers who purchase at the supermarkets typically do most of their buying on Thursday, Friday, and Saturday when they shop for their entire grocery supply. Reasons given by consumers for buying fresh produce there were one-stop shopping, convenience, cleaner produce, more pleasant surroundings and ease of parking.

The supermarkets in the shopping centers buy from large growers and distributors. One chain of eight stores has a central produce warehouse at which the produce is assembled and then distributed to their retail stores. Other than this, deliveries are made directly by the suppliers to the stores.

6.1.4 Agro-Industries

According to the Jamaica Industrial Development Corporation (JIDC) and the Factory Inspectorate Division of the Ministry of Labor, there are currently 126 industrial plants which process agricultural commodities (Table 6-1), these do not include facilities such as banana boxing plants, coffee pulperies, vegetable washing, grading, packaging operations. There is a considerable diversity of products processed and produced. The largest number of plants are located in Kingston and in the larger cities close to Kingston.

There are many plants in evidence which have failed and are now closed, for example, the sisal rope factory at Lititz, S.E., the banana raisin plant near Windsor Castle in Portland, the starch factory at Newton, S.E. An often-stated cause is insufficient and irregular supply of product. The Map of Agro-Industries (Map 16) shows the location of existing plants and projected plants. (See also Appendix for more detailed list of processing plants.)

6.1.5 Constraints in Domestic Food Marketing and Recommendations for Their Elimination

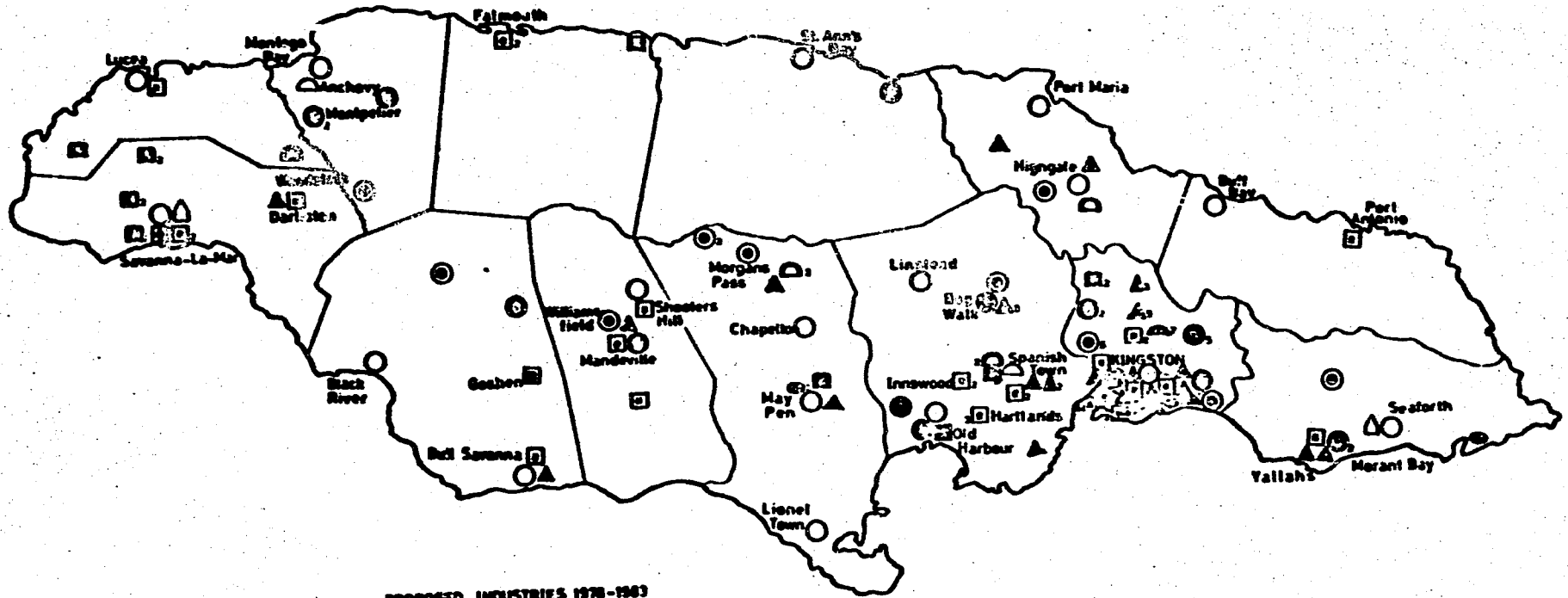
The task at hand is to overcome the constraints in the marketing system. This section of the report will discuss the main constraints and will recommend courses of action for their elimination. The main constraints will be discussed under the following headings:

- Assembly Costs
- Wastage and Spoilage
- Standards of Quality
- Retail Margins
- Market Intelligence
- Production Planning
- Transportation
- Interrelationships of Constraints

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EXISTING & PROPOSED AGRO-INDUSTRIES

MAP 10



EXISTING INDUSTRIES

- Canned & Frozen Foods
- Cassava
- Coffee
- Confectionery
- Dairy Products
- Fruit Processing
- Meat Processing
- Grain Mills
- Cattle
- Alcoholic Beverage

PROPOSED INDUSTRIES 1978-1983

- Agro-Industries (Food Process)
- Cotton Gin
- Rice Mill
- Tobacco
- Cane Formatories



Figures indicate Number of Plants
 Source: Jamaica Industrial Development Corporation, Factory Inspection Division, Ministry of Labor, September, 1978.

Table 6-1. Agricultural Processing Industries in Jamaica.

Classification	Number of Firms	Parish Locations
Manufacture of dairy Products	11	Kingston, St. Andrew, St. Catherine, St. Ann, Manchester, St. James, St. Elizabeth
Canning preserving of fruits and vegetables	24	Kingston, St. Andrew, Trelawny, St. Mary, St. Catherine, Clarendon, Manchester, St. Elizabeth, St. Thomas
Canning and preserving fish and other seafood	1	St. Andrew
Manufacture of grain mill products	28	St. Thomas, St. Elizabeth, Westmoreland, St. James, Clarendon, St. Catherine, St. Mary, Hanover, St. Andrew, Kingston
Manufacture of cocoa, chocolate and sugar confectionary	16	Kingston, St. Andrew, St. Mary, Hanover, St. Catherine, Clarendon, Manchester
Manufacture of miscellaneous food preparations	29	Kingston, St. Andrew, Trelawny, St. Catherine, Clarendon, Manchester, Westmoreland, Portland, St. Thomas, Hanover
Distillery, rectifying and blending of spirits	5	St. Andrew, Kingston
Wine industries	3	St. Andrew
Tobacco manufacturers	6	Kingston, St. Andrew, St. Catherine
Cordage, rope and twine	3	Clarendon, St. Thomas
TOTAL NUMBER OF FIRMS	126	

SOURCE: Ministry of Labour.

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Assembly Costs

A major marketing constraint is that of assembly of products. Assembly costs are high, and these find their way into the wholesale costs, and eventually into the retail cost to consumers. This does not necessarily mean that any single higgler's margin is excessive; it means rather that the sum of the numerous changes of hands add up to a high social cost. Assembly costs are high, because numerous country higglers have to travel up and down the roads, stopping at each gate to negotiate for and load on their vehicles small lots of often mixed produce, or they take their produce in small lots to nearby market towns. It also contributes to small lots of uneven quality moving into the next stage of the marketing process.

This is in contrast with the method of marketing bananas, coffee cocoa, and pimento where the growers belong to the cooperative or the respective commodity association which have local collection points where the growers bring their product for assembly and sale. Thus, between his domestic food crops and export crops, the small farmer must concern himself about making arrangements for as many as ten different crops during the year at frequent, although at intermittent intervals, and at different places. Obviously, the existing arrangements 'work' as they have for so long, but the cost is high.

A problem of a similar nature is the assembly of inputs: fertilizer, weedicides, insecticides, seed varieties, and including specialized tools and implements. To take a single example, fertilizer is offered by many institutions, public and private, under different conditions of sale and delivery. In most cases, the small farmer has the problem that under

the chancy condition the fertilizer is available of arranging for pickup and delivery to his farm. Like outputs, the number of individual inputs adds up, and the sum of the two complicates the small farmer's life even without taking into consideration problems of road conditions and the distance of his farm from the road.

A procedure for neutralizing or diluting the force of this constraint would be to adopt existing cooperatives, or to establish them where necessary, to serve the purpose of assembling both inputs and outputs. Precedent for this is the fact that three or four existing (mainly small farmer) cooperatives are already performing a couple of these functions. The Portland Blue Mountain Coffee Cooperative at Buff Bay, for example, assembles cocoa as an 'approved product' in addition to coffee; and it also purchases fertilizer, provides the credit, and delivers the bags to several convenient central points in the valley for pickup by their shareholders. The study group was informed that members had requested the co-op to consider the marketing of selected food crops as well.

Our recommendations may be summarized as follows:

- (a) Adapt existing cooperatives, or establish new ones, to serve as grower purchasing and marketing cooperatives. The territory of the cooperative should be sufficiently large territory to enable it to have enough volume of marketable produce to employ a competent manager.
- (b) Local assembly points should be established preferably using the already existing coffee and cocoa collection points or banana boxing plants as the first point of assembly. New local assembly points should be established at strategic locations not otherwise covered.
- (c) Technical assistance should be provided to the manager of the growers' marketing cooperative--perhaps in the form of a counterpart for awhile--in the early stages of organization and operation.

- (d) The growers' marketing cooperative should consider the best means of transporting the product--either trucking the product itself or hiring truckers for the purpose--from its assembly point to institutions and public markets in different cities. Where prospects for profitable short-term storage exist, the cooperative should lease storage space from AMC or the local parish market (hopefully now modernized), or wherever available.
- (e) The AMC and the cooperative should consider a contractual arrangement for the delivery and prior inspection and grading of products at the local assembly points. Such an arrangement would simply extend the AMC's existing contractual arrangements with supermarkets, etc. to small farmers' cooperatives.

Physical Wastage

Substantial losses occur in marketing of fruits and vegetables due to lack of protected display space in parish markets, inadequate holding, handling, and transportation facilities, improper production, harvesting, and handling methods, limited outlets for produce during seasonal peaks, and absence of processing facilities. These losses were quantified by a 1976 FAO/IDB study as totaling 25 percent of the harvest of which 10 percent was due to supplies discarded due to lack of refrigeration, 10 percent due to downgrading of prices resulting from quality deterioration caused by lack of refrigeration or improper handling, and 5 percent due to products discarded as unsuitable for fresh market. Other studies have put the losses as high as 40 percent of the value of the crops. Clearly, even with no change in the volume produced, reduction in spoilage and wastage would increase the amount of the saleable products. Since these are mainly the product of the small farmer, this could mean a significant contribution to his income.

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It is recommended:

- (a) The marketing cooperative in conjunction with the Extension Service should carry on a continuing educational and demonstrational program in improved cultural, harvesting, handling, and packing practices on the individual farms. The focal points for these meetings can be the local assembly points.
- (b) A careful study and design of the containers used for assembly, transportation and storage should be made with recommendations to growers and wholesalers for adoption. Efforts to develop improved packaging and containers for use by the marketing cooperative could reduce transit damage. These could also serve as a prototype for the rest of the country. By involving the marketing cooperative in this study, the incentive for adoption would be increased.
- (c) Rudimentary cooling and washing facilities at local assembly points or the cooperative depending upon the crop would be a first step in reducing deterioration.
- (d) Graduated prices should be applied to first class and to second class products (immature, bruised, or deteriorated) by the marketing cooperative, wholesale buyers and AMC as a buying policy.
- (e) Adequate storage at the Kingston and local parish wholesale markets can provide a way of holding produce with a minimum of wastage and spoilage. AMC regional branches likewise can reduce wastage and spoilage with adequate storage facilities. All storage facilities should have controls for adjusting temperature and humidity control with respect to interior loading.

Standards of Quality

Quality of fresh vegetables sold in Jamaica is below that of many countries in similar or less advanced stages of development. One of the main reasons is that little discrimination in purchasing is exercised by the first buyers; therefore, little incentive exists on the part of producers to improve the quality of the products which they market.

The first step toward improving quality must come through the development of uniform quality standards. Both buyers and producers must understand them, why they are necessary, and why they are of long run financial importance to all; then they must be used.

Uniform grades and standards also can facilitate transactions with a minimum of personal inspection. This speeds up transactions and reduces costs. In their absence, every lot must be looked at, for there is no common basis for mutual understanding otherwise. The use of the phone or radio to conduct transactions thus is facilitated. Likewise, it facilitates expansion of sales to supermarkets which depend upon standardization of quality and a steady supply as a basis for business.

An important cause of the quality problem associated with the marketing of Jamaican fresh vegetables is the lack of proper pest and disease control by producers. Effective plant protection service is lacking. An interesting interrelationship of constraints is the small farmer's preference for country higgiers who will take all of his produce including the off-quality.

It is often recommended that wholesome, but off-quality, produce and short-term surpluses from the fresh market be diverted to processing. However, one cannot expect processing factories to be run successfully on casual surpluses. If a basic supply is available as the foundation for a processing season, such overruns from the fresh market then can be absorbed. But they cannot serve as the basic supply for the processing operation.

Recommendations:

- (a) Grades and standards for different qualities should be set by the government of Jamaica. These should be rigorously applied in the

first instance by AMC in their price support activities. If more detailed specifications are written into AMC Grades and Standards, it will facilitate quality improvement nationally.

- (b) Special workshops should be held for supermarkets, growers, marketing cooperatives and wholesalers to explain and demonstrate the use of these grades and standards and their use should be encouraged.
- (c) Educational programs with growers should be carried out jointly by the Extension Service and the growers' marketing cooperative to explain the standards and grades, why they are being used and how they are important to the long-term growers' benefit.
- (d) Expanded research is needed by the Ministry of Agriculture on pest and disease control under Jamaican conditions. This information then should be presented to the Extension Service, the marketing cooperative and the wholesale buyers so all can carry the technical knowledge to the growers.
- (e) Sorting of products at the local assembly points should be done to segregate those lacking quality for the fresh retail market, but yet perfectly wholesome for sale at a reduced price to the government's subsidized low-income food programs of basic stores and mobile routes.

Retail Margins

Larger volume of sales per outlet is the first requirement for reducing retail margins. Second is reduced spoilage. Third is enough competition in a location to keep prices competitive.

Street higglers have the smallest volume and the highest margins. Only 22 percent of those responding in a 1977 Ministry of Agriculture study had a weekly capital outlay of over \$100. Consumers will pay higher prices because of convenience of location--they may not want to go to a less convenient public market or supermarket where the price is lower. There will always be some people who want just a few items. So the street

higgler is not likely to disappear completely. But if public and private markets (on the receiving end of the produce) are more convenient and better organized, there would be a decline in the number and volume handled by street higglers.

If the proposed marketing cooperative (on the delivery end of the produce) can offer the small farmer a better overall return by helping him to reduce his crop losses, increase his production, and save him and his family some of the time and trouble involved in marketing, the economic incentive for farmers' wives (or their surrogate, the country higglers) to go to town on market day will be reduced.

Of course, the best means of controlling retail margins is adequate food production. Short supplies always limit the availability of food to the consumer, and this situation enables an intermediary to make the most of it. But, even increasing supplies, as we have noted above, can be nullified by marketing losses.

As the supermarkets grow in number and volume of business, they also will serve increasingly to control margin. Observation indicates that their prices currently are competitive with each other. Streamlining and improving their fresh produce departments could lead to further reduction in their margins.

Sources of credit to higglers are limited. A 1977 study of higglers by the Ministry of Agriculture found the limited amount of money available for investment by higglers through the non-institutional sources such as friends, customers, etc., along with the sizable number of persons competing for these funds, one of the major causes of the large number of small uneconomic enterprises characteristic of the retail higgler system.

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Recommendations:

- (a) Present public markets should be improved to provide better storage and display facilities which will reduce spoilage and give adequate room per stall for the vendor.
- (b) Construction is needed of additional smaller satellite public markets conveniently located around the urban areas to improve access of consumers to sellers. It would reduce the need for as many consumers to pay the higher margins of the street higgler.
- (c) A program to supply higgler who have stalls in markets should be inaugurated to enable them to finance the larger volume handled per higgler, and thus also lower their costs.

Market Intelligence

Uncertainty increases costs. If a wholesale buyer is uncertain about the current crop and market condition, he must allow himself a wider margin to compensate for possible error in what he pays. He will restrict the amount he buys at one time to minimize this risk. Producers not aware of current crop and market conditions may accept too low a buyer's bid. They may pick a day to sell when the market is oversupplied, when a short time later or earlier would have netted a better price.

When buyers lack knowledge of current supply and market conditions over the island, pockets of market undersupply or oversupply with accompanying price distortions can develop. A 1976 Ministry of Agriculture study found variations in parish prices chiefly the result of supply conditions. Knowledge of these distortions can permit proper movement of food supplies by the wholesalers to correct such conditions. The Jamaican Agricultural Society as early as 1964, in outlining Jamaica's agricultural needs, recognized this constraint when it stated, "an efficient marketing intelligence service must be set up." But, the only present market

intelligence published is a weekly retail market price report for a limited number of products collected by two Kingston newspapers for four Jamaican cities.

Recommendations:

- (a) Market research should be done cooperatively by the University and the Ministry of Agriculture to provide demand forecasts as a basis for providing market outlook for storable commodities. This will permit marketing decisions by growers, the growers' marketing cooperative, wholesalers and the AMC leading to a more rational flow to market over the marketing season.
- (b) The Ministry of Agriculture should provide this market intelligence through regular Ministry of Agriculture daily market news radio broadcasts covering Kingston and all regional markets around the island reporting supplies, prices, demand, etc., at these markets, crop reports when available; periodic review of weather in producing areas, etc.
- (c) Information dealing with Crop Reports, Crop Surveys, etc., conducted by the Ministry of Agriculture should be relayed to the growers' market cooperatives, the Extension Service and all credit agencies. The Ministry of Agriculture should have responsibility to transmit along with this information the Ministry's analysis of its meaning. Cooperative members, being in regular contact with the cooperative's assembly centers, would have information to help them with their marketing decisions.
- (d) A Ministry of Agriculture Market News Information program might be broadcast daily over the island's radio stations. The local Extension Service would alert the growers to the fact that they can get market information from this source.
- (e) The growers' marketing cooperative assisted by the Extension Service should inform the members of the Government's price support program and the reasons for its structure.

Production Planning

Growers' production plans are influenced by their anticipations for income. Growers will be encouraged to adjust their production of the different crops depending on what they believe best for them--considering their farm, their family situation and their willingness to change.

Thus, when more production is desired nationally or regionally, an increase in the AMC support or buying price can serve as a signal for growers to produce more of that crop. A lowering of the AMC support or buying price will give the opposite signal.

Recommendations:

- (a) The Planning Section of the Ministry of Agriculture should do the analytical work needed to develop price policy based on prospective need and market demand, rather than solely on cost of production. Items to be considered are: current and desired per capita supplies; forecasts of demand; nutritional requirements; competitive crops; intentions to plant as reported by producers; costs of production; availability of imports; prospects for exports; etc.
- (b) Periodic and improved surveys of farmers by the Ministry of Agriculture can provide information such as reports on crop prospects, intentions to plant and probable production. This information will help the grower make his decisions concerning what to plant, how much, and when. These reports also will assist in development of AMC price and support and buying policy.
- (c) Direction can be given to the level and pattern of national food production by making AMC price supports and buying policy apply to items which are basic to an adequate diet or which form an important component of the income of a region. By varying the support or buying levels and their application between regions, zones of production or regional distribution can be encouraged as well.

Transportation

Small farmers continue to have considerable difficulties moving their bulky crops from their hillside farms to the main roads via so-called 'bridle paths.' While the maintenance of these roads is the responsibility of the parish councils, the funds are provided by the central Government.

Small farmers are influenced in the choice of cultivated crops by the relative facility of transporting crops to market. Not infrequently, small farmers located near main roads will take the longer, paved route to Kingston for sale of their products because local parish or regional markets are thin or virtually non-existent.

Recommendations:

- (a) The budgets of the parish councils should be increased to permit the upgrading of 'bridle paths' so as to increase the ease of flow and the volume of product from 'inside' hillside farms to market.
- (b) Transportation plans should include farm to market roads planned on a local/regional basis to facilitate the collection of intra-regional food supplies. (More will be said on this point in the section on market towns.)

6.1.5 Interrelationship of Constraints Among Institutions

Many empirical studies suggest private traders and growers' cooperatives may be more efficient than public sector institutions in aggregating output from large numbers of small producers and providing them with market access. The dual charge to the AMC to serve as a price supporter on the production side and as a price restrainer on the

consumer side results all too often in policy conflicts with the result that the agency is compromised on both.

Recommendations:

- (a) The AMC should concentrate on its role of serving as Jamaica's food market stabilization agency. It should not try to handle every potato, pumpkin, and yam produced in Jamaica. Rather, its purchases should be aimed at making the Government's production goals, price incentives and market stabilization programs succeed by standing ready to purchase at the Government-set support and incentive levels. The list of affected crops and their prices should represent national and regional production targets.
- (b) Farm products procured by AMC under this support program should be disposed of as follows:
 - (1) Store where possible during peak harvest gluts and moved into the market later;
 - (2) Sold to the agency operating the subsidized food distribution program in low income areas;
 - (3) Sold to the private sector when possible at prices above the support level.

The AMC should use the proposed local grower marketing cooperatives as much as possible in carrying out field price support procurement programs. In all its field purchase activities, the AMC should strictly adhere to pricing and buying strictly on grade and quality standards.

- (c) AMC should withdraw from retail distribution. The role of subsidized sale of food to low-income consumers through the basic shops and mobile routes should be transferred to a new agency set up and budgeted specifically for this purpose of low-income subsidized food distribution.

For the near future, much of Jamaica's food crops will likely be sold via the parish markets and the higglers (country, town, and the larger specialized speculators). Consequently, efforts should be made to establish

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conditions for reducing costs of operation. The ongoing program (financed by the Inter-American Development Bank) for updating and modernizing the parish markets would provide them with more ample and convenient facilities to display and sell their products, and it would increase the volume of daily retail business per higgler. In time, this could result in lower retail margins.

The role of the larger wholesale inter-city higgler should be studied with a view to integrating their efforts into a supply-equilibrating system of delivery, preferably on a parish/regional basis.

Workshops should be set up with the top management of the supermarkets and their produce department supervisors at which representatives of well-managed United States supermarket chains would discuss and demonstrate the latest management and operations now in practice in U.S. food chain produce departments.

Jamaican supermarkets should be encouraged to establish contacts with grower marketing cooperatives and private wholesalers and develop contracts for the supply of specific quantities and grades of fresh produce. The present haphazard method of supermarket supply should be streamlined. Stricter requirements for quality should be established and adhered to.

6.2 Marketing: Export Crops

6.2.1 Bananas

Small farmers constitute the large majority of producers of bananas. According to the Banana Board's registry, growers with farms of less than 5 acres numbered 24,984 representing 94.4 percent of the total; they had 54 percent of the total acreage. The largest farms, over 100 acres, numbered only 57, and these had 19 percent of the acreage. (Table 6-2)

Table 6-2, Banana Growers Registered for Spraying by Size, 1977

<u>Size of Banana Planting (Acres)</u>	<u>Number of Growers</u>	<u>Percent</u>	<u>Acreage</u>	<u>Percent</u>
<u>Jamaica</u>				
5 and Under	24,984	94.4	36,795	54
Over 5 to 10	989	3.7	6,876	10
Over 10 to 25	287	1.2	4,314	6
Over 25 to 100	149	.5	7,402	11
Over 100	57	.2	12,891	19
TOTAL	26,466	100.0	68,178	100

Two critical issues, securely intertwined, face the banana industry at this time. The first is that the industry has not been able to meet its export quota to the United Kingdom; indeed production of bananas has hardly increased over the past five years. Jamaica has an assured quota of 130 thousand metric tons annually for the British market. This is a guaranteed market for quantity only--not price. In 1977, Jamaica exported 81,000 tons of bananas--almost 50 thousand tons short of their British market quota. Jamaican total banana production in 1977 was only about a third of the 1971 level. Part of this was due to weather, part to decline in average yield and part to a shrinkage in the number of banana plants grown.

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The other is that productivity on the small farms is quite low, two to three tons per acre on the average as compared with seven to ten tons on the banana estates. The rub here is that efforts by the Board to 'go' with the more productive estates to meet their target of 50,000 tons more would deprive the small growers of a chance of improving their incomes, while the alternative of 'going' with the small producers for the additional tonnage would probably result in a continuing large percentage of 'rejects' and the accompanying complaints. The Board faces the dilemma that small farmers, particularly in the 'banana' parishes of Portland and St. Mary are highly dependent on their income from bananas to meet a portion of their cash requirements while the Board is severely constrained in its capacity to 'subsidize' the acceptance of bananas of dubious quality.

The low productivity of banana production on the small farms has several causes, probably the most important being the lack of fertilizer application. (Small farmers when questioned on this point respond that the fertilizer has not been available.) But there are other reasons as well. Most small farms are on hillsides where the steep slopes make the weeding and crop care difficult. The same condition impedes the tying of polyethylene 'shields' (provided free of charge by the Board) on the banana stems to protect them against insect damage. Area spraying (also free of charge) is less successful in covering the mixed stands of the small farms than the pure stands of the banana estates.

Most of what is known about maximizing banana yields has been conducted on the more favorable, pure-stand conditions of the banana estates, and very little on the more difficult, mixed-stand conditions of the small farm. Our information is that the Board is considering extending

its research to the mixed-stand conditions of the small farm. Even moderately successful results from this research, combined with the better assembly of inputs, especially fertilizer (discussed elsewhere in this section), may well result in substantially better yields on the small farm. Such an end would cut through the double tier of dilemmas in this industry and enable it to attain its target of '50,000 tons more' by resort to better yields on the small farms and additional acreage in banana estates.*

Two of the major sources of grower dissatisfaction with banana marketing are the matter of rejects and prices. Some small growers have complained of as high as 40 percent of their delivery being rejected at the boxing plant. The average is reported to be 10 + 20 percent. The grower is paid for the weight of the bananas accepted; he gets nothing for those rejected. He usually abandons the rejected bananas on the lot. Banana rejection can come from: undersize hands, blemishes caused by fungus growth, thrips or oil spray damage, latex stain, or mechanical injury, i.e., the hands get punctured in handling or transit. One of the first needs is a better understanding by the producers of the reasons for the rejection of their bananas. Improved roads likewise would reduce the damage suffered in transit from farm to boxing plant--as well as make the boxing plants more accessible to small growers.

*Still another possibility is the extension of the usage of the giant Cavendish-Williams hybrid now being tested by the Banana Board. This variety is higher yielding and faster ratooning than the Valery. Still another advantage is that this variety is shorter, about 'man-high' and this would facilitate shielding and reaping by small farmers on the hillsides and contribute to reducing the rate of rejects. Whether this variety is acceptable, in terms of flavor and size, to the 'English house wife' remains to be determined.

Efforts have been made to transport the banana 'hands' packed in plastic boxes rather than by stems which flex and often puncture the hands. This is effective for growers whose farms skirt the main road, but it has not been practical for the growers who count on their donkeys to bring the stems down. The plastic boxes do not fit conveniently in the donkey baskets.

The second major banana grower complaint concerns the price the grower is paid by the Banana Board at the boxing plant. The growers claim it is an inadequate incentive to grow bananas and that it constitutes too small a share of the export price going to the grower. Some blame the Banana Board for being top heavy with management personnel.

The following recommendations are made with a view to meeting the national requirements for '50,000 tons more' of bananas and keeping in mind the income and cash requirements of the small farmers (especially in the 'banana parishes'):

- (a) Excessive rejections of bananas as being unfit for export are an important marketing income constraint to the small banana growers. Educational activity by the Extension Service, the Banana Board, and the boxing plant staff should be carried out with small growers to inform them of the causes of rejections and how these can be reduced by improved cultural, harvesting and transportation practices. Much of the printed technical information now available is beyond the level of the small grower. Significant increases in income would accrue to the small banana grower if his yield per acre could be brought up to near that of the estate-type producer.
- (b) The Banana Board should investigate the feasibility of a two-price system for export and reject bananas with the lower priced rejects being utilized through by-products and through distribution by the governmental subsidized food distribution program to low income groups.

- (c) About the only way the banana industry can overcome its high production cost problem and mitigate its dependency on governmental subsidy is to increase yields and lessen rejects. Since the lowest yields are on the small farms, the industry-wide banana expansion program should concentrate especially on the small grower and how to raise his yield. If one ton more of export quality bananas per acre could be marketed by each small grower of 5 acres or less bananas, the banana industry's economic problems would be greatly diminished along with a lot of the small growers' income problems. The slogan of this program might be 'one ton more.'
- (d) The role of the small banana grower in the banana industry should be re-evaluated together with the degree of representation of his interests in the All Island Banana Growers Association and on the Banana Industry Board.

6.2.2 Coffee

The coffee industry faces two problems similar to those in the banana industry--insufficient production island-wide and relatively low yields among the large majority of its small growers. However, it can claim an important advantage: Coffee prices, although below their historical highs, are still attractive.

Coffee is the largest contributor, among the export crops, to small farmers' income where it forms part of his mixed farming pattern. It is estimated, for example, that in the Buff Bay River Valley, on a farm of average size of 4.0 acres with 1.5 acres devoted to coffee, the overall return in 1977 was \$480 (yield of 16 boxes/acre @ \$20/box of 60 lbs.). This is more than 50 percent greater than the return on bananas (where the rejection rate is fairly high) and much better than the returns on cocoa, which has relatively low price and yields.

Generally speaking, coffee production is well adapted to small growers. It is a high income, permanent crop. The high value of the product in proportion to its volume, its ease of packaging on the farm, and lack of sensitivity to damage in transport make it well adapted to production in small or remote areas. Because of inadequate cultural practices, however, yields and net income of the smaller growers typically are below average.

The following table showing the distribution of coffee growers in Jamaica by size of planting is based on a sample survey of 3,805 coffee growers made in 1977. The Coffee Industry Board estimates there are a total of 25,000 to 30,000 farmers currently growing coffee in Jamaica. (Table 6-3)

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Table 6-3. Estimated Percentage Distribution of Coffee Growers by Size of Coffee Plantings, Jamaica, Based on Sample Survey, 1977.

<u>Size of Planting (Acres)</u>	<u>Percent of Growers</u>
Less than 0.25	12.1
0.25 to 0.49	24.6
0.50 to 0.74	29.7
0.75 to 0.99	8.2
1.0 to 1.49	18.1
1.5 to 2.49	5.6
2.5 to 4.99	1.3
5.0 to 7.49	.3
7.5 and over	<u>.2</u>
	100.0

SOURCE: Coffee Industry Board

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The Coffee Industry Board advocates expansion of coffee production. In 1960, the annual report to the Coffee Industry Board stated, "In Jamaica, our problem is under production . . ." It still is. The present plant capacity of the board well exceeds its current level of utilization. Facilities are good and a quality check program is maintained. All shipments are sampled and subjected to a cup taste test. Samples are maintained for a year in case of complaints by the buyer. The green beans sell readily in Japan at a premium over the general world market.

Future coffee prices will depend on the world coffee situation. Coffee has just gone through a period of very high world prices and scarce supply due to frost problems in Brazil. Supplies have recovered somewhat and the world price in turn receded, but the crop currently is still enjoying a favorable market. Some further reduction in world coffee prices seems likely as world supplies increase. Jamaica's coffee production is so insignificant relative to the total world supply of arabica coffee, that variations in Jamaican supply have little effect on the price received for Jamaican exports or the world market.

Currently there are no major disease problems in Jamaica. The leaf miner is the main pest, but it can be controlled through cultural practices. A main complaint of growers is the unavailability of fertilizer

Recommendations:

1. Efforts should be made to expand the production of coffee, especially among small growers. Coffee is a high-income, permanent crop and is one of the easier crops to move out of poorly accessible areas. Returns to growers could be increased by a larger industry output, since the overhead of the existing processing and marketing organization could be spread over a larger volume.

2. Special educational and demonstrational programs designed to improve coffee yields on small grower farms should be conducted by the Coffee Industry Board and the Extension Service.

6.2.3 Cocoa

Cocoa in Jamaica is largely produced by small growers. In 1977, there were 24,000 growers who had 33,000 acres in cocoa. Three-fourths of the growers had less than two acres in this crop. (Table 6-4).

The industry faces a set of problems similar to those in bananas and coffee. Production island-wide is insufficient to meet the demand, and yields on small farms are very low.

The island's production for 1975-76 amounted to 1,573 tons, down from 1,771 tons in 1974-75 and 1,593 tons in 1973-74. Under normal conditions, according to the Cocoa Industry Board, annual cocoa production varies between 2,000 and 2,300 tons. For three successive years, however, cocoa production throughout the island was seriously affected by protracted periods of severe drought which resulted in unusually poor yields.

The board estimates that it could market 4,000 tons of cocoa beans--more than double its present figure.

Cocoa fits the small grower's needs. It can be interplanted with other crops, particularly bananas, to provide a source of cash and diversification against risk. Labor requirements are less than that for coffee. There are, however, two disadvantages from the small farmer's point of view: cocoa (at present) adds little to his income and yields are quite low. Its potential has lost luster, additionally, because of the length of time it takes before a tree becomes fully bearing. In the Buff

Table 6-4. Distribution of Cocoa Growers by Size, 1977.

<u>Number of Acres of Cocoa on Farm</u>	<u>Number of Growers</u>	<u>Percent of Growers</u>
Under 1	10,439	43.5
1 < 2	7,534	31.4
2 < 5	4,887	20.5
5 < 10	873	3.7
10 < 20	199	0.8
20 < 50	27	0.1
Over 50	<u>2</u>	<u>-</u>
Total	24,011	100.0

SOURCE: Cocoa Industry Board

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Bay Valley (Portland) for example, yields averaged 3.54 boxes/acre on an average farm size of 3.86 acres, of which 1.0 acre was devoted to cocoa. Thus, the average cocoa farmer could count on J\$42.55 for the year without counting the cost of fertilizer, rat poison, fungicides and his own labor ($3.54 \times 1.0 \times \text{J}\12.02). To counter the problem of time before the tree comes to full bearing strength, however, cocoa trees can be interplanted with banana in the early years, when the young trees require shade. This would provide the cash income needed by the farmer. When the cocoa trees have reached full height, their branches form a canopy, thus protecting the pods on the lower branches, and any additional shade increases the trees' susceptibility to the black pod disease. From that point on, the cocoa tree requires considerably less labor to maintain it, and to reap its fruit, and it endures on the average for 25 years.

Jamaica has excellent soils and climate for cocoa, and the quality of its product is highly regarded on the world market. Since the planting of trees on slopes is no deterrent to its productivity and longevity, it is quite suitable as a small farmer crop.

The board's program for increasing production and improving yields is to encourage farmers to improve their cultural practices and to extend their plantings. The board has subsidized warfarin for rat control in cocoa fields. It stresses pruning, reduced overhead shade, and the control of black pod disease. Prior to 1977, the entire extension educational program was carried out by the board. It now has only one technician, with no responsibility for direct education of growers.

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Recommendations:

1. The efforts to step up production of cocoa, through extension of plantings to new areas and increases in yields, should include special attention to areas where small farmers predominate and where ecological conditions are apt for cocoa cultivation.
2. Special programs with materials and methods of presentation 'pitched' to the small grower should be carried out showing how cocoa trees can be interplanted with other crops in their early years, and what the combined flow of income is over a period of years after the trees come into full bearing.

6.2.4 Coconuts

Although listed as a traditional export crop, in fact neither coconuts nor their products are being exported except for a small amount of coconut seed, shells, and shell charcoal. This is due to the extermination of millions of trees by the Lethal Yellow Disease. There have been only very small exports of coconut oil from Jamaica for ten years. Virtually all of the national output presently is consumed at home.

Although the small farmer is listed as the most numerous among the growers of coconuts, his share of total production was a relatively small part of the total. In a 1975 registration by the Coconut Board, there were 785 growers with up to 500 bearing trees, and these constituted 72.5 percent of the number of registered growers. But, they accounted for 168,099 bearing trees, or only 11.6 percent of the 1,448,494 bearing trees in the country. The largest growers--over 20,000 bearing trees per grower--numbered only 11 in that year, and they accounted for 37.2 percent of the bearing trees. Yields are low--about 20 nuts per tree in that year. It is worth noting the yields vary according to the size of grower. They were about the same as the overall average for the small and the large grower, and lowest and highest for the in-between grower.

The volume of production reaped from this stock of trees tells essentially the same story: those delivering up to 20 coconuts represented 67.9 percent of the growers, and they delivered only 5.5 percent of all the coconuts. At the other end, those delivering 5000 or more coconuts were only 0.2 percent of the growers, and they contributed 31.4 percent of the 338,545 coconuts delivered in 1975.

The industry is now in the process of recovering from the ravages of the Lethal Yellow Disease which wiped out most of the pre-existing population of coconuts, the Jamaica Talls. Production of copra is way down from previous years, and the country has not exported it for several years. It represents a small income for a relatively few small farmers in a few parishes.

Nevertheless, the industry still has a considerable potential in which the small farmer can share in the years to come.

Recommendations:

1. Coconut production by small farmers should be encouraged. Coconuts and bananas can be interplanted profitably, thus spreading the risk from a one-crop culture.
2. The Coconut Industry Board and the Government of Jamaica should re-examine their price policy with respect to the coconuts-copra-coconut oil complex with an objective of reducing the diversion of coconuts to the highly inefficient crude oil boilers which lose half the coconut oil which could be extracted from the nuts.

6.2.5 Spices

The spices grown in Jamaica are: pimento, ginger, nutmeg, turmeric, kola nuts, black pepper, cardamon, annotto, sarsaparilla. The first five are the principal ones currently produced in the country.

The marketing of spices in Jamaica is under the supervision and control of the Government, through the administration of the Ministry of Agriculture. Government-set prices are announced every year in May for pimento and in November for turmeric. The other spice prices float freely in the market. Four private agents buy all the pimento crop, financing their purchases and then selling the pimento to the Government-operated warehouse, receiving a commission for their work. The pimento is prepared for export at the Ministry of Agriculture warehouse, with the shipments going mainly to Russia, Poland, United States, United Kingdom and Germany. The other spices are marketed through Government-licensed produce dealers.

Export demand for pimento has been good and no problems have been encountered in exporting the crop. Grower price increased from 72¢ per pound in 1977 to 95¢ per pound in 1978. Current gross returns per acre to the grower are about \$2,300 for a field of 8-year old plants in full production. Export demand for turmeric is very good; all of the export from the 1978 crop was sold before processing began. Turmeric (used in curry powder) also finds a ready market locally as does nutmeg. Jamaica imports about \$10,000 of nutmeg annually.

One of the principal shortfalls in Jamaican spice supply is for black pepper. Jamaica imports about \$600,000 of black pepper annually. An estimated 300 acres of black pepper production in Jamaica would be needed to substitute for these imports.

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Portland Parish has an ideal climate and soil for growing black pepper. It can be grown on hillsides, but the soil must have adequate drainage. Black pepper plants need four to five years to come into production. A half-acre plot in full production will yield around 1,500 pounds of dry peppers which currently sell at \$1 per pound.

Turmeric and nutmeg likewise are adapted to the parish. Nutmeg in full production will gross about \$2,500 per acre. Turmeric, an annual crop not cultivated but growing on marginal lands and around fences, returns \$150-\$200 per acre. A small semi-processing (drying) plant could be located at Buff Bay to handle the first stages of processing for all these spices. The Jamaican Industrial Development Corporation has recently made a feasibility study of such a plant. Current cost would be about \$30,000.

For most of the spices, development hinges on the task of organizing sufficient production concentrated in an area to provide the basis for economical gathering and semi-processing of the crop. The world market for spices has been expanding steadily, with the highest demand for spice imports in North America and Western Europe. Thus, the market demand is adequate, though obviously not unlimited.

Spice production is well adapted to production by small farmers. Except for pimento where some of the production is on large farms, virtually all the spice production in Jamaica is on small farms.

Recommendations:

1. The earlier feasibility study by JIDC of a black pepper industry for the western area of Portland Parish should be re-evaluated in relation to its application in increasing incomes of small farmers in that area, aiding in the economic development of Buff Bay as a market town, and contributing to the saving in foreign exchange by substituting for the black pepper now imported.

2. If the feasibility evaluation shows the project economically sound, steps should be taken to organize a Buff Bay Black Pepper Growers Cooperative. The cooperative should serve as the focal point for getting a sufficient number of growers to provide an economically viable volume of production needed for successful operation of the processing plant.
3. The cooperative should own and operate the plant and either market the product itself or turn the processed pepper over to the Government Pimento Board for distribution.
4. Grower returns for their marketings should be in the form of a payment at the time of delivery, with a patronage dividend at the end of the year based on the final profit earned by the cooperative from the marketing of the crop.
5. Producer credit will be needed for the growers to finance the growing of the crop since it takes four years for the pepper plant to come into maturity. Other crops can be interplanted with pepper for the first few years on land where suitable.
6. The cooperative itself will need credit to finance the construction of the processing plant and for working capital to finance the annual processing and marketing of the crop itself.
7. Demand for the other spices is adequate and where they can fit into the small farmers' farm organization production plans, should be included. Most can be produced in small, not otherwise utilized plots.

6.3 Inputs and Subsidies

For food crop production, local merchants, the Ministry of Agriculture (through the Extension Service), the Jamaica Agricultural Society (through its farm supply stores), and a few local cooperatives are the main sources of such inputs as seeds, fertilizers, pesticides, weedicides, feeds, and farm equipment. For export crops, the Commodity Boards are the main suppliers of seedlings, fertilizers, and weedicides, usually on a subsidized basis. Transport to the collection point is also subsidized in the case of sugar cane and coconuts.

The Ministry of Agriculture also offers a large number of services such as contract plowing, farm ponds, farm housing, improved planting materials, crop care (chemical control agents and equipment), credit and fertilizer on a subsidized basis. But the limited and uncertain availability of these goods and services added to qualification requirements and other limitations reduce their impact to levels of little significance to the small farmer. The reasons are as varied as the programs themselves. Sometimes, the incentive is nullified by a 'bridle track' which would impede the transport of the additional production, or by the unavailability of farm labor to reap the larger harvest, or by fear of a fortuitous drought which, in the absence of small-scale water supply emergency system, would destroy the crop, or by fear of a 'surplus' which would result in a fall in price and eliminate his gain (the 'floor price' by the AMC notwithstanding), etc.

The vitally important fertilizer subsidy program has remained virtually inoperative for the past three years--even as Government has urged larger production upon all farmers. For most of 1976, fertilizer

was not available because of a local strike. In the same year, the balance of payments deficit reached a record high. Supplies of fertilizer during 1977 and 1978 have been subject to the constraints of the foreign exchange conservation program. In sum, the generous subsidy on fertilizers offered by the Ministry of Agriculture (both for domestic food crops and for export crops administered by the commodity boards) has remained largely unutilized for lack of availability.

In 1978, the ministry's principal farm subsidy programs were the following:

1. Farm House Program. The farmer pays 15 percent in cash of the estimated cost of \$1,800 for a 17' x 20' house. In addition, he hauls material, mixes concrete and helps in other ways as he is able.
2. Tank Program. Farmers in dry areas with no wells or springs can get a 50 percent grant and a 50 percent loan toward the cost (about \$2,000) of a 10,000 gallon tank.
3. Land Preparation Scheme. Initial preparation. The department will use a bulldozer to clear, plow twice, harrow twice, and furrow if necessary for \$84.50 per acre. If the farmer uses a private contractor, the ministry will pay \$35 per acre toward the cost, or \$20 if land has already been cleared. For lighter land preparation, the ministry will use a wheel tractor, bush cut, plow once and harrow twice for \$18. All these costs are under review currently.
4. Hill Farming Subsidy for Soil Conservation Structures. This is a new program available on a limited basis. The subsidy rate is 75 percent of the cost. The farmer's contribution may be supplied in labor or cash spread over a three year period.
5. Fertilizer. The Government pays one-third the cost of fertilizer at the source as part of the "Basic Needs Basket." The Ministry

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of Agriculture also refunds to the farmer one-third of the retail price.

6. Agricultural Pesticides. The Government buys in bulk and supplies the parish managers. They employ spray men and also make hand sprayers available to farmers at no charge. But there is always much greater demand for spraying services than can be provided.

Large or highly commercialized livestock producers get their supplies principally from the private sector except for artificial insemination of cattle, which is a ministry service. There are several plants that mix and distribute feeds made largely from imported cereals and proteins. For the broiler industry, there are five firms that supply chicks, feed, and processing services for several hundred broiler growers under contract. Most seeds and planting materials for food crops are grown within the country and often by the farmer himself. Irish potatoes and hybrid maize are usually imported. Most of the commodity boards are active in supplying planting materials for their crops.

Comment

Farmers report serious problems in getting fertilizer and ministry pest-control services. Even simple farm tools are said to be often out-of-stock. The various Ministry of Agriculture schemes consume a substantial amount of time for extension officers. The supplying of small farmers with their limited quantities of inputs is costly and time-consuming for farmers and all others concerned. There is also a feeling that the supply of hand tools available to farmers is too costly and of poor quality and that more such tools could be made in Jamaica. A study of this problem is under way in the Ministry of Agriculture's equipment

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section. A modernized agriculture would take added requirements for quality inputs including better breeding stock for goats and dual purpose cattle and new crops and much larger supplies of fertilizers and pesticides and weedicides.

6.4 Credit*

Prior to 1977, only one institution had been established to minister to the credit needs of small farmers--the Peoples Cooperative Banks operating under the supervision of the Agricultural Credit Board. The Self-Supporting Farmers Development Fund (SSFDP), with foreign exchange provided by the Inter-American Development Bank, attended to the needs of the medium-size farmers (5 to 25 acres); however, 20 percent of their loans had been made to farmers with up to five acres. The institution of the Crop Lien Program in mid-1977, with funds from the Ministry of Agriculture, was specifically aimed at the seasonal credit needs of the small farmer. For a comparison of the similarities and differences among the three programs, see Table 6-5.**

Total loans outstanding to agriculture amounted to J\$166.5 million*** in 1977. Large farmers had 72.0 percent, medium size farmers 12.7 percent and small farmers 15.2 percent. The 1977 percentage for small farmers includes J\$9.5 million of the Crop Lien Program initiated in that year. Through 1976, loans outstanding of the Peoples Cooperative Banks were J\$1 million, or 11.0 percent of the total agricultural loans outstanding of J\$136.7 million. The share to small farmers of total agricultural credit declined from 40.9 percent in 1971 to 22.9 percent in 1974 and 15.2 percent in 1977

Translated into real terms (after taking the inflation of the 1970s into account) total agricultural credit rose from J\$25.3 million in

*Much of the data in this section is drawn from Rural Financial Market in Jamaica: Analysis of Performance Problems and Recommendations, by D.H. Graham, C. Bourne and G. Begashaw, USAID Mission, October 1978.

**Ibid.

***Corrected for devaluation on dollar-linked loans, it becomes J\$169.0 million.

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1970 to J\$65.5 million in 1977 in constant 1970 dollars. Loans by the P.C. Banks actually declined in real terms, going from J\$12.0 million in 1970 to J\$6.2 million in 1977. All of the other agricultural credit institutions showed substantial increases in real terms. (Table 6-6)

Reviewing the agricultural credit history of the 1970's, the authors found (p. 47):

- 1) Commercial banks are the largest suppliers of credit to agriculture, followed (in more recent years) by the JDB, the ACB and the SSFDP lines of credit;*
- 2) The most rapidly growing agricultural credit programs were those financed by the JDB and SSFDP;
- 3) U.S. dollar-based loans (i.e., the running behind the JDB and SSFDP) were far more important than domestic based funding in expanding the loan portfolio to agriculture;
- 4) As a whole, the "old line" source of public sector credit for agriculture (ACB) grew very slowly during this period and within this organization the credit to the smaller farmer component (the P.C. Banks) grew much more slowly than the larger farmer credit portfolio (i.e., direct borrowers).
- 5) For the system as a whole, credit expanded most rapidly for larger farmers (the commercial banks, the JDB portfolio and the direct borrowers within the ACB) and medium sized farmers (the SSFDP). Credit to small farmers grew very slowly (the PC Banks) except for the final year 1977 when the Crop Lien program of the Ministry of Agriculture was launched. This was directed to small farmers with less than five acres.

The authors also note that none of the long-term developmental agricultural credit has been made available to the small farmer. They say:

*The large increase in commercial bank lending to agriculture from 1974 to 1975 in column 1 of Table 6-6 is largely due to an accounting and classification change. Loans which had been previously recorded under the service sector or distributive trades such as loans to the A.M.C. and the Banana Board were now reported under agriculture. Land acquisitions financing now appeared for the first time under agriculture. There was also a substantial increase in the category 'other'. For these reasons, the 'sharp increase in commercial bank lending was exaggerate

"In sum, foreign source financing has been of considerable importance to the growth of agricultural credit in Jamaica in the 1970s. Even more importantly, it has been the most important source for long term development finance in agriculture. The domestic sources are almost all short term and not related to long term investments designed to modernize agriculture." (p. 52)

Since the P.C. Banks are the principal and, for all intents and purposes, the only institution ministering to the credit needs of small farmers, some comment is in order with respect to the lending criteria, procedures, and performance of these banks.

The agricultural credit study's evaluation of the P.C. Banks may be summarized as follows:

- 1) Although the criteria for the approval or rejection of a loan are: honesty and ability of borrower, financial position and progress, repayment capacity of borrower, loan purpose, and available security, it is open to serious question whether they are applied effectively by the Management Committees of the P.C. Banks. There is the impression that "the banks make loans on the basis of sympathetic understanding of the needs of the borrower rather than the criteria listed above;" and "to implement the above criteria, a more highly trained staff is needed and more information is required than that provided through the application form and related documents. Given these human and institutional limitations, only a cursory appraisal is made of loan applications."
- 2) Loans to members are used for either productive or consumption activities, including farming, school fees, medical expenses and other family needs. This implies that the PCB's are not operated primarily as agricultural credit institutions emphasizing agricultural development.
- 3) Taking inflation into account, real credit administered through P.C. Banks declined from J\$12 million in 1970 to J\$6.2 million in 1977 when measured in 1970 dollars.
- 4) A major portion of the loans is short-term (although, in theory, the P.C. Banks may make loans on a short-term, medium-term, and long-term basis). Rate of interest is 6 percent. None of the loan conditions are demanding, and the likelihood of foreclosing on any of the collateral is slim. This might possibly explain the high rate of arrears.

- 5) Slim operating margins and high arrears combine to suggest that the P.C. Banks are barely viable. The implication of the precarious financial state of the banks is that they do not have the resources to implement effective loan appraisal and collection procedures with a well-trained staff. This leads to inadequate loan appraisals, insufficient monitoring and collection of outstanding loans with a consequent high level of loan delinquencies.
- 6) The arrears rate in the eleven parishes from the ACB line of credit is about 40 percent of loans outstanding (Tables 6-8 and 6-9). In the parishes of Hanover, Portland, and St. Thomas, the arrears rate goes as high as 76 percent, 61 percent, and 62 percent respectively. This measure of the arrears rate understates the seriousness of the problem, since the arrears ratio is based on loans outstanding rather than on amounts due. The "main factors contributing to this high rate of arrears are the poor administration of the loan programs by the P.C. Banks' staffs, and the attitude of many borrowers that they do not have to repay Government-source funds. This attitude is encouraged by the lax administration which does not properly manage and supervise the loans in the first place."

In summary, the constraints faced by the small farmer in the field of credit are numerous and across the board. Long-term and medium-term credit from formal bank channels simply did not exist. Where it was offered in the form of a subsidy for one or another scheme (building and installation of water tanks, for example), it was hedged with conditions and qualifications as to make its practical use minimal. Short-term credit from the P.C. Banks in the 1970's rose more slowly than any other source in current dollars, and it actually declined in real terms between 1970 and 1977. The high percentage of arrears is attributed to lax administration and to farmers' attitudes. Where attitudes are concerned, however, it may be noted that attempts at buying agricultural development "on the cheap" is recognized for what it is. "Credit" is no substitute for other aspects of a development program. Credit must be used in conjunction with other elements of a coherent and rounded development program. The credit needs of the small farm sector, short-term and long-term, have been the most neglected; in terms of its potential, it is underestimated.

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Table 6-5

Summary Table of Similarities and Contrasts of PCE's, SSFDP
and Crop Lien Programs by Farm and Loan Characteristics

Term Structure	Size (acreage category)	Size of Loans	Enterprise financed	Source of funds	Lending costs	Interest rate	Collateral	Arrears	Adm. Organization	
Short, medium and long term; short term predominant	Predominantly small to medium farms (acreage not specified)	No limits but predominantly loans less than \$3000	PEOPLE'S COOPERATIVE BANKS			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 staff
			Farm and family needs including non-productive purposes	Share capital and Government fund through ACE						
Short, medium and long term. Medium to long term predominant	5-25 acre category	US\$ \$600 to US\$ \$24,000	SELF-SUPPORTING FARMERS DEVELOPMENT PROGRAMME			Quite high	7 percent	Land, other assets, stocks & bonds, life insurance policies	Relatively better	-171+ organization, more power and better trained
			Productive purposes financed (crop and livestock enterprises)	Loan from Inter-Amer. Dev't Bank, Govt. contribution and loan recovery						
Short term	Less than 5 acres of cultivable land	Less than \$6,000	Feed crop enterprises (productive purpose only)	CROP LIEN PROGRAMME		6 percent	None	Remarkably high	Not equipped with training personnel; evaluate and collect loans	
				Government fund	Low; no expensive administration for loan evaluation or collection					

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Table 5-6

Loans Outstanding to Agriculture (at End of Year) in
Current Values by Institutional Source 1970-1977
(J \$000)

Year	Commercial Banks	Agricultural Credit Board (ACB)		
		Total	Direct Borrowers	P.C. Banks
	(1)	(2)	(3)	(4)
1977	90,545	20,711	4,856	15,855
1976	82,385	19,133	4,144	14,989
1975	71,061	17,366	3,585	14,291
1974	26,586	16,306	2,515	13,791
1973	22,473	15,271	2,243	13,027
1972	12,927	14,904	1,918	12,986
1971	11,959	13,958	1,449	12,509
1970	10,093	13,038	1,008	12,030

	Jamaica Development Bank (JDB)	Self Supporting Farmers Development Program (SSFDP)	Ministry of Agriculture (Crop Loan)	Grand Total
	(5)	(6)	(7)	(8)
1977	24,507(27,006) ³	21,200 ¹	9,488	166,451(168,950)
1976	19,415	15,788		136,721
1975	12,051	11,765		112,743
1974	7,438	9,730		60,060
1973	3,429	7,833 ²		49,005
1972	1,399	5,933 ²		35,162
1971	606	4,035 ²		30,557
1970	55	2,133		25,320

Sources: Statistical Digest (Bank of Jamaica), various years; Monetary Statistics (Dept. of Statistics), various years; Annual Reports of the JDB, SSFDP and Ministry of Agriculture.

- 1 = Provisional.
- 2 = Interpolated values between 1970 and 1974.
- 3 = Loan balance in parentheses for JDB in 1977 reflects upward re-evaluations of outstanding balances due to correction for devaluation on dollar linked loans to farmers.

Table 6-7

Percentage Distribution of Total Agricultural Loans Outstanding and Annual Increases of Agricultural Loans for Selected Years by Farm Size Categories 1971-1977

A. Total Loans Outstanding (2)

Farm Size and Institutions	1977 (1)	1974 (2)	1971 (3)
I. Large Farmers	72.0	60.8	45.8
(a) Commercial Banks	(54.4)	(44.2)	(39.1)
(b) ACE Direct Loans	(2.9)	(4.2)	(4.7)
(c) JDB	(14.7)	(12.4)	(2.0)
II. Medium Sized Farmers			
(a) SSFDP-JDB	12.7	16.2	13.2
III. Small Farmers	15.2	22.9	40.9
(a) ACB-PC Banks	(9.5)	(22.9)	(40.9)
(b) Crop Lien Program	(5.7)	-	-
TOTAL	100.0 (\$166,451,000)	100.0 (\$60,060,000)	100.0 (\$30,556,000)

B. Annual Increases in Loans Outstanding (1) during the year indicated

	1977 (1)	1974 (2)	1971 (3)
I. Large Farmers	46.9	76.0	55.1
(a) Commercial Banks	(27.4)	(37.2)	(36.0)
(b) ACB Direct Loans	(2.4)	(2.5)	(8.3)
(c) JDB	(17.1)	(36.3)	(10.6)
II. Medium Sized Farmers			
(a) NSFDP-JDB	18.2	17.2	36.7
III. Small Farmers	44.8	6.9	9.2
(a) ACB-PC Banks	(2.9)	(6.9)	(9.2)
(b) Crop Lien Program	(31.9)	-	-
TOTAL	100.0 (\$29,730,000)	100.0 (\$11,054,000)	100.0 (\$5,177,000)

Source: Derived from sources in Table III.2

Table 6-8

Loans Outstanding to Agriculture in Current and 1970 Dollars by Institutional Source 1970 - 1977

A. Total Agricultural Credit in Current Values and in 1970 Dollars (End of Year Balances)

	Current Values (J \$000)	In 1970 Dollars (J \$000)	Net Annual Chg
	(1)	(2)	(3)
1977	166,451	65,455	4,364
1976	136,721	61,091	6,000
1975	112,743	55,731	20,914
1974	60,060	34,817	-2,224
1973	49,005	37,041	4,900
1972	35,162	32,141	3,583
1971	30,557	28,558	3,238
1970	25,320	25,320	-

B. Agricultural Credit in Current and 1970 Values by Institutional Source (J \$000)

Source	Current Values		In 1970 Dollars	
	1970	1977	1977	Net Chg 1970-77
	(1)	(2)	(3)	(4)
(1) Commercial Banks	10,093	90,545	35,606	+25,513
(2) Agr. Credit Board				
Total	13,038	20,711	8,144	-4,894
Direct Borrowers	(1,008)	(4,856)	(1,909)	(+901)
P.C. Banks	(12,030)	(15,855)	(6,235)	(-5,795)
(3) Jamaica Dev. Bank	55	24,507	9,637	+9,582
(4) SSFDP	2,133	21,200	8,337	+6,204
(5) Crop Lien	-	9,488	3,731	+3,731
(6) Total	25,320	168,950	65,455	40,126

Source: Same as Table III.2. The implicit GDP deflator was used to correct for inflation.

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Table 6-9

PCB's Loans Outstanding to Agriculture at End of Year
in current Jamaican Dollars (ACB Line of Credit)
(J\$ 000)

Year	Loans Outstanding	Percentage Increase
1977.	15,855	5.78
1976	14,989	4.96
1975	14,281	3.60
1974	13,791	5.90
1973	13,027	0.32
1972	12,986	3.80
1971	12,506	4.00
1970	12,030	-

Source: Monetary Statistics, various years.

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Table 6-10

Cumulative Loans Outstanding, Principal and Interest Arrears
of PCB's by Parish as at March, 1978 from ACB Line of Credit
(J\$)

Parish	Loans outstanding	Arrears		Total Arrears	Arrears (Col. 2+Col. 3) percent
		Principal	Interest		
	(1)	(2)	(3)	(4)	(5)
Clarendon	1,906,823	495,114	14,074	509,188	27
Manchester	2,341,939	822,534	43,967	866,501	37
St. Elizabeth	1,134,624	574,120	10,302	584,422	52
Westmoreland	893,748	195,804	6,880	202,684	23
Hanover	227,057	154,089	19,361	173,450	76
St. James	709,343	147,530	5,175	152,705	22
St. Mary	904,732	302,078	17,031	319,109	35
Portland	285,359	168,605	6,366	174,971	61
St. Thomas	367,192	222,495	3,704	226,199	62
St. Andrew	454,763	135,691	5,052	140,743	31
St. Catherine	1,767,152	492,795	16,974	509,769	29
Total	11,658,119	4,339,167	164,361	5,503,528	47

Source: ACB files

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7. Agricultural Support Activities: Non-Commercial

This section is concerned with the principal non-commercial institutions that are important to the development of small farms. These institutions are examined with respect to their adequacy to meet development needs.

7.1 Extension

The extension service is a part of the Ministry of Agriculture's Production Unit, established in 1977 to handle all of the Ministry's field programs for food crops and animals. The national center plans, directs, and coordinates these programs, but the main responsibility for day-to-day operation is with the three regional directors (Western in Montego Bay; Northern in Port Maria; and Southern in Kingston). While leadership for export crop programs is operated quite independently by the commodity boards, the extension services for those crops have largely been phased into the Production Unit except for bananas, coconuts, and sugar. National leadership for soil conservation projects such as Pindars-Two Meetings, is not with the Production Unit, but with the Soil Conservation Unit, but these programs also fall within the ambit of the regional directors. Extension responsibilities in the Production Unit appear to encompass numerous action responsibilities for credit, the handling of subsidies and inputs in addition to teaching and demonstrations. Extension Field Staff. As of early 1978, the main field staff were as follows:

	<u>Positions</u>	<u>On Board</u>
Parish Officers	13	13
Division Officers	65	58
Area Officers	401	387

There were also said to be one agricultural headman for each area extension officer. These are graduates of vocational schools or primary school leavers. Some are experienced farmers. The Social Development Commission, Ministry of Youth, Sport and Community Development has some extension work. The number of extension workers still with the commodity boards was not ascertained. The Jamaica Development Bank has six regional agricultural officers, 36 extension officers, and 13 "recovery" officers.

Pre-service training of extension officers has been mainly at the Jamaica School of Agriculture, although some in top echelons have degrees and some at the area level are vocational school graduates or persons with long experience and Ministry in-service training.

The Ministry specialist staff consists of 20 positions located at Montego Bay for the West and Kingston for the rest of the country. When Research completes its regionalization, the specialists will go to the Regional Research Centres. In early 1978 the staff included two food crop specialists, three in vegetables, one in tree crops, one in maize, one rice, one coffee, and cocoa and one home economics. There are additional specialized staff posted in the parish offices to run various programs. There is a Parish Home Economics Officer, for example. There is also a national Plant Pest Service in extension with five professionals. The Ministry has an Agricultural Information Service which is not under the extension program.

Inservice Training in extension is said to be given for at least one week per year for all staff. New members get three months' induction training.

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There is a Training Officer on the headquarter's staff, and training facilities at Eltham near Ocho Rios (St. Ann); Canaan (Westmoreland); Twickenham Park (St. Catherine); and Smithfield (Hanover).

Farmer training in 1977/78 was reported to be as follows:

<u>Kind of Training</u>	<u>Events</u>	<u>Farmers Involved</u>
Residential Course	28	390
Field Days	729	10,489
Individual Farm Tours	52,952	53,866
Group Farm Tours	223	1,970
Demonstration Plot	185	1,773
Total Number of Farmers Trained	-	47,614
Farm Visits	-	39,712

SOURCE: Ministry of Agriculture National Prod/Ext. Rept. 1977-78.
Discrepancy in number of farmers trained not explained.

Facilities. Ministry reports carry numerous complaints that the supply of vehicles is inadequate. The Ministry gives loans to field officers to help them buy vehicles, but there is still a problem. Various studies refer to the inadequacy of field office space and housing accommodation for staff. Inadequate roads for travel into hilly areas are also a problem.

Program. Field extension officers apparently have quite good access to farm opinion as to program needs through area extension councils and the numerous branches of the Jamaica Agricultural Society in which small farmers have a major voice. These branches are variously estimated to number somewhere between 500 and 1000 active bodies.

Conclusions with Respect to Small Farmers. The Jamaica Extension Service probably is better equipped to keep in touch with the needs of small farmers than most because of its relationship with JAS. The Society has a number of women members, several of whom are officers in branches.

7.2 Information Services

The Information Division of the Ministry of Agriculture issues information materials on agriculture and livestock production, fisheries and forestry. Newspapers and radio programs also are used to some extent to publicize the findings. The two periodicals of the Jamaica Agricultural Society are useful channels of communication along with meetings of the JAS branches and other groups.

7.3 Research

Research in agriculture and closely allied subjects is done principally by the Ministry of Agriculture and the Commodity Boards. Primary responsibility is given to the Ministry. Problems of farm product storage and infestation are addressed by the Storage and Infestation Division of the Ministry of Industry and Commerce. The Scientific Research Council, under the Ministry of Finance, works on agro-industry, food science and nutrition. CARDI (Caribbean Agricultural Research and Development Institute) has a branch at Mona which undertakes studies in cooperation with others. At the University of the West Indies (Jamaica) the Departments of Botany, Geography and Zoology respectively participate independently or cooperatively in some agricultural research. The Institute of Social and Economic Research at the University is an important source of economic and sociological research. An indication of research resources by agency is given in Table 7-1. In addition to in-country resources, the College of Agriculture, University of the West Indies, St.

Table 7-1. Principal Agricultural Research Agencies in Jamaica.

<u>Agency</u>	<u>Technical Staff</u>		
	<u>Professional</u>	<u>Sub-Professional</u>	<u>Total</u>
Ministry of Agriculture			
Crops Research	10	2	12
Soils and Land Use	9	--	9
Plant Protection	6	1	7
Veterinary Division	12	--	12
Livestock Division	12	6	18
Fisheries	7	--	7
Forestry	1	1	2
Soil Conservation Unit	4	13	17
Agricultural Planning and Policy Review Division ²	14	2	16
Banana Board ³	9 - 12	8	17 - 20
Coconut Board ⁴	3	3	6
Tobacco Industry Control Authority	1	1	2
Sugar Research Institute	11	12	23
Scientific Research Council ⁵			
Agro-Industry	6	--	6
Food Science and Nutrition	4	1	5
CARDI (Jamaica) ⁶	4	--	4
U.W.I. (Jamaica)			
Inst, Soc. & Econ. Res. (ISER)			
Botany Department ⁷	7	--	7
Zoology Department ⁸			
Geography			
Ministry of Industry and Commerce			
Storage and Infestation Division	6	--	6
Pioneer Hybrid ⁹	1	1	2

1. Except as noted, data are taken or adapted from G. Barker, A. Wahab and L. Bell. Agricultural Research in Jamaica. IICA, Kingston, 1977.
 2. Total staff. About half time in statistical analysis, agricultural and socio-economic studies.
 3. Data are for 1976.
 4. Information supplied by Coconut Board, September 1978.
 5. 1973. The Council is in the Ministry of Finance.
 6. Including two new positions as of July 1978.
 7. Not on full-time research.
 8. No information but said to sometimes do work for fisheries.
 9. Sorghum breeding. 120 a. land south of Spanish Town. Does some soybean testing in co-op INTSOY (Illinois) and U.W.I. (Mona).
- For a good many years, Alcan did applied research on mined land restoration on its properties with highly successful results.

The principal field stations for the Ministry of Agriculture are as follows:

1. Bodles, St. Catherine, 50' elevation, 2200 acres (500 irrigated). Livestock and crops. It has offices, laboratories, livestock buildings, a mechanical workshop, storerooms and housing for 12 to 14 staff. This is becoming the Ministry's main station and headquarters for the Southern Region for research.
2. Lawrencefield, St. Catherine, 50' elevation, 94 acres, irrigated crops research.
3. Grove Place, Manchester, 1400' elevation, 1200 acres unirrigated. Livestock, pastures and crops. Adequate livestock water has been a problem. The station is being phased out. Montpelier will replace.
4. Orange River, St. Mary, 500'-1000' elevation, 305 acres, unirrigated. Crops, vegetables, plant protection.
5. Beverly Pimento Station, St. Ann, 300' elevation, 31 acres, unirrigated.
6. Top Mountain, St. Andrew, 3500' elevation, 8 acres (5 irrigated). Various experiments mainly on vegetables and fruits on farms.
7. Montpelier. A new station to be developed. Will become headquarters for the Western Region.
8. Smithfield, Hanover. 600'-900' elevation, 110 acres, unirrigated. Soil conservation research and development mainly crop trials with various conservation treatments. There are office, classroom and dormitory facilities.
9. Allsides, Trelawny, 2000'-2500' elevation, 5 acres unirrigated. Cropping systems research and development headquarters for trials on farms.

The regional station for the North has not been selected.

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Perusal of the annual Investigations bulletin and other sources reveals a wide range of research studies in the Ministry of Agriculture considering the small and scattered staff. The reports frequently comment on problems of maintaining quality research arising from labor difficulties, natural disasters, equipment failures and theft of crops from experimental plots. The commendable practice of placing some field trials on farmers' fields has been hindered by difficulty in getting farmers to apply inputs as promised, and in getting yield data from the plots. (Barker, et.al. p. 22) In addition to study of existing problems, some attention is given to new crops. For example, research on the winged bean was started in 1975. Castor beans also are being studied.

Soursop is being studied to solve the problem of setting and thus make it an economically viable crop. The Ministry initiated research on hot peppers because it felt peppers were ready to move from the backyards into becoming a commercial crop.

With respect to the applicability of Ministry research to small farms, most of the research is scale-neutral; good for producers of all sizes. Some highly successful research has been of considerable benefit to small farmers, such as the introduction of new varieties of onions, the control of pests and diseases of Irish potatoes, and applied research on various kinds of terraces and associated cropping. The studies of cocoa growing under Malayan Dwarf coconuts will help small farmers as well as larger ones.

7.4 Cooperatives and Producers Associations

There are various kinds of formal and informal cooperatives. The formal ones under the oversight of the Cooperative Department of the Ministry of Agriculture are listed in Table 7-2. The number of members is estimated at over 200,000. (Tables 7-2 and 7-3)

Many of the informal and formal farm service, supply and marketing co-ops are associated with Commodity Boards, the Agricultural Marketing Corporation, and the Jamaica Agricultural Society. The AMC or a Board does most of the selling and grading for cooperating groups of farmers who assemble small quantities from the farmers and help with preliminary sorting and grading. AMC and JAS also handle fertilizer. The four Land Lease cooperatives are organized around varying degrees of communal or cooperative farming lines. Nyerere Farm is one of these (Hanover), but appears to have retained considerable individual initiative.

The sugar workers cooperatives were formed at the three sugar estates that have been purchased by the Government. Each has 1,500 to 3,000 acres of cane land and around 150 to 300 worker-members who appoint hired managers. The work is done as it was on the Estates, without subdivision of the lands. The transition from hired field-hand to worker-owner was abrupt, and although education is being extended, workers still tend to think that their labor is a cost to be paid at trade union rates without reference to the profits or losses they will incur as owners at the harvest.

The People's Cooperative Banks, although cooperative in name, appear to be run from the top down, as any other quasi-government bureau.

Table 7-2. Registered Societies: Membership, Classification, Capitalization, Reserves.

No.	Classification	Member-ship	Share Capital \$	Statutory Reserve \$	Other Reserves \$	Loans Granted \$	Loans Repaid \$	Loans Outstanding \$	Turnover \$	No. Persons Employed	Amount Paid \$
115	Credit Unions	80,987	27,893,530	962,090	195,551	35,642,606	20,501,596	21,219,688	-	209	437,633
4	Thrift & Loan	2,968	432,097	54,654	38,170	169,508	132,254	375,892	-	5	16,315
59	Marketing	109,129	364,248	193,615	177,904	-	-	-	14,026,166	822	353,013
2	Credit Marketing	1,025	178,064	47,364	51,943	692,071	1,542,359	979,625	-	6	16,740
2	Farming	28	10,353	20,669	19,400	-	-	-	50,154	14	4,000
1	Cattle Insurance	1,785	14,533	8,524	16,742	18,091	14,452	22,660	-	-	-
5	Community Development	460	8,620	2,417	13,774	-	-	-	-	-	-
22	Fishermen	1,724	24,992	26,689	8,039	-	-	-	280,349	4	9,933
4	Transport & Tillage	539	10,937	1,014	2,149	-	-	-	51,933	32	4,185
17	Housing & Land Purchase	893	12,000	3,645	19,126	-	-	-	-	-	-
1	Cultural	72	268	30	160	-	-	-	-	-	-
2	Industrial	87	18,733	333	-	-	-	-	25,000	2	5,560
10	Cooperator	810	31,922	13,120	16,008	-	-	-	54,896	4	5,026
2	Irrigation	59	6,963	307	1,200	-	-	-	-	-	-
4	Land-Lease	132	351	45	1,163	-	-	-	-	-	-
2	Multi-Purpose	22	2,100	105	499	-	-	-	-	-	-
20	Production & Marketing (Sugar Markers)	3,464	28,148	142,660	142,800	-	-	-	3,304,383	3,256	1,390,001
11	Federation Secondary	238	34,379	121,759	59,991	-	-	-	590,201	39	109,257
2	Federation Tertiary	11	400	120	-	-	-	-	-	-	-
285		204,433	29,072,643	1,599,160	764,629	36,622,266	22,190,661	22,597,865	18,383,082	4,393	2,351,663

SOURCE: Cooperative Development Center

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Table 7-3 Cooperatives by Parish and Activity.

Parish	No. of Co-ops	MAJOR CLASSIFICATIONS				
		Agriculture (No.)	Thrift & Credit (No.)	Services & Consumer (No.)	Industry (No.)	Housing (No.)
Kingston and St. Andrew	116	3	79	21	4	9
St. Thomas	9	2	2	4	-	1
Port. and	13	4	1	8	-	-
St. Mary	17	2	1	14	-	-
St. Ann	8	3	1	4	-	-
Trelawny	5	-	1	4	-	-
St. James	14	3	2	9	-	-
Hanover	4	-	1	1	-	2
Westmoreland	9	7	1	1	-	-
St. Elizabeth	11	4	4	3	-	-
Manchester	9	-	3	6	-	-
Clarendon	30	10	6	13	-	1
St. Catherine	<u>24</u>	<u>8</u>	<u>9</u>	<u>5</u>	<u>-</u>	<u>2</u>
TOTAL	269	46	111	93	4	15

SOURCE: Cooperative Development Centre

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In addition to the formal cooperative organizations, there are various kinds of producers' associations, the largest of which is the Jamaica Agricultural Society with its claimed membership of 100,000 in 1,000 branches. Most of the members are small farmers although membership on the Board of Directors has recently been opened to the various commodity associations. Where the branches are active, they provide an effective chain of communication with the Government on farmers' needs. As mentioned earlier, they also facilitate the assembly of small lots of produce.

There are approximately 228 land settlements with 360,000 settlers on 614,000 acres. Some date back for more than half a century. They have many problems and exist in varying degrees of viability. Few of them could be looked upon as cohesive groups of farmers for the building of effective programs of group action in their present state.

7.5 Agricultural Training

Formal

Many Jamaican institutions give some kind of agricultural training including:

1. 231 All-age Schools. These are primary schools which pupils can attend to age 15. Training in agriculture is introductory, mostly in classrooms, but some schools have gardens.
2. 43 Junior Secondary Schools, now called "New Secondary Schools." Instruction again is mostly from books, but some schools have farms. Students may prepare to sit the Jamaica School Certificate or GCE in Agriculture. These schools look to JSA for teachers in agriculture and home economics.
3. 3 Technical High Schools, existing or under construction. These give considerably more attention to technical agriculture and are better equipped for field and laboratory experience. The schools are: Dint Hill, St. Catherine, offers various technical

fields; Elim, St. Elizabeth, agriculture only, nearing completion; Passley Gardens, Portland, agriculture only, construction starting.

4. 1 Vocational Agriculture School, Knockalva Agricultural Training Centre, Westmoreland. This is a highly vocation-oriented school. The new Cuban-assisted school at Spanish Town, Jose Marti, also is expected to offer some vocational training in agriculture (IICA, Basic Agr. Inf. on Jamaica, n.d., p. 31).
5. The Jamaica School of Agriculture. This school near Spanish Town is the principal source of technical manpower for Government ministries, the private sector and the secondary schools in agriculture and home economics. In 1977/78 there were 520 students, of whom 151 were women. There were 145 graduates in December 1977, most of whom sent to the Ministry of Agriculture, followed in importance by the secondary schools. Only a handful went to universities for further study. Demand for graduates to fill vacancies in the Ministry of Agriculture and the secondary schools exceeds the supply.

The Government hopes vocational agricultural training will help those who seek to go into farming. The more technical levels in (2) and (3) above also are expected to fit graduates for lower level jobs in agricultural agencies and agri-business. None of the curricula are terminal, except Knockalva, whose graduates are said to find it difficult to enter JSA without remedial training.

The JSA offers an Associate in Agricultural Science after three years' work. There is also a two-year diploma course. The entire curriculum of the school is currently under review within the school and with some assistance from experts from the University of Florida. The school's program also is receiving some attention from the American Association of Colleges for Teacher Education team currently in Jamaica under a USAID Rural Education Sector Loan.¹ The JSA received an IBRD loan in 1968-71.

1. College of Agriculture, University of Florida. "Report on the Jamaica School of Agriculture." Gainesville, July 1978. (Report to USAID), Processed. Holcomb, John. "Report on Curriculum Evaluation for the Vocational Agricultural Schools of Jamaica and Their Coordination with JSA." American Association of Colleges of Teacher Education. Washington. July 1978. Processed.

Table 1. Jamaica School of Agriculture.

1. <u>Enrollment</u> 1977/78	Male 369	Female 151	Total 520
2. <u>Graduates</u> , December, 1977	Male 108	Female 37	Total 145
3. <u>Intake</u> 1977	Male 129	Female 55	Total 184
4. <u>Geographic distribution</u> of 1977 intake by parish.			

<u>Parish</u>	<u>No.</u>	<u>Parish</u>	<u>No.</u>
Kingston & St. Andrew	24	St. Elizabeth	8
St. Catherine	28	Westmoreland	12
Clarendon	26	Hanover	5
Manchester	11	St. James	11
St. Thomas	5	Trelawny	7
St. Mary	10	St. Ann	19
Overseas	12	Portland	6

5. <u>Applicants</u> 1977.	Male 1,026	Female 684	Total 1,710
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6. Placement of graduates:

a) Ministry of Agriculture	97	g) Farming	--
b) Jamaica Development Bank	--	h) Further study	--
c) Commodity boards	--	i) Other (Specify)	
d) Other ministries or agencies	7	Private enterprise	3
e) Jamaica Agriculture Society	--	Overseas	16
f) Schools	22		

7. Faculty:

	<u>No. of Positions (filled)</u>
a) Administration	3
b) Crop Science and Soils	5
c) Horticulture	2
d) Animal and Poultry Science	4
e) Home Science	8
f) Agricultural Engineering	3
g) Math and Statistics	2
h) Agricultural Education & Communication	4
i) Plant and Animal Protection	1
j) Agricultural Economics	2
k) Basic and Social Science	5

8. Number of hours offered in 1977/78 (actually taught)*

	<u>Lecture</u>	<u>Lab</u>	<u>Total</u>
a) Animal Science	28	22	50
b) Plant Science	34	29	63
c) Plant & Animal Protection	14	11	25
d) Agricultural Engineering and Irrigation	20	17	37
e) Home Science	48	107	155
f) Agricultural Economics	15	14	29
g) Agricultural Education and Communications	18	10	28
h) Statistics	3	--	3
i) Farm Practice	--	36	36

*Not listed are Basic Courses (English, Maths, Botany, Zoology, Genetics, Plant Physiology, Biology). In addition, the hours listed above are for each discipline and do not take into account hours repeated when class groups are subdivided to size.

9. Special Courses offered in 1977/78:

<u>Subject</u>	<u>Number of Students</u>	<u>Source of Students and of Financial Support</u>
Horticulture & Gardening (Evening Institute)	32	Students come from all over Jamaica, funded by fees paid

10. Active Faculty research, 1977/78: None

11. College Farm:

a) Acres		b) Livestock	
Field Crops	15	Milk Cows	42
Horticulture	1	Heifers & Calves,	
Soil Conservation,		Other cattle	71
etc.	--	Pigs	118
Fish Ponds	--	Goats	39
Other	--	Sheep	--
TOTAL	60	Laying Hens	1,600
		Broilers	12,800
		Rabbits	47

12. School Budget 1977/78: Recurrent \$1,466,446.

SOURCE: Supplied for this paper by Principal Wesley Nelson, JAS. Aug. 1978.

Land for teaching and field experiments is very limited: about 40 acres are available for forage and pasture work, 15 acres for field crops. Some 300 acres of rocky hillside are also used by the school to a limited extent. (Table 7-4)

Informal Education (other than Agricultural Extension, q.v.)

The principal sources of out-of-school agricultural training other than agricultural extension are offered under auspices of 4-H and the youth clubs. Both are under the Ministry of Youth and Sports. Both admit boys and girls.

The 4-H Clubs cater to youth from 10 to 21. Much of the training is given in one-day sessions and field trips, but there are also residential courses of up to a year or so given at some eleven centers:

<u>Name</u>	<u>Location</u>	<u>Parish</u>
Denbigh	May Pen	Clarendon
Salisbury Plain	Salisbury Plain	St. Andrew
Warminster	Myersville	St. Elizabeth
Ann Douglas Dillon	Jericho	Hanover
Charlottenburgh	Highgate	St. Mary
Vernamfield	New Yarmouth	Clarendon
Roehampton	Roehampton	St. James
New Forest	Duanvale	Trelawny
Rose Hall	Linstead	St. Catherine
Thatchfield	Sturge Town	St. Ann
Bog	Darliston	Westmoreland

(For more detail, see A. W. Wood, "Agricultural Education in Jamaica, IICA ms. unpublished. (about 1976), Kingston, pp. 58-63.)

There are also Youth Clubs under the Youth Development Agency of the same ministry that offer some agricultural and home making training. Some members of these clubs are also in 4-H. The Youth Club training appears to give considerable emphasis upon improving attitudes toward farm work and life, but they also encourage training in skills. Three youth camps are

operated for those from 16 to 19 years. They are at Cobble, Chestervale and Cape Clear.

The Youth Club projects are said to make an effort to operate projects on commercial, self-supporting lines and to involve the Commodity Boards and commercial farmers as sources of on-job experience. The goal of the youth training program was 1,700 youth in the camps.

7.6 Constraints

1. Extension

With a staff approaching 1 per 500 farmers, and assuming the agricultural headmen are effectively used, extension should be able to serve a high proportion of its clientele to some extent. Experience with development projects, however, shows that a much higher concentration is needed for intensive campaigns in the early years. The Pindars-Two Meetings project proposes assignment of officers at the rate of 1:200, and programs in many countries assume much higher rates than that. Intensive projects tend to draw staff from the general pool, so an additional project is often in competition with preceding ones. The heavy involvement of extension officers with programs can be a handicap, but if subsidies, loans and similar activities are looked at as tools to help accomplish an end, there may be some off-setting benefits.

2. Information Services

The principal shortcomings in information with respect to small farmers' needs are:

- a) Nutritional information on how to feed the family most economically, including selection, growing and home preparation or preservation of food;
- b) Economic information for making production and marketing decisions.

The Data Bank in the Ministry of Agriculture is making an effort with USAID assistance to improve the Ministry's monthly projections of production, but it does not contemplate publishing its findings except on a national basis, so results will be of limited direct use to individual farmers. The Ministry of Industry and Commerce is starting a Consumers Information Service that is intended to help consumers identify the foods in abundant supply. This should be helpful to consumers and producers as well.

There is need for more localized and timely production and marketing information by local areas to guide production decisions. Perhaps the AMC's telephone network for their approximately 200 buying points could be put to greater use. Good market intelligence is of great value to large producers, but it is critically important to the survival of small producers, as development programs push them farther into the commercial market, increasing their exposure to price risks that they can ill afford to take.

3. Research

With respect to the research needs of small farmers, more attention should be given to their special problems of labor bottlenecks. The need here is not merely selective mechanization to expedite certain tasks such as land preparation for yams, but a combination of mechanization and plant breeding research to yield a plant that would give smaller but more numerous tubers, for example, so that the machine requirement for hill or mound building would be easier. More research is needed also on home or village processing of certain crops for local markets. For example, there is at present some concern because the Ministry has encouraged cassava

growing in anticipation of needs of an upcoming cassava factory. Perhaps the problem could be alleviated by development of simple machines to facilitate marketing the output as "bammies" or meal, or even to convert some of it into animal feed. More attention probably should also be given to other home or small scale processing of fruits and vegetables. It is probable that small farmers should increase their attention to ruminants to use the products of rough grazing or browsing lands. More research is needed on simple farm structures for more intensive handling of small numbers of milk cows or goats and for milk production. Another area in need of attention is the conservation of forage on a small scale including ensiling or haymaking and silage. Farm management and micro-economic analysis is badly neglected, both with respect to small farmers and to farmers generally. Research is needed on farming systems, input-output relationships for enterprises, production functions, and regional production patterns that would maximize incomes or employment. The marketing and transportation problems of small farmers need attention.

4. Education and Training

Formal and informal education are being pushed actively by the Government. Vocational agriculture is available on a modest scale at all levels from elementary school. The training should help small farmers if the quality of instruction is good and if there is enough technology adapted to small farmers' needs.

Formal education for Government service and for industry or farming is undergoing reviews. The key to maintaining the technical manpower in the Jamaican agricultural programs and in the private sector is the Jamaica School of Agriculture. Improvement of the school is a high

priority need. It presently has severe financial, physical and land resources constraints. Even though it is a teaching institution operating only at an undergraduate level, encouragement should be given to more applied, small farmer oriented research and development and more field experiences for students. There is concern in some quarters that the school does not grant degrees, an issue beyond the scope of our review. However, it might be noted in passing that the graduates of JSA seem to have an unusually good record of staying in agriculture and in Jamaica and rising to responsible posts in their fields. With degrees, the drain of brain would be greater.

The youth club organizations cannot supply information as to the proportions of members that come from small farms. Scarce leadership and technical talents are hard to supply adequately for two parallel and seemingly uncoordinated organizations. The Youth Club concept of self-supporting projects is commendable, as is the effort to build links with farmers and commodity organizations. Reviews of the youth programs and of agricultural vocational training generally stress the need for more attention to the next step in the career ladder beyond vocational training: the creation of career opportunities related to the training.

There is obvious critical need for training in administration and management of those in, or preparing for careers in, the public, private and "government company" sectors related to agriculture and agribusiness.

5. Cooperatives

In general, the cooperative movement in Jamaica has not had great success in agriculture. Only two individual co-ops have been pointed out

to us as really outstanding: the Christiana Potato Cooperative and the Blue Mountain Coffee Growers Co-op. For limited functions, the JAS branches are doing useful work, but not doing it in a way that allows them to accumulate capital to permit them to grow and expand their services. We found a few examples of group buying of farm supplies, but none of cooperative use of farm machinery. Small farm development programs that contemplate group approaches will need a substantial element of institutional development.

Priorities and Interrelationships of Constraints

On the whole, Jamaica is better equipped than other countries with rural institutions to serve small farmers. In fact, the variety of institutions attempting to serve farmers could probably be reduced advantageously.

It is suggested that the following set of closely interrelated agricultural support activities be assigned high priority for simultaneous strengthening:

- Applied research
- Adaptive field trials, preferably on farmers' fields
- Credit
- Economic analysis and farm planning
- Organization of farmers' groups

Some might argue with validity that other institutions should be added, such as input supply systems, but the creation of effective small farm groups can improve the working of input, product and credit markets.

For extension, the priority need is more concentration on campaigns or programs rather than general extension; better logistic support; and a reduction in the administrative burdens imposed by so many service activities. Some of the latter, such as the handling of inputs or details

of field trials or demonstrations can be shared by farmers groups to a greater extent than they now are. The Extension Service should have a specialist in farm management planning, and most area and division officers should be offered short courses in farm planning. The farm planning work now underway in the Pindars-Two Meetings area is commendable.

Credit needs include simplified procedures to cut down on the time needed to process loans, better collection procedures, and probably more funds. We are assured that credit institutions are willing to lend to persons on Phase II and III Land-Lease about as readily as to fee-simple owners. The long-term leaseholds can be hypothecated and foreclosed in the same ways as title deeds.

The need for more economic analysis and information on farm production costs and returns, price, demand, and marketing is readily apparent, especially as farmers are encouraged by one program after another to grow more and more without careful assessment of the effects on production costs, farmer's incomes and risks, market potentials, storage needs and implications for subsidy costs.

The proposal to strengthen farmer self-help groups would build upon the existing network of JAS branches and other existing viable cooperative groups; strengthening and making greater use of such of them as are viable, ready and willing to shoulder greater responsibility in serving their members. A full line of public services for small farmers can be very costly if a public agency is to maintain a one-to-one relationship with all 3- to 4-acre farmers. The only way to keep costs down is to help farmers help themselves through group action. With so many agencies already in the field, the emphasis in Jamaica should not be to spawn a new agency to help the small holder. Rather, the message should be to simplify, streamline, and stabilize what exists.

Issues of Agrarian Reform

The goals of agrarian reform in Jamaica are to reduce the inequities in income in agriculture through a more equitable sharing of the resources, and to do this within a framework of "participatory democracy." The country historically has used various means to try to accomplish this end, principally the following:

- a) Land Settlements on Government land or land acquired from large landholders.
- b) Acquisition of idle lands on large properties and re-leasing them to small farmers.
- c) Special credit programs for small farmers.
- d) Various input and development subsidies, especially for small farmers.
- e) Acquisition of a few sugar estates and conversion of them into cooperative plantations.
- f) Experiments with communal farms.
- g) Mild gradation of real estate taxes with increasing size of holding.

Land-Lease is a highly original and constructive step to help small farmers by identifying idle land and putting it into the hands of small farmers. Much of the land is used to enlarge existing small farms, but a number of formerly landless persons were given farms. The program is part of a package, with assistance provided in land preparation, extension assistance and sometimes credit. The provision of long leases under the program rather than fee simple ownership does not seem to have been a detriment to farmer initiative, at least after the Ministry began to issue certificates acceptable to creditors. The Land-Lease Program acquires almost as much non-arable as arable land, and there appears to be room for more effective use of the poorer land in grassland or perhaps forestry uses.

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Scattered parcels of land are an obstacle to good management of small farms, and it might be possible, through exchanges, to effect some farm consolidation in connection with negotiating leases with farmers.

The central aim of all land reform schemes has been to help small farmers to prosper and to keep them on the land. So, a small farmer development program is supported by the theory of land reform policy as adumbrated by the "Green Paper," and is accepted as the core of practical reform as revealed by legislative and administrative actions. The policy of helping small farmers is long-established, the principal recent variant being the shift in emphasis from free-hold to leasehold, and increased experimentation with communal and cooperative modes of farming.

8. Demographic, Social and Attitudinal Aspects

8.1 Rural Population Trends; Migration

Total rural population has increased only slightly over the past three population censuses. As may be seen in Table 8-1, the rural population was 1,000,200 in 1943, 1,090,300 in 1960, and 1,097,300 in 1970. Over the whole period of 27 years, the overall increase was less than 1 percent. As a consequence of this, the proportion of rural population to the total population has shown a steady decline: it was 80.8 percent in 1943, 67.7 percent in 1960, and 59.4 percent in 1970. The probability is that this tendency has continued to hold sway during the decade of the 70s.

Table 8-1. Jamaica: Rural and Urban Population, 1943, 1960 and 1970.

<u>Jamaica</u>	<u>1943</u>	<u>1960</u>	<u>1970</u>
Total Population	1,237,000	1,609,800	1,848,500
Rural Population	1,000,200	1,090,300	1,097,300
Urban Population	236,800	519,500	751,200
Percent Rural	80.8	67.7	59.4
Percent Urban	19.2	32.3	40.6

SOURCE: G.W. Roberts, et.al., Recent Population Movements in Jamaica, 1974, p. 42.

Migration

The rural areas of Jamaica contributed heavily to the external and internal movements of population between 1960 and 1970. They provided more than half of the population that emigrated and nearly all of those who moved to the main cities. As a result, rural population was only slightly greater in 1970 than in 1960.

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The number of emigrants represented almost 60 percent of the total natural increase in population: 292,100 out of 530,000. The rural areas, including every parish in the country, contributed to the external flow to the extent of 55 percent; the metropolitan parishes of Kingston and St. Andrew originated 45 percent (141,800 out of 292,100). (Table 8-2)

Where internal movements are concerned, all of the parishes lost population with the exception of the parishes with the largest towns, St. Andrew, St. James and St. Catherine. St. Andrew showed a large absolute increase, and Montego Bay and Spanish Town large relative increases. Even though the parish of Clarendon showed a decline of 5,900 in the decade, the city of May Pen showed an increase. (Table 8-3)

The movements of population by parish are worth noting on a north-south basis. Differentiating the seven northern parishes from the seven southern parishes, the southern group increased its population by 181,800 and the northern group by 56,900, or by 17.6 percent and 9.9 percent, respectively. The southern group increased its population three-fold on an absolute basis and twice on a percentage basis. Most of this is explained by the phenomenal growth of St. Andrew in this period. (Table 8-4)

A recent study (1977) of migration* shows that movements out of rural areas in the parish of St. Ann "has many features in common with internal migration in the island as a whole, but in a modified form."

- a) Population has been moving from areas which are predominantly agricultural toward the nodes of development within the parish.
- b) There are indications that migration occurs to some extent in steps: rural to urban within the parish, and parish to metropolis often by way of intervening parishes.
- c) The dominant 'pushes' within this rural parish were population pressure and high levels of agricultural employment, and the nodes of non-agricultural employment provided the 'pull.'

*Morrissey, Michael Patrick. "Population Movements within a Rural Jamaican Parish between 1960 and 1970." Thesis submitted for M.S. degree, U.W.I., June 1977.

- d) Females dominate the stream of migration. The young adult is more likely to migrate directly out of the parish, while the adult aged 30 years and over is likely to be the migrant within the rural parish.
- e) Young potential migrants are highly influenced by a desire to live in an 'urbanized' environment with the advantages of 'modern amenities.' They would prefer to live in one of the small urban nodes in this predominantly rural parish. For actual migrants, housing and amenities came second to family considerations in influencing their decision to move. The economic factor which is widely held to control migration in developing countries, is perceived as being of minor significance in the redistribution of population in this rural parish.

Worth noting is the finding that the two most significant independent variables associated with out-migration were population pressure, defined as the population aged under 10 years of age and the proportion of the labor force engaged in agriculture. (Note that by population pressure, the author is referring to the dependency ratio and not population density.)

He says:

"The causative factors are particularly clear in the southwest constituency (28) of the parish: this constituency had the highest rate of out-migration, with the overall population declining by 1.4 percent between 1960 and 1970, the greatest 'population pressure' (35.1 percent of the 1960 population aged under 10 years) and the largest proportion of the labour force engaged in agriculture in 1960 (83.6 percent)." (p. 98)

With respect to the second significant variable, he says:

"The second significant determinant of migration is the proportion of the male labour force employed in agriculture: the higher this proportion in 1960, the greater the population loss in the decade which followed. This supports the conclusion arrived at by Ebanks (1968) that the main stimulus of migration in Jamaica

'results largely from a push from the overcrowded, overworked land of the rural parishes rather than from a very strong pull . . . from job and other economic opportunities.'" (p. 99)

The author goes on to say that "there appears to be no correlation between migration and farm size. This is also supported by the findings of the St. Elizabeth study . . . which concluded that farm size

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is not related to the rate of migration. Family size was found to be the significant factor, and members of large families tend to migrate whatever the size of the farm."

The author concludes:

"There is a 'highly significant' relationship between the change in population and the proportion of the population aged under ten years in 1960: the larger the proportion of young people in the population, the greater the population loss between 1960 and 1970. The implication is that population pressure, 'the imbalance between human numbers and needs and the physical and human resources of a defined area' (Clarke, 1970) is a determinant of population redistribution within the parish. This is supported by Hunter (1966) and Eyre (1972) who contended that there is an optimum population carrying capacity under traditional systems of agriculture in developing countries: when the 'optimum' is exceeded in any district redistribution of population is likely to occur." (p. 98)

Table 8-2. Movements in Parish Population - 1960-1970.

Parish	Population		Intercensal Increase	Natural Increase	Internal Migration	External Migration
	1960	1970				
Kingston	123,400	109,800	- 13,600	50,200	-28,000	- 35,800
St. Andrew	296,000	421,700	+125,700	132,200	+99,400	-106,000
St. Thomas	68,700	71,200	+ 2,500	18,200	- 3,200	- 12,500
Portland	64,500	69,300	+ 4,800	16,800	- 4,500	- 7,500
St. Mary	94,200	100,400	+ 6,200	25,500	- 8,500	- 10,800
St. Ann	114,400	122,700	+ 8,300	32,300	-11,900	- 12,100
Trelawny	56,100	61,900	+ 5,800	16,500	- 4,300	- 6,400
St. James	83,000	103,100	+ 20,100	30,400	+ 1,200	- 11,500
Hanover	53,900	59,400	+ 5,500	16,300	- 5,700	- 5,100
Westmoreland	109,600	115,800	+ 6,200	29,700	-12,100	- 11,400
St. Elizabeth	116,700	127,800	+ 11,100	32,700	-13,700	- 7,900
Manchester	111,800	122,900	+ 11,100	35,300	- 6,400	- 17,800
Clarendon	164,000	178,300	+ 14,300	45,100	- 5,900	- 24,800
St. Catherine	<u>153,500</u>	<u>184,200</u>	<u>+ 30,700</u>	<u>49,600</u>	<u>+ 3,600</u>	<u>- 22,500</u>
TOTAL	1,609,800	1,848,500	238,700	530,800	-	-292,100

(Totals rounded to nearest 100)

SOURCE: Adaptation of data in Recent Population Movements in Jamaica, (1974), F. W. Roberts, et.al., p. 27.

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Table 8-3. Components of Population Growth for Parishes 1911-1970 - Annual Estimates.

Parish of Birth	Natural Increase				Net Internal Migration				NET EXTERNAL MIGRATION			
	1911-21	1921-43	1943-60	1960-70	1911-21	1921-43	1943-60	1960-70	1911-21	1921-43	1943-60	1960-70
Kingston	130	1,280	3,460	5,020	+1,030	980	-1,240	-2,800	- 750	- 150	-1,440	-3,580
St. Andrew	180	490	4,890	13,220	+ 410	+2,160	+7,440	+9,940	- 420	+ 700	-2,450	10,600
St. Thomas	360	550	1,280	1,820	+ 80	+ 250	- 60	- 320	- 120	+ 30	- 740	-1,250
Portland	510	750	1,240	1,680	+ 130	- 140	- 410	- 450	- 70	- 80	- 610	- 750
St. Mary	1,050	1,140	1,720	2,550	+ 90	- 400	- 920	- 850	-1,300	+ 140	- 610	-1,080
St. Ann	1,370	1,630	2,550	3,230	- 470	- 650	- 980	-1,190	- 880	+ 170	- 490	-1,210
Trelawny	380	710	1,300	1,650	- 40	- 130	- 350	- 430	- 430	+ 10	- 450	- 640
St. James	470	920	1,730	3,040	- 30	-	- 10	+ 120	- 390	+ 60	- 570	-1,150
Hanover	490	790	1,190	1,630	- 80	- 190	- 540	- 570	- 330	+ 10	- 520	- 510
Westmoreland	860	1,330	2,310	2,970	- 120	- 360	- 720	-1,210	- 500	-	- 450	-1,140
St. Elizabeth	1,330	1,720	2,750	3,270	- 620	- 890	-1,340	-1,370	- 650	+ 120	- 440	- 790
Manchester	1,050	1,450	2,380	3,530	- 510	- 460	- 710	- 640	- 660	+ 320	- 550	-1,780
Clarendon	1,280	1,880	1,990	4,510	+ 70	- 120	- 90	- 590	- 480	+ 110	-1,180	-2,480
St. Catherine	920	1,440	3,020	4,960	+ 60	- 40	- 70	+ 360	- 130	- 290	-1,040	-2,250
TOTAL	10,380	16,080	31,810	53,080	-	-	-	-	7,710	-1,170	-11,540	-29,210

NOTE: The above estimates are calculated on a yearly basis. Estimates for the entire intercensal period may be derived by multiplying the values by the number of years in the intercensal period. All estimates are rounded to the nearest ten.

SOURCE: Adaptation of data in Recent Population Movements in Jamaica, (1974), F. W. Roberts, et.al., p. 31.

Table 8-4. Movements in Parish Population.

South

Parish	Population		Intercensal Increase	Natural Increase	Internal Migration	External Migration
	1960	1970				
Kingston	123,400	109,800	- 13,600	50,200	- 28,000	- 35,800
St. Andrew	296,000	421,700	+125,700	132,200	+ 99,400	-106,000
St. Thomas	68,700	71,200	+ 2,500	18,200	- 3,200	- 12,500
St. Elizabeth	116,700	127,800	+ 11,100	32,700	- 13,700	- 7,900
Manchester	111,800	122,900	+ 11,100	35,300	- 6,400	- 17,800
Clarendon	164,000	178,300	+ 14,300	45,100	- 5,900	- 24,800
St. Catherine	<u>153,500</u>	<u>184,200</u>	<u>+ 30,700</u>	<u>49,600</u>	<u>+ 3,600</u>	<u>- 22,500</u>
TOTAL	1,034,100	1,215,900	181,800	363,300	-	-227,300
<u>North</u>						
Portland	64,500	69,300	+ 4,800	16,800	- 4,500	- 7,500
St. Mary	94,200	100,400	+ 62,000	25,500	- 8,500	- 10,800
St. Ann	114,400	122,700	+ 8,300	32,300	- 11,900	- 12,100
Trelawny	56,100	61,900	+ 5,800	16,500	- 4,300	- 6,400
St. James	83,000	103,100	+ 20,100	30,400	+ 1,200	- 11,500
Hanover	53,900	59,400	+ 5,500	16,300	- 5,700	- 5,100
Westmoreland	<u>109,600</u>	<u>115,800</u>	<u>+ 6,200</u>	<u>29,700</u>	<u>- 12,100</u>	<u>- 11,400</u>
TOTAL	575,700	632,600	56,900	167,500	-	- 64,800

SOURCE: Adaptation of data in Recent Population Movements in Jamaica, (1974),
G. W. Roberts, et.al. p. 27.

8.2 The Small Farm Household

8.2.1 The Family; Fertility; Dependency Ratio

Among the lowest income groups, the legality of marital status has become subordinated to other considerations. Where the association includes sharing a household, it is a 'common law' union. Where it does not include sharing a household, it is termed 'visiting.' Frequently, a partnership endures to the point where the couple consider themselves husband and wife, and the rites are celebrated publicly.

There are undoubtedly historical reasons behind these consensual unions, probably the most important being the insecurity of interpersonal relationships under precarious conditions of survival. Eventually, many of these consensual unions do acquire the status of legalized marriages, usually when the couple has enough money to afford the culturally prescribed elaborate marriage ceremony--by which time their children may all be grown.*

Children usually stay with the mother. In some cases, the father may keep a child, but have it brought up by his sister or mother. Mothers, too, may leave children with sisters, aunts, or mothers so that they can work, or migrate. Some households have no male head. These usually consist of a group of related women and the children of any of them as well as some of absent family members, and, occasionally, mates of any of the

*See Edith Clarke's My Mother Who Fathered Me (1957): ". . . there are certain pre-requisites which have to be fulfilled before marriage can be considered. A man should, in the ideal at any rate, be able to offer a wife, as distinct from a concubine (read 'common-law union') an assured social position. He should, if a wage earner, be in a position to buy his own house and land on which they can make a permanent home or have inherited land or house, and be regularly employed, even if this does not in fact imply relatively higher actual earnings." (p. 27)

women. The eldest woman, usually the grandmother, is the head of the home. (This is the matrifocal family often said to be typical of the Caribbean; in Jamaica it accounts for about 30 percent of all families with a higher concentration among sugar estate workers. Female headed households are also common in cities.)

Child adoption, temporary or permanent, and often by an old person or couple, is also common. Sometimes these are children of relatives, sometimes not, the latter often sought by a childless couple. An elderly relative, usually the mother of the male head of a family, may live with a family. Or the father of a daughter's child may move in with the family.

All these patterns result in many households consisting of various categories of relatives.

Family authority differs with the different family types. Where there is a legal marriage or permanent common law union, the man is likely to be the head of the home as well as of the farm--in the sense that decisions, particularly those involving the spending of money, will be left to him. In other unions the women will not only run the home, but will have more financial independence, although the man will be considered the head of the house. The small farmer's woman may cultivate her own field. She may retain some of the proceeds of her sale of the farm produce. In the matrifocal family, the eldest woman will be the family head.

Although all children in a household are treated equally, it is reported that children brought up away from parents form a large part

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of the social workers' case loads. This is probably because these, in many cases, are left in the care of grandparents who are too old to exert proper care or supervision.

Where the farm woman does have small children to care for, she will probably not help with the field work--"go to the bush." This is to be understood in the context of farm settlement pattern where fields may be at some distance from the home. Indeed, it is noticeable that Jamaican women, unlike women in much of the developing world, do not "wear" their babies on their backs as they go about their work. Rather, they leave small children home alone or with child nurses, should they work in the fields.

Farm children are expected to help with farm work, though they are not usually compelled to do so. Often they are given squares to cultivate by themselves as soon as they are judged able to do so, or a small animal to raise. Farmers who can afford to do so sometimes buy a small plot for a grown son, hoping to start him in farming.

Although it is flexible and allows for upward mobility, Jamaican society is made up of groups with different standards of living, cultural traits, interests and career probabilities. Some social distance between classes exists--mainly in social situations--and marriage is usually within a class. A successful farmer will usually be legally married and a mark of his high status is that his wife does not work.

Poor women in rural Jamaica tend to be keepers of the home, center of the family, helper on the farm, and business women in farm families who do their own marketing. (In this case, business is mixed with pleasure--women enjoying a day at the market as a chance to meet friends and share in exciting times.)

Women engage in business outside the family, since they comprise the great majority of higgler.* More women than men migrate to towns, cities, and abroad to make a living for themselves as well, frequently, as for children and parents left at home. However, it is clear that despite the fact that almost as many Jamaican women as men have had higher education, more men than women are in high level jobs. In terms of employment chances, women represent almost half the labor force, but more than half the unemployed.**

Unemployment is also differentiated by age group, being heaviest in the youngest, the 14-24 group, which approaches half unemployed. Unemployment rates decline steadily with increasing ages right through 55-64. Although percentage employment for the youngest age groups is about twice that for females as males, it is the unemployed men who seem to present the major social problem. Whether in small towns or the cities, they often must resort to various forms of "scuffling" (retrieving trash, pimping, peddling, begging, robbing, etc.) to survive. With the ready availability of both ganja and guns, their activities frequently lead to violence. Young unemployed women, too, may resort to scuffling, which for them may include prostitution.

While the unemployed generally want work, many demand it of the government just before Christmas, so that they can celebrate the holiday. Although agricultural policy emphasizes bringing youth into farming, hitherto many agricultural development schemes effectively ruled out the young as principals because demonstrated agricultural competence is a requirement. The concept of Pioneer Farms was introduced to alleviate in part these constraints.

*Much consideration is currently being given to the economic validity of the higgler system. Possibly less measurable roles of the higgler should also be taken into account. They may extend credit, help harvest crops they wish to sell, carry messages, run errands, etc.

*The Government Women's Bureau is seeking new sources of employment for women, and might be enlisted to help introduce and supervise certain projects.

Fertility

Fertility was higher in the rural areas than in the urban areas of Jamaica according to the population census figures of 1970.

Three indicators of fertility--the proportion of women who are mothers, children per mother, and children per woman age 45-54--applied to the Kingston Metropolitan Area and to the rural parishes show this. (Table 8-5)

The differences between the urbanized parishes of Kingston and St. Andrew and the rural parishes stand out. By every measure, fertility is higher in the rural parishes. The percentage of women who were mothers was 88.9 percent in St. Elizabeth (the highest parish), while it was 75.2 percent for Kingston and 80.1 percent for St. Andrew. (St. Thomas had a figure virtually identical with St. Andrew, but this may have been influenced by the fact that this parish is contiguous to St. Andrew.) St. Elizabeth showed 6.22 children per mother against Kingston's 3.52. Similarly, children per women 45-54 were 5.53 in St. Elizabeth and 2.67 in Kingston. Still another indicator of fertility is family size distribution. Childless females were 11 percent in St. Elizabeth and 25 percent in Kingston. Families with six or more children were 20 percent in St. Elizabeth and 9 percent in Kingston.

Dependency Ratio

rapid growth in the number of dependents imposes a heavy burden on the working population. It is measured as the ratio of persons in dependent age groups (under age 15 and over age 65) to those of working ages. Three such measurements for all Jamaica are shown in Table 8-6.

for the last three censuses. They have increased notably over this period. In 1943 there were 688 dependent persons for every 1,000 in the working ages. Rising fertility increased this ratio to 834 in 1960 and to 1,068 in 1970.

Since not all persons of working age participate in economic activities, a more meaningful assessment of dependency is obtained from data relating the number of inactive persons per 1,000 gainfully occupied persons. This ratio rose from 1,449 in 1943 to 1,662 in 1960 and to 2,328 in 1970.

In terms of actual employment, the ratio rose from 1,525 in 1943 to 1,842 in 1960 and then to 2,867 in 1970.

A dependency ratio calculated for rural areas where the average number of children is almost twice that of urban areas, would, of course, be higher than that for Jamaica as a whole.

8.2.2 Consumption Patterns

Food is by far the largest item on the consumer budget for all low income Jamaicans, rural as well as urban, and farmer as well as non-farmer. Indeed, in the rural areas, there may be little distinction between farmer and non-farmer in the need to purchase food, since most farmers, needing cash, grow mainly for sale, and most non-farmers grow some food in their spare time. As mentioned earlier, sugar cane workers, low paid and only seasonally employed, have to purchase all or most of their food. Nationwide, in 1973, carbohydrate foods represented 41 percent of the cost of all foods eaten.

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Other major items of expenditure are shelter and clothing, and it is noticeable in Jamaica that the clothing, even in the poorer areas, is relatively expensive for people of such low income.

Table 8-7 shows consumption figures for all Jamaica for 1964 and 1973. The amount listed for recreation on the consumption table exceeds that for rent, but it must be remembered that the figures represent averages for the entire population. Recreation expenses of the rural poor represent largely family events (such as marriages, wakes and holiday get-togethers) as well as participation in local festivals (especially the Junkanoo dancing at Christmas) and events at local community centers. These centers may be provided by Government or local bauxite or sugar companies. In their absence, churches or schools may be used as community meeting places. Local rum shops figure prominently as informal meeting places.

Sports--participant and spectator--are a cost-free recreation throughout the island, mainly for males, the older playing dominoes and the younger playing soccer and cricket. A small number of each sex swim or fish.

Market days are treated, at least in part, as recreation. One form of cooperative, exchange labor, "morning sport" is considered a chance for a fun get-together. Helpers are treated to festive food and drink for services rendered.

A favorite Jamaican form of recreation is conversation, often enjoyed while visiting friends at the end of the day's work.

The lack of sports fields and community centers figures prominently in people's complaints about their home areas.

Table 8-5. Jamaica: Rural and Urban Fertility, 1970.

	Proportion of Women Who Are Mothers	Children Per Mother	Children Per Women Age 45-54
Kingston	.752	3.56	2.67
St. Andrew	.801	4.12	3.30
Highest Rural (St. Elizabeth)	.889	6.22 (St. Elizabeth)	5.53 (St. Elizabeth)
Lowest Rural (St. Thomas)	.800	5.13 (St. Thomas)	4.10 (St. Thomas)
Jamaica	.837	5.23	4.38

SOURCE: Recent Population Movements in Jamaica, 1974, C.I.C.R.E.D. Series, p. 130 (adapted).

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Table 8-6. Dependency Ratios (a) Per 1,000 of Dependent Age,
(b) Per 1,000 of Total Labour Force,
(c) Per 1,000 Employed Labour Force.
1943, 1960, and 1970.

Year	Dependents (under age 15 and over age 65) per 1,000 population of working age	Dependent Population per 1,000 in the labour force	Dependent population per 1,000 employed labour force
1943	688	1,449	1,525
1960	834	1,662	1,842
1970	1,069	2,328	2,867

SOURCE: Recent Population Movements in Jamaica (1974), p. 73.

Table 8-7. Jamaica: Distribution of Household Consumption Expenditures.
1964 and 1973
(in percent)

Category	1964	1973
Food, beverages, and tobacco	44.2	40.6
Clothing and personal effects	11.0	13.7
Housing and related costs		
Rent and water charges	6.5	5.1
Fuel and light	1.4	2.1
Furniture and furnishings	5.6	6.3
Household operation	6.9	4.9
Total housing and related costs	20.4	18.4
Transportation and communication	10.3	9.7
Personal care and health	2.7	2.8
Recreation and entertainment	6.7	6.5
Miscellaneous	4.7	8.3
TOTAL	100.0	100.0

SOURCE: Department of Statistics, National Income and Product, 1973,
 Kingston, 1974, p. 17.

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8.2.3 Nutrition and Health

Nutrition in the farm population is not dramatically better than among the non-farm group. Severe malnutrition is primarily seen in urban slums and sugar estates, clearly related to poverty. More malnutrition is seen in the rural areas of the western parishes, as it does generally in the least accessible areas, beyond the reach of nutrition services.

Other social factors besides poverty which contribute to malnutrition in Jamaica include: large family size with short birth intervals (this contributes to the 45 percent incidence of anaemia among expectant mothers), reduced time of breast feeding with no adequate weaning food or proper sanitation*, inadequate knowledge of nutritional needs, domestic instability, and cultural food habits. This last category includes traditional beliefs such as that children who are given solid food before they talk well will never learn to talk, as well as more modern customs, such as the practice of vegetarianism.

That nutrition problems are not strictly a reflection of inadequate food supply is evidenced by 1972 findings that national dietary energy supplies were 30 percent and protein supplies 70 percent above requirements. However, in the 70 percent of the population which is low income, energy intake is 27 percent and protein intake 14 percent below requirements.** Sources and quality of nutrients also differ among low and high income groups--sugar, flour, and rice being the main energy sources and flour, rice and bread the main sources of protein among the poor. Among high

*This contributes to gastro-intestinal problems of young children. In Portland, many mothers leave a baby alone with a child nurse while they go "to the bush"--with no food but an unsanitary bottle of "bush tea."

**Food and Nutrition Policy for Jamaica, 1975/76-1977/78, by the Nutrition Advisory Council, June 1974, p. 5.

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income groups, there is much more dependence on animal protein. Nation-wide, cereals provide one-third of both energy and protein, and 95 percent of cereals are imported--and therefore purchased. A major animal protein source of the poor, salt codfish and salted mackerel are entirely imported. Imports of rice have increased by over 50 percent between 1971 and 1975, as have imports of beef and veal (fresh, chilled or frozen). Salted codfish and salted mackerel have reversed places. Imports of the former having been halved, and of the latter having doubled, in this period. (Table 8-8) The cost of calories and proteins from different sources as of the fourth quarter 1976 is shown in Table 8-9. In 1978, it is two to three times higher following the devaluations of May 1978 and after.

Many foods supplied by the farm are low in protein, being largely root (yams, sweet potatoes, cassava) and tree crops (banana, plantain, and breadfruit). These also lack the amino acids of grains which serve to enhance the protein value of legumes, such as red peas.

The consequences of malnutrition in certain vulnerable population groups include:*

- 1) About one-fifth (approximately 50,000) children under four years of age are significantly underweight for their age. About one-third are sufficiently underweight as to be classified as malnourished.
- 2) About three percent of children in the second year of life are so severely malnourished as to require hospital treatment.
- 3) Mortality among one- to four-year old children is 4.5 per 1,000, which is twice that of Barbados, Puerto Rico, and Trinidad and Tobago.
- 4) About 45 percent of pregnant and lactating women are anaemic.
- 5) Weights and heights of school children of low income families are significantly lower than that of children from middle and upper income families.

*Ibid. p. 2.

- 6) About 30 percent of pre-school and an undetermined number of school children do not receive sufficient food energy and protein. It is thus impossible for them to reach their full potential both physically and mentally.
- 7) Agricultural workers during periods of heavy labor lose weight, indicating a deficient energy intake. Under these conditions, their productivity may be seriously reduced.

Loci of poorer than average nutrition include: rural areas of the western parishes; sugar estates; Kingston slums; inaccessible areas beyond the reach of nutrition services.

For the national population, the combination malnutrition/diarrhea diseases ranked third as cause of death. (Table 8-10)

Government Health Services are intended to serve the entire population, and although progress is being made toward that goal, private hospitals and private physicians still serve many patients.

In 1975 there were 570 physicians practicing in Jamaica--120 of whom were in private practice. There were 103 dentists. These figures represent one-fourth and one-ninth, respectively, of the ratio to population recommended by P.A.H.O. (U.N.) The difference in adequacy of the numbers of doctors and dentists reflects the fact that the country has a medical school but no dental school.

The shortage of each is exaggerated by the number of the country's professionals who have emigrated in recent years. The number of emigrating dentists had declined to 84 in 1976; data for physicians are not available.

The shortage of doctors leads to complaints among rural people that although they do go to clinics, there are long waits--sometimes with no one to see them.

The country is trying to make better use of its short supply of doctors and dentists by training paraprofessionals. Community Health

Table 8-8. Imports of Selected Foodstuff, Jamaica: 1971-1975.
('000 lb.)

Commodity	1971	1972	1973	1974	1975
Cereals					
Rice	70,964	80,182	69,715	86,995	108,591
Cornmeal	8,384	8,027	4,533	4,919	73
Baking Flour	27,358	24,374	32,951	73,924	51,691
Counter Flour	111,550	100,618	117,810	108,847	117,598
Vegetables, etc.					
Beans, Peas, etc.	1,062	4,095	5,530	4,480	5,290
Onions	11,061	10,662	7,533	7,034	7,766
Other Vegetables (fresh & dry)	1,154	1,872	5,050	2,121	2,136
Potatoes (including seed potatoes)	7,002	6,342	6,332	13,089	7,132
Soup (vegetables)	279	329	338	-	-
Meat and Fish					
Beef and Veal	7,170	3,355	9,671	8,671	11,058
Mutton and Lamb	6,337	7,417	4,694	4,790	4,992
Pork	1,919	1,837	832	98	1,546
Poultry Meat	16,653	13,739	17,695	22,439	34,520
Other Meat	12,349	10,213	4,190	5,673	10,976
Beef and Veal (smoked, dried or salted)	2,233	3,056	2,120	1,728	2,631
Corned Beef	1,818	6,843	4,059	5,991	8,822
Salted Pork	2,968	2,904	2,771	2,667	2,379
Fish (fresh, chilled or frozen)	1,081	1,164	1,460	1,695	4,293
Codfish (salted)	12,462	16,208	9,473	6,206	5,810
Mackerel (salted)	5,261	6,635	6,714	6,928	10,639
Sardines (canned)	4,512	3,058	8,071	2,873	6,204
Herrings (canned)	5,375	5,917	2,001	1,775	1,931
Other Prepared Fish	-	-	10,423	11,512	6,853
Dairy Products					
Milk and Cream (dry)	20,377	28,013	14,235	32,827	17,550
Eggs in shell for eating ('000 doz.)	5	1	3	8	3
Butter (including butterfat)	12,486	8,544	9,589	12,899	9,411
Cheese and curd	8,015	5,487	4,475	7,203	6,834
Tonic Foods	97	295	1,329	1,327	1,635
Malt	15,980	17,930	21,670	22,888	23,080

SOURCE: Economic and Social Survey, Jamaica, 1975. National Planning Agency, Kingston, Jamaica.

Table 8-8. Cost of Energy and Protein, Jamaica, Fourth Quarter, 1976.

	Dollars Per Pound	Calories Per Dollar	GMS Protein Per Dollar
Meat, Fish & Poultry			
Mackerel, Salted	0.47	2947	179
Codfish, Salted	0.80 to 1.54	1272 to 661	191 to 99
Mackerel, Canned	0.52	1586	167
Salt Beef	0.78	906	143
Tripe	0.60 to 0.90	756 to 504	144 to 96
Chicken Neck & Back	0.30	1203	125
Canned Corned Beef	0.94	1038	122
Sardines	0.88 to 2.51	1595 to 562	105 to 37
Liver	0.75 to 1.20	810 to 506	119 to 74
Herring, Canned in Tomato Sauce	0.67	1185	106
Herring, Smoked or Kippered	1.00	958	101
Beef, without Bone	0.95 to 1.60	1069 to 635	89 to 53
Pork, including Bone	0.80 to 2.00	2283 to 913	45 to 18
Pork, Salted	1.00	3410	17
Chicken (whole)	0.71	742	79
Mutton, Choicer Cuts	1.20	958	69
Pork, Choicer Retail Cuts	1.10 to 2.00	891 to 490	64 to 35
Mutton or Goat, including Bone	1.00 to 2.35	1093 to 465	54 to 23
Beef, Bone included	1.20 to 2.20	850 to 464	55 to 30
Mens' Eggs	1.01	649	51
Canned Vienna Sausage	1.72	633	37
Fish, Fresh	1.10 to 1.80	256 to 156	36 to 22
Cereals, Pulses & Starchy Roots			
Soda Crackers	0.15 to 0.80	13273 to 2488	278 to 52
Cornmeal	0.14 to 0.46	11721 to 3567	291 to 88
Counter Flour	0.16	10573	304
Pre-Packaged Flour	0.29 to 0.60	5693 to 2751	164 to 79
Red Peas or Kidney Beans	0.47 to 1.20	3253 to 1274	210 to 82
Parboiled Rice	0.29	5739	115
Split Peas	0.70	2256	157
Oatmeal or Rolled Oats	0.54	3288	120
Green Bananas	0.06 to 0.25	5316 to 1276	68 to 16
White Bread	0.35	3473	112
Spaghetti or Macaroni	0.63	2665	90
Breadfruit	0.07 to 0.15	3750 to 1666	60 to 26
Whole Wheat Crackers	0.55	3324	69
Peanut Butter	1.40 to 3.77	1882 to 698	90 to 33
Black Eye Peas	1.15	1345	95
Peanuts in Shell	1.10	1698	78
Yams or Yampios	0.18 to 0.35	2277 to 1171	52 to 26
Peanuts, Roasted and Salted	1.87 to 3.09	1419 to 862	62 to 38
Dasheen, Coco, or Taro	0.18	2133	37
Ripe Plantain	0.16	2339	19
Sweet Potatoes	0.25	1760	20
Irish Potatoes	0.28 to 0.50	1128 to 632	27 to 15
Cashew Nuts	3.21	753	21
Milk and Milk Products			
Dried Skim Milk	0.34 to 0.51	4802 to 3201	480 to 320
Condensed Milk	0.34	4285	108
Cheese (Cheddar Type)	1.05 to 2.00	1671 to 877	108 to 56
Evaporated Milk	0.38	1654	84
Whole Milk	0.22	1341	72
Whole Dried Milk	1.78	1287	66
Fats and Oils			
Margarine	0.30 to 0.68	10886 to 4802	9 to 3
Oil, Pure, All Kinds	0.69	5850	0
Vegetable Shortening	0.75	5268	0
Butter	0.81 to 1.74	4009 to 1866	3 to 1
Sugars and Syrups			
Brown Sugar	0.08	21150	0
Granulated Sugar	0.15 to 0.41	11640 to 4258	0 to 0

SOURCE: Some Basic Data Relating to the Food and Nutrition Situation in Jamaica
 CNFI, Kingston, 1976.

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Table 8-10. Selected Causes of Death as Percentage of Total Deaths, 1970.

<u>Causes of Death</u>	<u>Percentage of Total Deaths</u>
1. Cardiovascular accidents	14.9%
2. Ischaemic Heart Disease and other Heart Diseases	12.3%
3. Malignancies (all types)	10.5%
4. Enteritis and Diarrheal Diseases	6.8%
5. Pneumonias (viral and other)	6.5%
6. Hypertensive Disease	5.1%
7. Conditions related to Birth and Congenital malformations	4.5%
8. Diabetes Mellitus	4.3%
9. Avitaminosis and other Nutritional Deficiencies	4.1%
10. Accidents, poisoning and violence	3.5%

SOURCE: Some Basic Data Relating to Food and Nutrition Situation in Jamaica, p. 3.

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Aides are now well known and well received in the countryside, being particularly active in nutrition surveillance. In addition to weighing babies in clinics, they visit homes in their areas to instruct mothers in child care and nutrition.

In each of the country's four Health Zones (1) Cornwall, including Hanover, Westmoreland and Trelawny; (2) Manchester, Clarendon and St. Catherine; (3) St. Mary, St. Ann, and Portland, and (4) Kingston, St. Andrews, and St. Thomas, there is, in addition to the Community Health Aides, at least one nutritionist. Each of the fourteen parishes has a nutrition assistant who works with mothers. Dental auxiliaries are also being trained. Jamaica is outstanding in family planning services and acceptances. Condoms are openly advertised and sold, Family Planning Clinics very visible, Depoprovera (a three-month injectable contraceptive) is the most common choice of clinic users. There seem to be adequate nurses--130 public health nurses and 26,000 nurses and midwives working in hospitals, clinics and in district field work in 1975.

8.2.4 Rural Housing

The 1970 census contains some useful indicators of housing conditions according to a rural/urban distribution. There were 188,671 urban dwellings, 321,488 rural for a total of 420,159 units. (Table 8-11)

Table 8-11. Number of Housing Units and Population by Urban/Rural Distribution.
(1970)

<u>Area</u>	<u>Housing Units</u>	<u>Population</u>
Urban	188,671	750,951
Rural	<u>231,488</u>	<u>1,062,643</u>
TOTAL	420,159	1,813,594

Approximately 21 percent or 48,000 farms contained substandard housing. A basic indicator is adequate water supply. According to the census, out of 420,159 dwellings, 69,827 or 16.6 percent had a public supply piped into the dwelling, and of this number, 63,289 or 90.6 percent were in the urban areas, and only 6,538 units or 9.4 percent were in rural areas. (Table 8-12)

The most common means for provision of water in rural areas was the public standpipe, which accounted for 92,565 households, or 40 percent of the total. Next most important were 'other' means, which included resorting to rivers and springs, and this included 54,037 households, or 23.3 percent of the total. The balance of one-third of the sources included public tanks, public and private pipes into dwellings, and pipes into the yard, and catchments.

A second indicator is the type of toilet facility. Of the total number of dwellings, 273,995, or 65.2 percent, had pit latrines. The overwhelming majority of rural dwellings fall in this category. In the urban areas, over 67,773 units had only pit latrines. This very high percentage (35.9) is not very satisfactory, in the high density of population, as it can create serious problems for health. (Table 8-13)

8.2.5 Education

Access to education in Jamaica is good by standards of LDCs. In 1970 there were 471 basic schools (kindergartens) and 742 primary schools (ages 6-11), which on an island of 4,400 square miles is a dense network. The wide dispersal of these schools is evident from the map of school locations in the National Atlas (p. 42). Higher level schools

Table 8-12.. Dwellings Classified by the Type of Water Supply by Urban/
Rural Distribution.

Area	Total Dwellings	Type of Water Supply							
		Public Supply		Private Supply		Public Stand-Pipe	Public Tank	Other	Not Stated
		Piped into Dwelling	Piped into Yard	Piped into Dwelling	Catchment Not Piped				
Urban	188,671	63,289	81,774	12,618	2,610	21,767	1,025	3,986	1,062
Rural	<u>231,488</u>	<u>6,538</u>	<u>20,733</u>	<u>8,275</u>	<u>17,413</u>	<u>92,565</u>	<u>21,455</u>	<u>54,037</u>	<u>1,472</u>
TOTAL	420,159	69,827	102,507	20,893	20,023	114,332	22,480	58,023	3,074

SOURCE: Housing Census, 1970.

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Table 8-13. Dwellings Classified by Type of Toilet Facility Urban/Rural Distribution.

Area	Total Dwellings	Type of Facility			
		Pit	Water Closet	Other	None
Urban	188,671	67,763	118,906	489	1,513
Rural	<u>231,488</u>	<u>206,192</u>	<u>12,622</u>	<u>396</u>	<u>12,278</u>
TOTAL	420,159	273,995	131,528	885	13,791

SOURCE: Housing Census, 1970.

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are, of course, fewer in number and somewhat less accessible, but still a good service is provided.

By 1975 the nearly 800 public primary units (All-Age Schools for children up to fifteen years) allowed virtually all primary age children to attend school for at least a few years.

Registration is high, but attendance is low. In the rural areas this is reported to be exaggerated on Fridays when children are kept home to help prepare home and farm for the weekend. In the rural areas attendance is also reduced because of distance to schools and difficulty of reaching them. Older daughters in motherless homes and daughters in homes where the mother "goes to the bush" are kept home to take care of younger siblings.

Secondary schools--some of them boarding--are also available to rural children, but at every level above the primary, applicants greatly exceed the number of places in school. Competition for these places tends to increase the importance of examinations.*

For the small farmer, education seldom goes above early primary and many adults who finished these early years in their childhood are functionally illiterate.** This is particularly true of women. The large

*Kuper estimated (1976) that "the chances of a smallholder's child getting into an academic secondary school and so perhaps entering a clerical or even a professional career are perhaps 3 in 100. This would rise to 7 in 100 for the child of an urban worker, and to virtually 100 percent for children of the upper middle class." This can serve as a greater disincentive to the small farmer, who, although functionally illiterate, looks forward to open opportunities and better times for his family.

**It was estimated in 1972 that 400,000-500,000 adults in Jamaica (40 to 50 percent of the population over 15 years old) were functionally illiterate. The National Literacy Programme was introduced for the purpose of eradicating illiteracy from the island. The aim was that all the adults who are now illiterate should be reached by this program by 1976. (Economic and Social Survey 1973, p. 220.) The Jamaican Movement for the Advancement of Literacy (JAMAL) Foundation was established in 1972 with the aim of eradicating illiteracy in the shortest time possible. The number of students increased from 47,736 in 1974 to 85,471 in 1975. The number of centers increased from 2,109 to 2,748 and the number of classes from 3,833 to 6,187. Voluntary teachers increased from 6,426 to 8,850. Enrollment in Kingston and St. Andrew totaled 15,299 or 17.9 percent of the total of 85,471. By far the majority of the students were enrolled in the rural areas of the country. (Economic and Social Survey, 1975, p. 254.)

proportion of illiterates is to be understood in the context of the average age of farmers--in the mid-fifties. Younger farmers are likely to have had more education and become readers. However, few farmers qualify for entrance to the Jamaica School of Agriculture; most extension agents were town boys--a frequent complaint of farmers, who complain they know theory, but not how to apply it to the specific local situation. Headmen are more likely to be farmers.

Farmers are offered informal education through the Extension Division of the Ministry of Agriculture, and their children, through the 4-H and Youth Clubs of the Ministry of Youth and Sports. Farmers' training might be one-day field demonstrations or a four-day course at a Farmers Training Center. More women are beginning to attend these latter courses.

8.2.6 Libraries and Community Centers

Library sources are available to an unusual degree as there are 14 parish libraries, 137 branch libraries, 50 book centers, and 238 book-mobile points plus a free book postal service for the remote or infirm.

Community centers are provided in 230 places as of August, 1978, and the program of construction is ongoing. There are over a thousand towns and villages in Jamaica. According to rural respondents, this service is especially valued. The community centers provide a place for community meetings, recreation, adult education and training programs of many kinds, services which are much valued and very lacking in rural areas.

8.2.7 Values and Aspirations

Attitudes of small farmers, as reported, often seem in conflict. For example, one is told that because slaves were not permitted to own land, the major value of the rural poor is to own land. One is also told that because slavery was mostly associated with agriculture, the major value of the rural poor is to get out of agriculture. Both attitudes (or residues of these attitudes) are probably true, although the strength of the linkage to the slave past is questionable. What seems to be the case is that older people desire to own land for the independence and security land ownership implies, while young people want to leave the land for the greater opportunities and excitement offered by the cities.

In general, attitudes tend to reflect economic and social realities. Farmers are willing to make changes, and indeed want help to do so, if they see a chance for profit and betterment without undue risk. And the reason for the caution is simply that there isn't the margin to absorb additional risk. They cannot afford to give up what has worked for them. There are numerous examples of this. The traditional system of mixed cropping is basically a hedge. A combination of domestic and export crops will carry the small farmer and his family through the vicissitude of one or another crop failure. The custom among Jamaican small farmers of planting "a likkle of everytin" is an expression of the desire to play it safe. "At least we always have something to eat." The production of export crops provides the cash he needs for the purchase of farm materials, for the consumer goods so desired by his family, and a small margin of savings for an emergency. Until the inception of the Crop Lien

Program, the small farmer was hesitant in applying for credit (putting up his land as collateral). Even though terracing is the logical response to erosion, is it wise for him to commit himself to a greater personal effort, for eight to ten years, to amortize the investment? Repeatedly, he chooses to proceed slowly assuring himself of his footing at each step along the way.

Another indication of concern for security is that individually owned land is often left to the person, whether related or not, who cares for the owner in old age.

It is reported of Jamaican small farmers that they, like peasants elsewhere, believe in "limited good" and feel that unusual prosperity achieved by one member of the community is at the cost of the rest. Fear of envy, or even of witchcraft (through obeahs) from his neighbors is said to be a deterrent to ambition. In contrast to this, our survey indicates that the opposite feeling obtains. Answers are often given in terms of "we" or "the people here." Where limited good is referred to, it is for the perfectly rational reason that services--extension and credit--are concentrated on certain people and denied to others.

The man who is manifestly a success--usually by acquiring enough land to be considered middle class--may be envied by his neighbors, but he is also respected; his advice on farming matters is sought; he is elected an officer in one of the local farmers' groups.

The farmer's attitude toward work is also susceptible to dual interpretation. The farmer does work hard. Clearing the bush on a twenty-degree slope or more requires a considerable physical effort. But

if he cannot be sure of the help he will need at harvest time, or of the availability of transport, or of a proper sale--is any extra effort to increase production worth it?

If farmers' experience is that harder work does not always result in more income, it would be difficult to persuade them to work harder. The question, "Do you believe that harder work on the farm always results in more crops and income?" put to a group of seven women and a man farming small Land-Lease plots near Port Antonio elicited the response that more crop would indeed result and this would lead to lower income, since most of their produce was marketed locally and extra produce would over-balance the supply:demand ratio bringing prices down. Indeed, they felt that extra costs involved in higher production would make net income lower. This same group put a strong value on work, however. The question as to whether it was all right for an able-bodied household member not to work if the family could get along without his contribution was greeted with a shocked and adamant answer that "all must work, if work is available."

An additional evidence of willingness to work hard is the number of Jamaican small farmers who have worked as migrant farm labor in the U.S. Many of these have used their earnings to enlarge or improve their farms.

Another value mentioned by small farmers was getting along with neighbors. One would not keep goats on her small farm since they would wander, eat a neighbor's crop, and cause ill feeling. Several said that neighbors supplied each other with food as needed. While this indicates a value on hospitality and sociability, it is also clearly a type of

of insurance since a giver could hope to be a receiver should he have need. It is also a contradiction to the usual report that "Jamaican farmers are very individualistic."

9. Market Towns, Rural Development and Regional Planning

9.1 Market Towns

In 1970, there were 26 urban centers in Jamaica with more than 2,500 inhabitants. Relating this number to the 1,150 villages, we have a ratio of towns to villages of 1:44. This puts Jamaica in an intermediate position, somewhere between the average of 1:16 of the European countries and the average of 1:157 of the Middle Eastern countries. In the Far East, the overwhelmingly rural economies have ratios of 1:1000 or even 1:10000. Jamaica's ratio is clearly nearer to the European than to the typically traditionalist economy. Still, the ratio, seen as an indicator, is suggesting that the question of the proper number of market towns, properly equipped, deserves further thought.* (Tables 9-1 and 9-2)

The real question, of course, is whether there is a proper distribution of market towns which can properly serve their own inhabitants and those of the surrounding rural areas. This is not just a question of equity, but more profoundly a matter of economic growth.

Various criteria can be applied to the condition of the parish capitals or other market towns as an indicator of their condition to spark economic development themselves and their hinterlands. The adequacy of basic infrastructure is the most common and likely of such measures. This is provided by the inventory of the National Physical Plan.

Still another indicator is the level and distribution of incomes. Data from the National Housing Trust (1976) show that the Kingston Corporate Area stands well above other urban centers in respect to the level of weekly incomes among the parish capitals. In Kingston, 40 percent of the

*See E.A.J. Johnson, The Organization of Space in Developing Countries, Harvard University Press, 1970, p. 194-5.

contributors had incomes of under \$50 per week, while all of the other cities showed percentages well above that, with Morant Bay showing a figure of 90 percent. At the other end, Kingston showed 25 percent of the contributors with incomes above \$100 per week, while other towns showed much smaller percentages. (Special situations in Port Morant and Lucea showed figures above that of Kingston.) (Table 9-3 and Figures 9-1 and 9-2)

The National Physical Plan (1970), now revised (1978), proposed a 20-year program for the selection and improvement of five regional, twelve sub-regional urban centers, and 87 district towns. This list could certainly serve as a basis for a closer examination of the rural/urban marketing relationship, of the requirements of the more important actual and potential market towns, and of their relationship to the assembly of agricultural inputs and disposal of outputs (mentioned elsewhere in this study). Market towns should be regarded, not only from the standpoint of individual 'master plans' (as important as these are), but also in terms of their capacity to serve the members of farming and rural communities nearby. (Map 17)

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Table 9-1. Number of European Villages for Each Central Place with Over 2,500 Inhabitants.

Country	Census	Villages	Central Places	Ratio
Switzerland	1963	1,209	233	5
Luxembourg	1964	67	9	7
France	1964	5,075	489	10
Denmark	1963	1,117	98	11
Sweden	1963	2,053	165	12
United Kingdom	1964	4,337	277	16
Netherlands	1964	2,378	147	16
Irish Republic	1964	3,077	122	25
Portugal	1964	2,810	74	37
Belgium	1963	1,931	49	39
Norway	1963	4,819	83	58
Finland	1964	3,445	59	58
Austria	1961	4,881	67	72

Table 9-2. Number of Middle Eastern Villages for Each Central Place with Over 2,500 Inhabitants.

Country	Census	Villages	Central Places	Ratio
Israel	1963	209	49	4
Lebanon	1963	243	10	24
Kuwait	1961	68	1	68
Muscat & Oman	1962	1,682	16	105
Saudi Arabia	1963	11,193	71	157
Turkey	1964	44,175	219	201
Iraq	1963	9,186	45	204
Syria	1963	7,540	25	301
Yemen	1962	9,532	15	635

SOURCE: E.A.J. Johnson, The Organization of Space in Developing Countries, Harvard University Press, 1970, p. 175.

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Table 9-3
NATIONAL HOUSING TRUST
Number of Contributors by Collectorate and Income Groups

1976

(Based on records of compulsory deductions from approximately
9,000 employers and 200,000 employees)

AVERAGE WEEKLY INCOME	Jamaica	Chapelton	May Pen	Lionel Town	Port Morant	Sav-La-Mar
TOTAL	<u>203,568</u>	<u>788</u>	<u>5,317</u>	<u>7,751</u>	<u>2,568</u>	<u>2,883</u>
\$20 TO \$29	41,377	223	2,314	520	629	861
\$30 " \$39	34,953	127	1,234	328	461	685
\$40 " \$49	26,411	103	774	329	193	474
\$50 " \$59	18,970	75	407	173	75	240
\$60 " \$69	15,634	61	140	107	51	156
\$70 " \$79	11,032	18	114	82	35	81
\$80 " \$89	8,676	32	68	46	27	88
\$90 " \$99	6,929	30	47	22	65	78
\$100 and OVER	39,588	118	218	144	1,033	221

Source: Unpublished data National Housing Trust
Kingston, Jamaica

LHC

Table 9-3 (Continued)

AVERAGE WEEKLY INCOME	Kingston (K.M.A.)	Morant Bay	St. Anns Bay	Falmouth
TOTAL	<u>124,133</u>	<u>3,216</u>	<u>4,891</u>	<u>6,507</u>
\$20 TO \$29	16,497	1,927	1,825	2,330
\$30 " \$39	18,274	621	932	1,837
\$40 " \$49	15,526	340	652	651
\$50 " \$59	11,863	269	438	968
\$60 " \$69	10,559	263	372	360
\$70 " \$79	7,861	127	166	324
\$80 " \$89	6,720	79	98	7
\$90 " \$99	5,326	51	99	15
\$100 and OVER	31,507	138	309	15

AVERAGE WEEKLY INCOME	Montego Bay	Luca	Annotto Bay	Port Maria	Buff Bay	Port Antonio	Spanish Town
TOTAL	<u>14,567</u>	<u>2,075</u>	<u>503</u>	<u>4,280</u>	<u>306</u>	<u>4,140</u>	<u>8,121</u>
\$20 TO \$29	4,570	501	187	1,455	66	1,285	1,634
\$30 " \$39	3,176	482	138	786	77	797	1,399
\$40 " \$49	2,275	155	68	387	106	569	952
\$50 " \$59	1,205	76	44	436	23	516	810
\$60 " \$69	1,036	126	44	319	8	359	664
\$70 " \$79	698	32	9	247	6	142	455
\$80 " \$89	430	54	9	151	2	97	373
\$90 " \$99	285	10	5	96	6	63	342
\$100 and OVER	883	640	22	403	13	312	1,493

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9.2 Integrated Rural Development, Regional Development, and National Growth

Market towns and rural development must be seen, not only in terms of their reciprocal relationship, but also in terms of a larger framework--the role of regional development in the nation's future economic growth.

That Jamaican agriculture was dominated for centuries by production for foreign markets (sugar and bananas) is well known. It hardly bears repeating, but for the fact that the domination of domestic crops by the Kingston Corporate Area is less recognized. The reasons for Kingston's primacy are apparent enough. Kingston's population represents one-third of the island's two million inhabitants, an extraordinary figure even for a developing country. This population has been swollen, of course, by tens of thousands of migrants from the rest of the country. While the Government's policy of "keeping them on the farm" and even of encouraging the youth to return to the farm and to the countryside is supported by a number of programs (Land-Lease, Pioneer Farms, various subsidies, the idle lands measures, etc.) the migration still continues. Kingston and a couple of nearby towns are still the beacon light.

This brings us to a second, and related, feature of the Jamaican landscape: the bottom-heaviness of urban development on the south side of the island. Along the main south road running from east to west are Kingston, Spanish Town, May Pen, Mandeville, the parish capital Black River and Savannah-La-Mar. The greater agricultural development and development on the southern side of the island are probably related. The first, best, and most extensive sugar lands were in the south. The capital city, into which scarce infrastructure funds were poured over the

decades, is in the south. The skeletal mountain barrier which runs across the middle of the island confined development to the south as it impeded its easy transference to the north.

History aside, the point is now that the accumulated weight of these factors is such that only strong and positive measures can arrest the worsening of the situation. Such a one-sided structure is not only an obstacle to the current development efforts under way; in the worst case, it would "fix in concrete" the existing faulty spatial configuration of the Jamaican economy and what this implies in terms of unbalanced social and economic development.

A proper response would be a strong and consistent program of regional development which would aim at the full use of the natural, human, and economic resources in different parts of the island, and in which the mutuality of the rural-urban relationship is recognized.

The first of these, regional development, implies, in the Jamaican context, a conscious and active policy to support regional growth centers, and the second of these, the rural-urban relationship, would turn part of the regional agriculture towards the regional center, another part to supplying other regions, and away from such complete dependence on Kingston. Over time, a given region's agriculture might have a diversity of markets--the regional center, neighboring towns, distant towns, export crops, and Kingston--instead of just one.

Too often, the mutuality of the rural-urban relationship is taken to mean that the matter can be left to itself. In an important sense, it can, but only after certain "macro" decisions have been made. It is a common belief that adjustments both on the rural and urban side

are made in "small actions" and that supply and demand will balance things up. Reliance on market forces is extremely important and should indeed be counted upon. But micro-adjustments cannot displace the role of Government in supporting the growth of regional centers and the promotion of agriculture and rural development in the regional hinterlands.

10. Constraints, Their Impact on Small Farms and Action Needed to Reduce Them

The constraints summarized in the following pages are those most commonly noted by, and reported to, the survey team in the course of its work. They cover the constraints found in respect to farm resources, inputs, marketing, rural infrastructure, credit, health, education, and attitudes.

It is worth noting, in this connection, the circularity of these constraints and, in consequence of this, the importance of dealing with them as a total system. By circularity, we mean that a particular constraint has a consequence which is itself a constraint, and it has a consequence which becomes a constraint with another consequence, etc. We have sought to trace a particular chain of problems back to their 'cause' and to specify the impact of a constraint on the small farm. (Table 10-1) This is easier done in some cases than in others. Thus, it is easy to trace the difficulty in weeding and 'clearing the bush' on hillside farms to the 20 to 30 degree slopes and to the 100 to 150 inches rainfall pattern. In other cases, the matter is more complex.

Thus, mixed cropping, so typical of the Jamaican small farmer's way of farming--to the point where it may be described as his 'way of life'--is a composite with a number of consequences: it complicates efforts to increase yields through greater use of pure stands, to mechanize the farm, to use fertilizer and pest control, etc. The cause or causes of the mixed cropping system include the fact that it goes back a long way (is traditional), it reflects the small farmer's need for food and for cash, and his need to hedge against an erratic

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climate, system of prices, and an inconstant government. Thus, the mixed cropping system (diversification) is a prudent compromise covering several constraints and causes. Before the small farmer will depart from the mixed cropping system, he would require assurance of the elimination or obsolescence of these causes. The circularity of these constraints requires that they be seen as a chain and as part of a total system.

Dealing with the constraints must become part of a plan--community parish, regional--and programmed into short-term (one year), medium-term (five years), and long-term (ten years or longer). The parish/regional plans should add up geographically as the sum of sectoral plans of development, especially in terms of public investment. This would be, in any case, a useful cross-check on the completeness of the National Plan. The existence of a plan means that there is an overall view or vision of what the community, parish, region will 'look like' in terms of its major attributes or vocation. Only then is it possible to establish priorities for an ordered and orderly implementation. (An exception to this would be any 'emergency' program where, in particular places, food, medical supplies, a road, or whatever simply cannot be postponed.)

To be avoided at all costs is the 'piecemeal and partial' method so often essayed by Governments pressed by tight budgets which distributes revenues 'fairly' (a little here and a little there). In the absence of community-parish-regional plans, these fall fruitlessly like a few drops of rain on a dry field. To be recommended in place of this are plans formulated at various levels and implemented steadily for cumulative and maximum impact.

A. Farm Resource Constraints

Constraint	Impact on Small Farms	Action Needed to Reduce Constraint		
		Physical	Economic and Social	
<p>1. Steep slope and poor land quality. Only 10% of area croppable with simple practices and just over 20% more with complex practices.</p>	<p>1. Severe loss of soil when in food crops and frequently when in tree crops. 2. Landslides on shale soils. 3. Some soils droughty, resulting in crop losses even from moderate drouth. 4. Difficult terrain leading to high labor requirements for production and for transport of products and inputs. 5. Hill farmers ineluctably produce on a small scale, regardless of acreage, fields can rarely be consolidated for mechanization. 6. Conveyance of water for irrigation or domestic use very difficult because of topography.</p>	<p>1. Shift in land above 30° into forest. 2. Shifts in land use out of arable crops above 25° or 30°. Contours and orchard terraces for tree crops. 3. Erosion control structures for arable crops on erosive sites. 4. Improved farm practices to conserve soil and moisture, e.g., mulches, chemical weed control and grass strips. 5. Grassland establishment on steep slopes or terrace risers, with concomitant development of a grass-using and conserving activity. 6. Highly selective and adaptive mechanization, e.g. cable transport for some products, donkey tools, portable mechan. tools.</p>	<p>1. Economic and social analysis to determine best paying soil conserving crop combinations and crop and livestock practices. 2. Educate farmers on land-use adjustment via farm planning. 3. Community educational materials on land-use planning.</p>	<p>1. Community-wide use adjustment mechanism to shift some farmers from hopelessly disadvantaged small hill farms to better lands via coordinate land-lease, land development and forest reserve activities. 2. Possibly community enterprise organizations to engage in cooperative woodlots or pastures.</p>

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A. Farm Resource Constraints (Continued)

Constraint	Impact on Small Farms	Action Needed to Reduce Constraints		
		Physical	Economic and Social	Institutional
2. Insecure or uncertain control over land by the decision maker.	<p>1. Insecure tenures result in short-term planning for investment of either labor or capital.</p> <p>2. Difficulty in borrowing as most lending agencies require land as security, and insist on an approved title.</p> <p>3. Titles received under the Facilities for Title law do not remove uncertainties about transmission of land to heirs and thus present some barriers to long-term planning by older farmers.</p> <p>4. Land-Lease I has the same problems of insecurity as other short-term leases.</p>		<p>1. Study feasibility of applying the Torrens System of land registration and title insurance as used in Australia.</p>	<p>1. If improved title registration procedures are developed, introduce the new system.</p> <p>2. Help credit agencies develop operational lending procedures that do not require land as a security. Small cooperative groups for guarantee of loans would be one possibility. Another is to develop link with marketing agencies to facilitate collections.</p>
3. Insufficient land quantity.	<p>1. Where labor and capital are not limiting, farmer uses his hilly land more intensively than he would if he could make a living from more extensive enterprises.</p> <p>2. Ruinate or fallow cycle is too short to recondition soil.</p> <p>3. Desire for more land leads to farming of multiple tracts with time wasted in travel and problems of field management.</p>	<p>1. Look for and open up additional productive remote areas through roads and trails.</p> <p>2. Improve land classification and land development on Land Lease acquisitions.</p>	<p>1. Feasibility studies of road or trail development.</p>	<p>1. Utilize existing programs like Land-Lease to effect farm enlargement and consolidation.</p> <p>2. Devise a program to facilitate functioning of the farm land market through "farm enlargement loans" available to small farmers who find a suitable piece of land to add to their holdings. JDB could make such loans.</p>

A. Farm Resource Constraints (Continued)

Constraint	Impact on Small Farms	Action Needed to Reduce Constraint		
		Physical	Economic and Social	Institutional
4. Non-availability of water at times and places.	<ol style="list-style-type: none"> 1. Despite high rainfall and dependable springs, many farmers have problems of crop losses from droughts of 3 to 4 months. 2. Domestic water for family, livestock, and crop-spraying is not easily accessible for farmers with houses, fields, or pastures away from settled communities. 3. Lack of ponds precludes fishing and stored water for livestock and field use. 	<ol style="list-style-type: none"> 1. Highly selective developments where need is great and payoff is high. 2. Field trials of a few small impoundments for fish and farm use. 3. More extensive use of low-volume sprays or dusts where carrying water is onerous. 	<ol style="list-style-type: none"> 1. Feasibility studies of water development for supplemental irrigation and for small ponds. 2. Socio-cultural studies of potential for community or group ponds. 	
5. Limited family labor supply in number, age composition, and motivation. Average age of farmer 50 years, 2/3 have no male children out of school and on farm. Half are without spouse.	<ol style="list-style-type: none"> 1. Crops are not adequately cultivated. 2. Insufficient family labor to renovate existing permanent crop or plant more. 3. Older farmers take less risk and avoid long-term planning. 4. Few older children interested in planning their future on the farm. 5. Lack of motivation impedes working and planning at full potential. 	<ol style="list-style-type: none"> 1. Adjust farming system to improve seasonal distribution of work. 2. Try out selective mechanization to make labor more productive and attractive. 3. Extend some amenities in small farm communities. 	<ol style="list-style-type: none"> 1. Devise farming systems and practices that pay better. 2. Educate farmers through farm planning to see profitability of improving their programs and thus encourage them to invest in hired labor. 3. Make feasibility studies of rural community amenities. 4. Study farmer motivation to identify programs and activities of most appeal. 	<ol style="list-style-type: none"> 1. Strengthen 4-H and Youth Club training and home-farm community projects to give income incentive to stay on farms, and indirect education to parents via the demonstration effect. 2. Utilize Youth Corps and crash programs to do soil conservation, community forest and similar programs for benefit of small farm communities. 3. Work via various farm and community groups to generate peer group pressures for agricultural improvements. 4. Tighten up Crop Lien and Land-Lease programs to push for higher performance.

A. Farm Resource Constraints (Continued)

Constraint	Impact on Small Farms	Action Needed to Reduce Constraint		
		Physical	Economic and Social	Institutional
<p>6. Limited structures, power and equipment, in quality and quantity. Tools are the hoe, fork and cutlass. Virtually no livestock shelter or pens. Hand tools in short supply. One in 4 has animal transport.</p>	<p>1. Low labor productivity (with customary practices, man-days per acre are: red peas (1-crop), 27; cocos or dasheen, 67; yellow yam, 160; coffee, 33).</p> <p>2. Drudgery, leading to discouragement and migration, especially of youth.</p> <p>3. Poor transport equipment leads to loss and damage of perishable commodities and difficulty in bringing inputs to the farm.</p> <p>4. Inability to find essential tools in local markets (e.g., files for machetes).</p> <p>5. Few suitable structures for storing perishables like onions, or for care of animals. Farmers report high mortality of calves and kids born in cold, wet weather.</p>	<p>1. Devise low-cost equipment for small farms. (e.g., the metal sockets for yam stakes developed at CARDI).</p> <p>2. Encourage small-shop manufacture of small tools.</p> <p>3. Construct simple farm-market roads and donkey trails.</p> <p>4. Cableways to move products and input in hilly areas.</p> <p>5. Experiment with applications of small gasoline motors and rechargable batteries for portable mowers, cultivators, sprayers, etc.</p>	<p>1. Feasibility of a wide variety of small tools, transportation devices and structures.</p> <p>2. Work simplification studies of alternate crop and livestock practices to increase productivity.</p> <p>3. Feasibility studies of alternate transport and road systems including donkey trails, motorable roads and cableways.</p>	<p>1. Improvement in group utilization of facilities and equipment.</p> <p>2. Credit and insurance program for donkeys and mules.</p>

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A. Farm Resource Constraints (Continued)

Constraint	Impact on Small Farms	Action Needed to Reduce Constraint		
		Physical	Economic and Social	Institutional
<p>7. Inadequate capital. (e.g., in West Portland and East St. Marys, 82% to 87% of small farms say they have no savings.)</p>	<p>1. Inadequate investments to maintain and expand tree crops.</p> <p>2. Insufficient working capital to properly handle annual crop production outlays for labor, fertilizer, and pesticides. (Farmers give lack of money as a common reason for low use of these, especially for hired labor.)</p> <p>3. Insufficient funds to permit purchase of livestock.</p>	<p>1. Adaptive research to develop less expensive or labor-consuming practices for production, e.g., minimum tillage systems.</p>	<p>1. Research on more capital efficient farming systems, e.g., legume production in rotations to reduce need for Nitrogenous fertilizer, or minimum tillage practices.</p>	<p>1. Improve land-title procedures to facilitate borrowing, and devise loan programs based on farmer-group guarantees in place of using title as security.</p> <p>2. Strengthen the co-op credit institutions.</p> <p>3. Improve credit facilities for livestock.</p> <p>4. Externalize more costs, especially where there are more effective ministry, co-operative, or board production, and transport services, e.g., aerial spraying.</p>

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B. Provision of Inputs

Constraint	Impact on Small Farms	Action Needed to Reduce Constraint		
		Physical	Economic and Social	Institutional
<p>1. Unavailability of fertilizers and some chemicals. Weedicides and pesticides also are said to be sometimes unobtainable.</p>	<p>1. Decline in fertilizer use over the past 3 or 4 years, while principally affecting large growers, has also resulted in lower yields on small farms (About 28% of fertilizer was used on farms of less than 10 acres in 1977. Tons of fertilizer distributed to members by the Blue Mountain Co-op was 531 tons in 1975/76 and 387 tons in 1976/77 and 330 tons in 1977/78.)</p> <p>2. Unavailability of pesticides and weedicides at times is said also to be having adverse effect on production and causing farmers to travel from town-to-town in search of supplies.</p>	<p>1. Improve the local handling and distribution of agricultural chemicals, perhaps a mini-store should be set up near or at each area extension office.</p>	<p>1. Study the current awkward procedures for ordering, procuring and transporting bulky inputs like fertilizer. Devise schemes to have some of this done by setting up groups of farmers to consolidate ordering, delivery and payment. (Alcan has experience in this area.)</p>	<p>1. Improve the performance of the foreign exchange allocation and procurement procedures for fertilizer and agricultural chemicals.</p> <p>2. Stimulate JAS, and the local co-ops to improve local planning, ordering, and distribution of fertilizers and chemicals including extension of arrangements for credit and collections.</p>

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B. Provision of Inputs (Continued)

Constraint	Impact on Small Farms	Action Needed to Reduce Constraint		
		Physical	Economic and Social	Institutional
<p>2. New technology is inadequate to move many farmers from present low technology equilibrium level to a higher level. Situation is spotty. Principal gaps appear to be: labor-saving technology for small farms, farm- or small-scale storage facilities, more knowledge of crop management practices and cropping programs for mixed cropping. Potentials for processing crop by-products are neglected.</p>	<p>1. In the absence of advice based on knowledge of the nature of the production potentials, farmers are told to increase fertilizer use by so many cut., but the advisor has no good basis to insure the farmer of yields he can expect. Vogue recommendations are usually ignored.</p> <p>2. Research findings on the physical, social and economic problems and potentials of small livestock enterprises are non-existent, especially for small increments, so these resources are neglected.</p> <p>3. Farmers have little idea of what the possibilities are for improved grassland and forestland management.</p>	<p>1. Expand research on small farmer mechanization aimed at cracking key bottlenecks in labor use.</p> <p>2. Expand research on small livestock production systems especially for small ruminants.</p>	<p>1. Feasibility studies of new farm enterprises, and of processing of selected farm products.</p>	<p>1. Expand the Allsides concept of field trials on farmers' fields into the Portland area.</p> <p>2. Strengthen the research components of the Ministry of Agriculture and of the Commodity Boards.</p>
<p>3. Inadequate credit on suitable terms, and inefficient credit delivery systems. PCB and JOB loans said to take 2 to 6 months to obtain. PCBs have inadequate funds and poor collection procedures. Virtually all sources except Crop Lien require pledge of title deeds. Inefficient collection policies result in funds being tied up in poor loans and less is available for good farmers. Insufficient control over uses of loans.</p>	<p>1. Farmers are discouraged from seeking loans because of delay and title requirements.</p> <p>2. Crop Lien, under which \$13 million was disbursed in its first year did not include permanent crops, which did not have similar favorable credit access, so farmers were steered toward food crops, a few of which over produced.</p> <p>3. Some funds, intended for specific production purposes are diverted to other uses.</p>		<p>1. Devise programs to make credit available in kind to expedite the timely availability of inputs.</p> <p>2. Study possibilities of increased links with marketing agencies in collection of credit.</p> <p>3. Study feasibility of developing crop insurance provisions in connection with credit programs.</p>	<p>1. Expand credit facilities of cooperatives that distribute inputs, e.g., the Blue Mountain Coffee Co-op.</p> <p>2. Strengthen or reorganize the PCBs ; improve effectiveness of credit disbursement and collection.</p> <p>3. Encourage PDBs to experiment with livestock loans.</p> <p>4. Encourage JOB/SSFAP to establish a small farmer window with less stringent collateral requirements for the longer term loans not obtainable from other sources.</p>

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B. Provision of Inputs (Continued)

Constraint	Impact on Small Farms	Action Needed to Reduce Constraint
<p>4. The existing system of inputs assembly (fertilizer, seeds, seedlings, insecticides, pesticides, and weedicides) pits the small farmer against a number of persons and agencies and situations. The procedure is often drawn-out and time-consuming. Nor have the inputs been forthcoming even after the expenditure of effort to obtain them.</p>	<p>1. The unavailability of agricultural chemicals has had the twin effect of reducing his yields and of increasing his labors for a given output.</p>	<p>1. A way to begin would be to use an existing cooperative which is already doing this for one or two crops, such as the Portland Blue Mountain Coffee Cooperative. It provides fertilizer on a group basis, where payment is made out of the coffee bonus. The co-op disposes of the cherry coffee. Cooperative members have requested that a limited program of disposal of domestic food crops be initiated.</p>
<p>5. The advertisement of the existence of subsidies for one or another purpose (water catchment and tank systems, housing improvements, ground clearance and preparation, etc.) have the limitation that funds supporting the subsidy are too little for it to go far.</p>	<p>1. Different subsidies often require different application forms, and not many farmers are up-to-date on the source, location, and means of payment of one or another input of subsidy. Information from the extension agent reduces in small measure the steps in the procedure.</p>	<p>1. Probably needs such as bridle paths improvement, water catchment and tank systems, etc., can be better handled on a group basis (reducing handling overhead) by community. 2. Simultaneous with above is the completion of a domestic food crop supply and distribution study in which local, parish, and regional contributions are verified and assayed.</p>

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C. Marketing

Constraint	Impact on Small Farms	Action Needed to Reduce Constraint		
		Physical	Economic and Social	Institutional
<p>1. The markets for small farmers are volatile for food crops, and it is hard for him to meet quality standards for export bananas.</p>	<p>1. Moderate increases in production are soon followed by local declines in prices. (Retail produce markets show as much as a 50% to 75% differential among Jamaican markets, suggesting considerable market imperfection.) In the Rio Grande area, dasheen price in 1977/78 is said to have fallen from 24¢/lb. to 8¢/lb. When prices fall, AMC is said to tend to withdraw from the market.</p> <p>2. Small farmers report rejection of from 30% to 40% of bananas sent to the boxing plants. They claim not to understand the causes or how to correct them.</p>	<p>1. Improve and increase local market collection facilities, storage, and distribution to make the market more responsive to supply and demand conditions.</p> <p>2. Improve roads and transport.</p>	<p>1. Improve market intelligence and market information to growers and higglers, to AMC and others.</p> <p>2. Develop new market outlets including lower-order uses for surpluses, e.g., starch, juices, or animal feeds.</p> <p>3. Offer price and yield protection assurances to farmers in first phase of production campaigns.</p>	<p>1. Strengthen and realign the agricultural marketing system, clarifying and rationalize respective roles of AMC and higglers.</p>
<p>2. Price fluctuations and uncertainty are a common occurrence, except for major export crops.</p>	<p>1. Price uncertainties discourage small farmers from expanding production. Even for export crops, some base prices have been too low to encourage growers, e.g., cocoa at \$7.02 in 1977.</p>	<p>1. Improve and increase local market collection facilities, storage, and distribution to make the market more responsive to supply and demand conditions.</p> <p>2. Improve roads and transport.</p>	<p>1. Improve market intelligence and market information to growers, higglers, AMC and others.</p> <p>2. Develop new market outlets including lower-order uses for surpluses, e.g., starch, juices, or animal feeds.</p> <p>3. Offer price and yield protection assurances to farmers in first phases of production campaigns.</p>	<p>1. Strengthen and realign the agricultural marketing system, clarify and rationalize respective roles of AMC and higglers.</p>

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C. Marketing (Continued)

Constraint	Impact on Small Farms	Action Needed to Reduce Constraint		
		Physical	Economic and Social	Institutional
3. Inadequate information in the hands of small farmers on production, prices and markets. Area extension officers help in presenting technical information, but there is very little economic information available to extension officers, farmers and policy-makers to guide production and marketing decisions.	<p>1. Farmers get confusing information. They are urged to grow crops that soon become in surplus, as with cassava in 1977 or that have low consumer acceptability, as with non-red cow peas in 1978.</p> <p>2. Farm planning programs have been tried as early as 1957, but largely on the basis of physical plans on the basis of inadequate physical data.</p>		<p>1. Make economic cost and return studies and do linear programming to help select priority crop and livestock activities.</p> <p>2. Disseminate cost, production, income and outlook information in a timely fashion to extension officers, cooperative and farm settlement officials and farmers.</p>	<p>1. Strengthen economic statistics and analyses services in the Ministry of Agriculture.</p> <p>2. Post specialists in production economics or farm management in the regional extension offices and later in parish offices.</p>
4. Small quantities marketed of domestic food crops and of export crops.	<p>1. Low return to the grower.</p> <p>2. Distributive margins are high in terms of social cost.</p> <p>3. Attention to grades and standards is variable depending on farmer's deal with the higgler.</p>			
5. Lack of alternative marketing outlets.	<p>1. Farmer or member of his family (usually wife) will carry produce to Kingston to obtain better price than that available locally.</p> <p>2. If expected price and/or quantity salable is below his expectations, commercial aspect of his operations will be retrenched.</p>		1. The creation of suitable alternative marketing outlets is beyond the capacity of any single farmer or group of farmers. This falls within the province of the central Government and of public and private agencies specialized in: (a) the promotion of regional and sub-regional urban growth centers, (b) establishment of agro-industries in rural areas or market towns, (c) export promotion, (d) a policy of national economic growth within which food consumption and industrial raw materials will rise.	

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C. Marketing (Continued)

Constraint	Impact on Small Farmer	Action Needed to Reduce Constraint
<p>6. Large amounts of wastage and spoilage.</p>	<ol style="list-style-type: none"> 1. Leads to reduced quantities for the consuming public. 2. Higher costs to public. 3. Reduced returns to the grower. 	<ol style="list-style-type: none"> 1. It is clear that knowledge exists with respect to grades and standards, but often the results depart from the standards. 2. Small farmer needs to be shown, by demonstration, the correct agronomic practice for meeting the required grades and standards.
<p>7. The existing system is functionally fragmented according to the major export crops--bananas, coffee, coconut, cacao, etc. For disposal of domestic crops, the small farmer deals with one or more higgler, the ANC, and he and/or his spouse may also participate in the wholesaling/retailing of these crops in the nearest regional center or in Kingston.</p>	<ol style="list-style-type: none"> 1. The small farmer thus finds himself in a one-to-one encounter with many different marketing institutions and channels. This costs him a lot in terms of marketing time and effort, and he is often in a disadvantageous bargaining position. 	<ol style="list-style-type: none"> 1. A cooperative which takes on the responsibility for the assembly of basic inputs and for the disposal of outputs should be able to do this more efficiently and with better returns to its members.

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D. Credit and Cooperative Constraints

Constraint	Impact on Small Farm	Action Needed to Reduce Constraint
1. Inadequate supplies of short-term credit (during the 1970s, outstanding loans of P.C. Banks declined in real terms).	1. Since small farmer's own supplies of working capital are virtually non-existent, an expansion of production without adequate supplies of short-term credit would be problematical.	1. An increase in the P.C. Banks credit resources are needed, but only on condition that administration is improved, particularly oversight of loans.
2. Delinquencies on P.C. Bank loans: 39% on Crop Lien Program--95% of loans extended.	2. Continuation of this tendency leads inevitably to the restriction of small farmer loan programs, even as their credit needs are greater than ever.	2. Where possible, loans for agricultural production should be channeled through a small farmers' marketing cooperative.
3. Inadequate supplies of long-term credit (no formal institution exists for the extension of long-term credit.)	3. In the absence of better farming tools, equipment, edifices, the farmer is condemned to permanent use of hoe, machete and pick. He cannot add new plantings of tree crops (coffee, cocoa, coconut) without assistance.	3. A separate line of credit is needed for long-term purposes. (This will probably require foreign-based funds.)
4. Marketing cooperatives are too few to meet credit and marketing needs of small farmers.	4. Small farmer is disadvantaged in his marketing encounters; he is regarded as being a risky client in seeking credit.	4. Marketing cooperatives are needed at the community level to handle assembly of inputs and outputs.
5. Attitude of small farmer that he doesn't have to repay Government loans (e.g., Crop Lien Program).	5. A consequence of this--if true and if it persists--is logically the end of any Government-sponsored credit program.	5. An integrated program covering the deficiencies in rural infrastructure and technical and financial assistance.

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E. Rural Infrastructure Constraints

Constraint	Impact on Small Farm	Action Needed to Reduce Constraint
<p>1. Roads: Local situations exist where short new roads or road maintenance are lacking.</p>	<p>1. Farmer finds it difficult, if not impossible, to carry crops via 'bridle paths' to main road, and thence to market.</p> <p>2. Certain crops, e.g., bananas, are subject to injury and rejection at the boxing plant.</p>	<p>1. Ascertainment of the facts of the case in order to determine the number of farmers and the volume (actual and potential) of produce involved, followed by an action program.</p>
<p>2. Electrical Service: Only 11% of rural farmhouses are connected for simple lighting, and most less for operating motorized equipment.</p>	<p>1. The impact on the farm household is adverse economically, socially, culturally, and psychologically. The farmer cannot pursue his goal of light mechanization even where the topography permits; social and cultural activities are restricted; and the feeling of 'abandonment' is ever present when the delay in making the connection is prolonged.</p> <p>2. Inability to use motorized tools restricts or inhibits other income-earning activities (handicraft, woodwork, construction, etc.)</p>	<p>1. Facilitate the programs, ongoing and projected, of the Rural Electrification Commission.</p>
<p>3. Inadequate supplies of water for domestic and farm use. Most rural households have to resort to springs and rivers for their drinking water.</p>	<p>1. Loss of time and effort on the part of the farm family to cover distances of a mile or more to obtain water; and the amount is restricted to what one can carry in relatively small containers.</p> <p>2. The paucity and uncertainty of water supply conduces unsanitary living and working conditions.</p> <p>3. Loss of crops in times of drought.</p> <p>4. Feelings of discouragement: can't "get ahead."</p>	<p>1. Extension of the standpipe system along the secondary and tertiary roads.</p> <p>2. Assistance to the farmer for the installation of rainwater catchment systems and tanks.</p> <p>3. Where justified by the number of farmers and the economic potential, the installation of minor irrigation systems or micro-dams.</p>

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F. Agglomeration of Village Services and Designation of Regional, Sub-Regional and Market Centers

Constraint	Impact on Small Farmer	Action Needed to Reduce Constraint
<p>1. There are many villages at a similar low or marginal level of development. Often no one village stands out as a higher order central place which would allow it to have more and better public and business functions. The common pattern is for populated places to have a linear and discontinuous form which may dribble along a road for one-half to three-quarters of a mile or more.</p>	<p>1. The farmer has to travel considerable distances to different higher order centers for different products or services, and often these are only sometimes available. This makes the provision of services more costly.</p>	<p>1. The availability of services in the designated Regional Center (Port Antonio) should be reviewed and brought up-to-date from the standpoint of its capacity to serve as a growth center, as a farm service center, as a tourist attraction, etc. A more clustered pattern should be encouraged.</p>
<p>2. The Target Area has the special characteristic that the important valleys have their outlet on the coast road. Communication between the valleys requires prior exit onto the coast road, but the services along the coast road are not what should be expected.</p>	<p>1. The incentive value of properly equipped market towns, sub-regional, and regional centers on the farmer and his family is under-estimated, including the importance of 'growth centers' which would provide jobs for youth entering the labor force.</p>	<p>1. Similarly, the functions of sub-regional centers (Buff Bay, Hope Bay) should be reviewed. 2. Market towns in each of the valleys should have their basic infrastructure services supplied, including their capacity to serve as collection points for the supply of inputs and outputs.</p>

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G. Small Farm System Constraints

Constraint	Impact on Small Farms	Action Needed to Reduce Constraint		
		Physical	Economic and Social	Institutional
<p>1. Mixed farming system may make high output and modernization difficult, although at present level of technology, it has advantages in diversification and complementary in resource use.</p>	<p>1. Plant competition may reduce yield of most valuable crop.</p> <p>2. Mixture of crops may make fertilizer and pest control more difficult for any one crop.</p> <p>3. Mixtures may complicate efforts to mechanize or use chemical weed control.</p> <p>4. Where a main crop and a "cash" crop or a main crop and a shade crop are grown together, often a tendency not to eliminate the secondary crop when the principal one needs the space.</p>	<p>1. Change cropping system by better choice of crop or changes in plant spacing or timing. Change to be made only when result is definitely more profitable than former one, with due regard to labor, risk, and soil conservation aspects.</p> <p>2. Do research to see if problems of mixed cropping can be simplified through changes in planting practice, row width, etc., to make mixed cropping compatible with higher technology.</p>	<p>1. Research to ascertain most profitable crop combination varying levels of technology and price-cost conditions.</p> <p>2. Extension farm planning with farmers to improve system.</p>	<p>1. Organized inputs assembly and output marketing must be given national support.</p>

N. Constraints in Attitudes, Values and Aspirations

Constraint	Impact on Small Farm	Action Needed to Reduce Constraint
<p>1. He feels small in relation to bigger entities and forces. He is, consequently, at turns, cautious and expectant.</p>	<p>1. Wherever he turns, the small farmer is confronted by bigger, often well-intentioned entities (Ministry of Agriculture, extension agent, PCs, JDB, Commodity Board, etc.). In few cases, is he a member of an organization that really speaks and acts for him.</p>	<p>1. Local farmer expression and organization are needed to assist him to modernize at a cost and with means available to him.</p>
<p>2. He feels that the economic margin above survival is small, so 'safety' and 'caution' are the guidewords.</p>	<p>2. He cannot take a chance that will wipe out his small margin. The 'chance' may be a new enterprise, a cash outlay for inputs (necessary but expensive), a credit application (which must be repaid with interest, however reasonable . .)</p>	<p>1. The common denominator behind the variety of actions that might be taken to neutralize these attitudinal constraints is his feeling that 'in unity there is strength;' that he is not facing the future alone, but is doing so on the best available expert judgment, and in company with fellow farmers in his community.</p>
<p>3. He wants his children to 'do better.'</p>	<p>3. He himself would be willing to clear some more ground for cultivation or even spend some of his savings (if he has any), if there is prospect of improvement . . .</p>	<p>3. The signals supporting an extra effort on his part and on the part of his family must be clear signals . . .</p>

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	VALUE OF PRODUCTION AT CURRENT PRICES (\$'000)										G. D. P. at constant prices (\$'000)								
	1969	1970	1971	1972	1973	1974	1975	1976	1977	1969	1970	1971	1972	1973	1974	1975	1976	1977	
AGRICULTURE	10502.7	12012.8	13266.5	14772.3	16365.9	18146.5	19553.7	21245.1	23115.6	14133.9	14981.8	16755.2	17665.2	15440.1	16245	16096	16627.1	17669	
EXPORT CROPS	2271.9	2573.2	2658.7	2678.0	2871.3	2962.7	2692.7	2555.8	2054.7	3937.9	3456.6	4033.5	4695.0	5310.9	5677.9	3243.7	3570.2	2947.7	
Cocoa Beans "A"	2097.1	2263.9	2207.3	1629.0	1691.2	2307.8	2577.8	2581.9	2440.4	2351.7	2473.7	237.5	2587.7	2109.6	2220.1	2069.7	2099.7	1648.7	
Cocoa Beans "B"	182.9	209.3	251.4	148.1	1580.2	264.9	135.0	170.2	114.3	576.2	572.9	698.0	1097.4	1201.3	1378.2	1734.0	1770.5	1299.0	
Banana (Whole)	1029.7	1082.0	1193.0	1155.3	2004.1	2102.5	2312.5	2522.5	3122.3	535.6	527.2	685.1	672.6	474.1	364.4	340.0	365.3	401.4	
Cocoa	39.1	42.7	45.6	59.7	49.1	72.0	92.7	91.2	110.3	7.4	8.0	7.0	9.2	7.6	6.4	6.5	6.2	6.2	
Coffee	206.9	160.7	152.3	72.5	96.2	119.4	205.6	179.9	300.3	125.7	142.9	107.4	123	90.7	123.7	91.5	52.7	96.1	
Citrus	202.8	295.0	222.0	263.5	219.0	225.5	275.6	272.4	258.3	328.0	331.9	367.2	360.0	205.6	230.5	231.0	231.9	113.7	
Guava	26.8	42.2	41.3	77.1	62.1	91.8	77.2	174.1	52.5	31.9	40.7	14.3	63.8	72.7	132	103	96.6	7.1	
Pineapple	212.5	217.4	200.0	213.9	251.9	232.5	161.7	120.8	176.0	439.2	299.6	300.5	337.4	253.1	516.6	317.7	546.0	271.2	
Other Export Crops	207.1	225.0	228.8	406.2	423.1	571.8	529.6	78.1	709.2	55.0	58.8	46.5	45.0	31.3	43.5	29.5	39.4	26.2	
DOMESTIC CROPS	3191.7	3422.8	3407.2	3793.8	4613.7	4932.7	4775.9	4269.2	4559.9	4362.4	5003.2	7021.4	7141.2	6599.3	7015.4	7233.0	6654.4	8136.1	
Root Crops	1518.6	1552.1	1517.5	1522.9	3609.6	3771.0	4540.9	4003.2	4671.1	1920	230.3	2779.7	4017.8	370.7	4033.1	4164.4	5703.0	4421.0	
Wheat and Maize	900.0	1015.0	1088.0	1140.0	1150.0	1251.5	1221.5	3441.1	4383.8	120.9	123.5	121.0	120.9	121.9	123.5	120.1	126.1	125.8	
Pulses and Vegetables	154.1	224.2	213.0	182.3	170.3	159.1	214.2	219.3	790.5	150.9	108.1	130.4	148.2	127.7	134.3	131.3	164.9	178.7	
Rubber processing	421.2	446.9	577.1	471.7	524.8	941.0	922.0	1058.2	1256.8	823.4	797.0	400	130.5	713.0	799.4	753.8	657.7	962.2	
Rice processing	129.7	62.2	26.9	35.7	20.7	20.7	206.5	21.1	1351.0	16.6	5.2	3.0	2.1	1.7	1.7	1.9	1.2	4.4	
Tobacco processing	117.2	100.1	100.0	117.1	106.7	132.9	195.0	191.0	335.5	52	32	45.7	20.7	9.1	11.3	17.5	17.8	27.2	
Fruit Tree crops	160.7	111.8	104.2	112.1	133.6	170.9	162.3	653.3	1019.6	50.4	61.9	67.5	58.7	65.0	51.2	51.8	44.9	51.5	
Herb Tea	370.0	240.0	362.8	366.6	31.2	37.7	412.2	412.2	412.2	31.0	32.0	33.1	34.5	35.8	39.2	38.8	44.3	47.8	
LIVESTOCK	2721.6	2632.0	2657.8	2797.5	3599.7	4642.2	4715.8	4617.2	4464.1	4112.2	4234.8	3622.1	3636.0	3993.1	3716.1	4124.0	4279.9	4637.0	
Eggs producing	205.7	207.5	207.9	201.0	1720.9	1918.2	2732.1	1141.0	1237.0	826.6	825.7	699.5	537.6	565.7	574.2	611.9	649.8	1050	
Poultry raising	711.9	591.0	526.0	507.0	1781.0	2217.5	2699.6	3347.6	4072.3	531.8	661.4	842.8	691.3	936.5	1030.3	1230.1	1334.4	1379.5	
livestock	992.9	1373.9	1296.6	1222.5	2220.5	2570.5	3740.5	3987.6	4876.1	2132.2	2072.8	1434.0	175.3	1734.5	1424.0	546.4	170.9	1999.3	
Milk producing	450.1	523.1	480.0	515.0	1150.0	1600.0	1244.6	1390.0	1310.0	611.6	686.9	645.8	669.8	653.4	656	656	669.8	654	
FISHING	437.0	6110.0	9500.0	10000.0	10200.0	2024.0	2520.0	2070.0	3200.0	1390.3	1435.5	1705.2	1790.0	1705.2	1614.1	1614.8	1647.7	1619.8	
FORESTRY	244.5	252.1	271.2	217.0	295.8	322.0	265.3	215.4	221.1	330.7	351.7	373.0	424.0	431.6	270.3	275.3	213.9	329.1	

Other Export Crops include Logwood, Pestic, Turmeric, Annatto, Honey, Hides and Skin.
 Root Crops include Sweet Potatoes, Irish Potatoes, Taro (Lacca, Negro, Renta, Tau, White, St. Vincent, Yellow, Hard, Sweet, Yamplo and Others),
 Taro, Cassava, Buckwheat, Oriso and Sweet Cassava.
 Pulses and Vegetables include Sorrel, Pumpkins, Carrots, Cabbages, Turnips, Peas and Beans (Cow, Gungo, and Red Peas and Broad, String and Sugar
 Beans), Cucumbers, Okra, Egg Plant, Escallion, Thyme, Tomatoes, Iceberg and other Lettuce, Cho-cho, Cauliflower, Hot and Sweet Pepper, Buetroot,
 Watermelon, Spinach, Celery, Cautelope.
 Products for Processing include Coconuts, Corn, Peanuts, Pineapple.
 Fruit Tree Crops include Breadfruit, Achee, Avocado Pears, Mangoes, Guava, Star Apples, Pau-pau, Haseberries, Guineps, Sweetzaps, Jackfruits, Pine
 and Others, Cashew fruit, Cashew nut, Okachi apple, Sumbur, Strawberry, Guava.

SOURCE: Department of Statistics.

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Best Available Document

CROP PRODUCTION BY PARISH 1977

CROP	ST MARY			ST ANNE			TRELAWNY			ST JAMES			HANDOVER			WEST AUNT LEO					
	Area (ha)	Yield (kg/ha)	Total (kg)	Area (ha)	Yield (kg/ha)	Total (kg)	Area (ha)	Yield (kg/ha)	Total (kg)	Area (ha)	Yield (kg/ha)	Total (kg)	Area (ha)	Yield (kg/ha)	Total (kg)	Area (ha)	Yield (kg/ha)	Total (kg)			
Wheat	730	22	16260	216	22	4752	506	22	11132	1191	22	26202	665	22	14630	5652	22	124344	1710	22	37620
Maize	67	22	1474	477	22	10494	2281	22	50182	994	22	48718	994	22	48718	789	22	16438	1012	22	48324
Barley	2672	15	40080	822	15	12330	1881	15	28215	1687	15	25305	1056	15	15840	2056	15	30840	2878	15	43170
ST. MARY'S	1576	15	23640	526	15	7890	566	15	8490	518	15	7770	419	15	6285	419	15	6285	622	15	9330
ST. ANNE'S	21	15	315	2772	15	41580	2772	15	41580	2772	15	41580	2772	15	41580	2772	15	41580	2772	15	41580
TREAWNY	11	15	165	134	15	2010	134	15	2010	134	15	2010	134	15	2010	134	15	2010	134	15	2010
ST. JAMES	308	22	6776	109	22	2398	720	22	15840	1272	22	27984	2264	22	50828	4328	22	95224	1172	22	25788
HANDOVER	209	22	4598	79	22	1738	622	22	13684	100	22	2200	770	22	16940	125	22	2750	125	22	2750
WEST AUNT LEO	209	22	4598	4376	22	96272	4376	22	96272	4376	22	96272	4376	22	96272	4376	22	96272	4376	22	96272
ST. MARY'S	67	15	1005	67	15	1005	67	15	1005	67	15	1005	67	15	1005	67	15	1005	67	15	1005
ST. ANNE'S	267	12	3204	116	12	1392	116	12	1392	116	12	1392	116	12	1392	116	12	1392	116	12	1392
TREAWNY	2157	15	32355	2287	15	34305	2287	15	34305	2287	15	34305	2287	15	34305	2287	15	34305	2287	15	34305
ST. JAMES	527	15	7905	527	15	7905	527	15	7905	527	15	7905	527	15	7905	527	15	7905	527	15	7905
HANDOVER	1678	15	25170	1678	15	25170	1678	15	25170	1678	15	25170	1678	15	25170	1678	15	25170	1678	15	25170
WEST AUNT LEO	3920	15	58800	3920	15	58800	3920	15	58800	3920	15	58800	3920	15	58800	3920	15	58800	3920	15	58800
ST. MARY'S	15	15	225	15	15	225	15	15	225	15	15	225	15	15	225	15	15	225	15	15	225
ST. ANNE'S	29	15	435	29	15	435	29	15	435	29	15	435	29	15	435	29	15	435	29	15	435
TREAWNY	20	15	300	20	15	300	20	15	300	20	15	300	20	15	300	20	15	300	20	15	300
ST. JAMES	29	15	435	29	15	435	29	15	435	29	15	435	29	15	435	29	15	435	29	15	435
HANDOVER	20	15	300	20	15	300	20	15	300	20	15	300	20	15	300	20	15	300	20	15	300
WEST AUNT LEO	20	15	300	20	15	300	20	15	300	20	15	300	20	15	300	20	15	300	20	15	300
TOTAL	2057	15	30855	2057	15	30855	2057	15	30855	2057	15	30855	2057	15	30855	2057	15	30855	2057	15	30855
ST ELIZABETH																					
MORNINGTON																					
CLARENDON																					
ST CATHERINE																					
HOWARD ANDREW																					
ST THOMAS																					
Wheat	47	76	3572	9	76	6784	38	76	2888	10	76	7600	14	76	10640	25	76	1900	28	76	2128
Maize	18	76	1368	9	76	6784	38	76	2888	10	76	7600	14	76	10640	25	76	1900	28	76	2128
Barley	61	118	7198	22	118	2596	27	118	3186	15	118	1770	56	118	6588	119	118	13926	119	118	13926
ST. MARY'S	277	118	32686	228	118	26880	163	118	19234	96	118	11208	56	118	6588	119	118	13926	119	118	13926
ST. ANNE'S	522	118	61596	621	118	73278	576	118	67968	45	118	5310	111	118	13098	119	118	13926	119	118	13926
TREAWNY	197	118	23246	22	118	2596	21	118	2498	25	118	2950	1	118	1362	5	118	1362	5	118	1362
ST. JAMES	2057	118	242626	957	118	112926	1114	118	131452	460	118	54280	230	118	27090	269	118	31742	269	118	31742
HANDOVER	112	21	2352	32	21	672	104	21	2184	2	21	42	169	21	4389	64	21	1344	64	21	1344
WEST AUNT LEO	112	21	2352	32	21	672	104	21	2184	2	21	42	169	21	4389	64	21	1344	64	21	1344
ST. MARY'S	418	118	49324	1128	118	133104	657	118	77526	622	118	73396	578	118	68184	262	118	31742	262	118	31742
ST. ANNE'S	576	118	67968	119	118	13926	119	118	13926	3724	118	438472	118	118	13926	118	118	13926	118	118	13926
TREAWNY	155	118	18290	119	118	13926	119	118	13926	269	118	31742	67	118	8196	2	118	1362	2	118	1362
ST. JAMES	6	118	7668	10	118	12880	10	118	12880	17	118	20166	67	118	8196	2	118	1362	2	118	1362
HANDOVER	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296
WEST AUNT LEO	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296
ST. MARY'S	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296
ST. ANNE'S	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296
TREAWNY	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296
ST. JAMES	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296
HANDOVER	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296
WEST AUNT LEO	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296	112	118	13296
TOTAL	2057	118	242626	957	118	112926	1114	118	131452	460	118	54280	230	118	27090	269	118	31742	269	118	31742
ST ELIZABETH																					
MORNINGTON																					
CLARENDON																					
ST CATHERINE																					
HOWARD ANDREW																					
ST THOMAS																					
Wheat	1510	57	86130	272	57	15444	11	57	6159	12	57	6786	179	57	10161	126	57	7254	126	57	7254
Maize	22	62	1364	16	62	992	224	62	13928	2	62	1224	10	62	624	6	62	3852	6	62	3852
Barley	215	119	25585	265	119	31515	284	119	33796	103	119	12153	58	119	6882	110	119	13162	110	119	13162
ST. MARY'S	72	119	8508	169	119	20061	75	119	8881	166	119	19794	76	119	9006	95	119	11166	95	119	11166
ST. ANNE'S	112	119	13328	112	119	13328	112	119	13328	112	119	13328	112	119	13328	112	119	13328	112	119	13328
TREAWNY	112	119	13328	112	119	13328	112	119	13328	112	119	13328	112	119	13328	112	119	13328	112	119	13328
ST. JAMES	112	119	13328	112	119	13328	112	119	13328	112	119	13328	112	119	13328	112	119	13328	112	119	13328
HANDOVER	112	119	13328	112	119	13328	112	119	13328	112	119	13328	112	119	13328	112	119	13328	112	119	13328
WEST AUNT LEO	112	119	13328	112	119	13328	112	119	13328	112	119	13328	112	119	13328	112	119	13328	112	119	13328
TOTAL	2057	119	242626	957	119	112926	1114	119	131452	460	119	54280	230	119	27090	269	119	31742	269	119	31742

APPENDIX

Agricultural Processing Industries in Jamaica

Classification 202: Manufacture of dairy products.

Manufacture of creamery and processed butter, natural and processed cheese, condensed and other types of concentrated milk, ice cream and ices, and other edible milk products. The pasteurizing and bottling of milk is also included.

NAME OF PLANT	PROCESS OR PRODUCTS	PARISH/CITY
United Dairy Farmers Ltd.	Milk and cream	Kingston
Cremo Ltd.	Milk and cream	St. Andrew
Dairy Industries Jamaica	Milk and cream	St. Andrew
Jamaica Milk Products Ltd.	Milk and cream	Old Harbor, St. Catherine
Shaw Park Dairies Ltd.	Milk processing	Ocho Rio, St. Ann
Mandeville Cooling Station		Mandeville, Manchester
Mountpelier Cooling Station	Dairy products	Mountpelier, St. James
Northshore Dairies Ltd.	Dairy products	Mont. Bay, St. James
Pepper Dairy	Milking cows and chilling of milk	Borge, St. Elizabeth
Taylor's Dairy	Chilled milk	
Cornwall Dairy Dev. Ltd.	Milk, ice cream, cheese, juices	Montpelier, St. James

Classification 203: Canning and preserving of fruits and vegetables.

Canning (packing in air-tight containers) of fruits and vegetable juices; manufacture of raisins and dried fruits, preserves, jams and jellies, pickles and sauces, canned soups; dehydrating and quick-freezing of fruits and vegetables.

NAME OF PLANT	PROCESS OR PRODUCTS	PARISH/CITY
Juicicles Ltd.	fruit drinks	Kingston
Jamaica Frozen Foods Ltd.		St. Andrew
Export Products Ltd.	Canned coconut meat	St. Andrew
Wonder Chef Sauce Mfg. Ltd.		St. Andrew
Grace Food Processors Ltd.	Canned foods	St. Andrew
Sausage Foods Ltd.		St. Andrew
Food Technology Pilot Plant	Processed foods	St. Andrew
Roberts Products Ltd.		St. Andrew
Foods of Jamaica Ltd.		St. Andrew
General Packaging Co. Ltd.		St. Andrew
DeCosta Brothers Ltd.	Canning	St. Andrew
Fanchoy Foods Ltd.		Falmouth, Trelawny
Pembroke Hall Boxing Plant		Pembroke, St. Mary
G & P Mfg. Co. Ltd.	Sauce Canning	Haylands, St. Catherine
Scotts Preserves Ltd.	Sauce Canning	Twickenham Park, St. Catherine

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Classification 203 (Con't.)

NAME OF PLANT	PROCESS OR PRODUCTS	PARISH/CITY
Jamaica Citrus Growers Ltd.	Juices	Bogwalk, St. Catherine
Caribbean Preserving Co. Ltd.		Bogwalk, St. Catherine
Tropical Frozen Novelties Ltd.		Salt Pond Rd., St. Catherine
Citrus Co. of Jamaica Ltd.		Maypen, Clarendon
Pickappa Co. Ltd.		Shooters Hill, Manchester
West Indies College Cannery		Mandeville, Manchester
Southern Processors Ltd.	Canning and Packaging	Bull Savanna, St. Elizabeth
Fletcher Bowman Ltd.		Yallahs, St. Thomas
Agricultural Processing Co.		Yallahs, St. Thomas

Classification 204: Canning and preserving fish and other sea foods.
 Preserving and processing fish and other marine foods. These processes include such operations as salting, drying, dehydrating, smoking, curing, pickling, packing in air-tight containers, and quick-freezing. Icing, salting, filleting of fish catch are classified in groups 041 (ocean and coastal water fishing, except factory-vessel fishing) or 043 (Inland water fishing), whichever is appropriate; and processing of the catch aboard fishing vessels is classified in group 042 (Factory vessel fishing).

NAME OF PLANT	PROCESS OR PRODUCTS	PARISH/CITY
Jamaica Frozen Foods	Salted fish, canned peanuts, canned peanut butter, mayonnaise, salad dressing, beef balls, stew beef, curried chicken, pickled pork, pickled mackerel.	St. Andrew

Classification 205: Manufacture of grain mill products.
 Grain mills (flour, meal, stock dry feeds; husking, cleaning and polishing of rice; preparation of breakfast foods such as rolled oats, rice, wheat and corn flakes, parched grain; blended and prepared flour and other cereal and pulse preparations. Coffee, pulse and root peeling mills are included in this group. Prepared feeds for animals and fowls are classified in group 209 (Manufacture of miscellaneous food preparations).

NAME OF PLANT	PROCESS OR PRODUCTS	PARISH/CITY
Moy Hall Coffee Factory	Coffee	Moy, St. Thomas
Magotty Coffee Factory	Coffee	Magotty, St. Elizabeth

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Classification 205 (Con't.)

NAME OF PLANT	PROCESS OR PRODUCTS	PARISH/CITY
National Cassava Ltd.	Cassava flour, bannies	Goshen, St. Elizabeth
Nelson's Rice Hulling Plant	Rice hulling	Linton Pen, Westmoreland
Subaram Rice	Rice hulling	Fullers Field, Westmoreland
Cheddisingh Rice Mill	Rice hulling	Savanna-la-mar, Westmoreland
Williams Rice Mill	Rice hulling	Little London, Westmoreland
Bacchas Rice Mill	Rice hulling	Grange Hill, Westmoreland
Catadupa Coffee Growers Co-op	Coffee	Catadupa, St. James
Aenon Town Coffee Factory	Coffee	Aenon Town, Clarendon
Clarendon Park Coffee Factory	Coffee	Clarendon
Trout Hall Coffee Factory	Coffee	Trout Hall, Clarendon
Bog Walk Coffee Factory		Bog Walk, St. Catherine
A.D.C. Rice Mills		Spanish Town, St. Catherine
Central Soya of Jamaica		Old Harbour, St. Catherine
Dover Coffee Factory	Coffee pulping	Dover, St. Mary
Mahabee Rice Mill	Rice	Mt. Pleasant, Hanover
Caribbean Milling (Ja.) Ltd.	Rice Hulling	Rio Bueno, Trelawny
Navis Bank Central Factory		St. Andrew
Salada Foods	Instant coffee	St. Andrew
Jamaica Popcorn Co. Ltd.		St. Andrew
Silver Hill Coffee Industry	Pulping coffee	St. Andrew
Langley Coffee Factory	Coffee	St. Andrew
Poly Foods Ltd.	Snack food and cereals	St. Andrew
Jamaica Grain and Cereal Ltd.	Processing of cornmeal	Kingston
Central Grading and Furnishing		Kingston
Albert Wong and Sons Ltd.		Kingston
Jamaica Flour Mills Ltd.		Kingston

Classification 208: Manufacture of cocoa, chocolate and sugar confectionery.

Manufacture of cocoa and chocolate powder from beans; chocolates, all types of sugar confectionery, such as boiled sweets, toffee, marshmallows, fudge, pastilles and fondants; crystallized fruits; sugar-covered nuts, salted nuts, studded dates and similar products; chewing gum.

NAME OF PLANT	PROCESS OR PRODUCT	PARISH/CITY
Cocoa Warehouse		Kingston
Hugh's Products		Kingston

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Classification 208 (Con't.)

NAME OF PLANT	PROCESS OR PRODUCT	PARISH/CITY
Lannaman's Confectionery Ltd.	Confectionery	Kingston
United Confectionery Co.	Confectionery	Kingston
Wander Jamaica Ltd.		St. Andrew
Osvelt's Manufacturing		St. Andrew
Vendomat Ltd.		St. Andrew
Kiskimo Ltd.		St. Andrew
Richmond Cocoa Fermentary		Richmond, St. Mary
Highgate Food Products Ltd.		Highgate, St. Mary
Haughton Court Fermentary		Haughton, Hanover
Blue Ribbon Products Co. Ltd.		Spanish Town, St. Catherine
Food Specialist of Jamaica Ltd.		St. Catherine
North Clarendon Co-op	Crystalized Fruits	Morgans Pass, Clarendon
Morgan's Valley Cocoa Fermentary	Fermentation and drying of cocoa.	Morgan, Clarendon
Pioneer Chocolate Co. Ltd.		Williamsfield, Manchester

Classification 209: Manufacture of miscellaneous food preparations.

Food industries not elsewhere classified, such as the manufacture of margarine, compound cooking fats and blended table or salad oils; starch and its products; baking powder; flavouring extracts and syrups; macaroni and similar products; yeast condiments, mustard and vinegar; meat pies and food specialities; prepared feeds for animals and fowls; egg processing; spice grinding; coffee roasting; processing of tea leaves into black tea; edible salt refining; harvesting and storage of natural ice and the manufacture of ice, except dry ice. Dry ice manufacturing is classified in group 311 (basic industrial chemicals, including fertilizers).

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NAME OF PLANT	PROCESS OF PRODUCT	PARISH/CITY
Jamaica Flavouring Ltd.	Flavouring and essence	Kingston
Acme Products Corporation		Kingston
Lipton Jamaica Ltd.	Teabags	Kingston
Seprod	Oils, fats, soaps	Kingston
Beacon Cone Company	Ice cream and drinking straws	Kingston
Jamaica Feeds Ltd.	Livestock feeds	Kingston
F.A. Headlam & Co.	Syrup	Kingston
Willis Lee Ltd.		Kingston
Stuart Bros. (Ja.) Ltd.	Flavour essence	St. Andrew
Central Manufacturing Co. Ltd.	Soup	St. Andrew
Virginia Dare of Jamaica Ltd.	Syrups, etc.	St. Andrew
General Blending Co.		St. Andrew
Jamaica Macaroni Factory Ltd.	Macaroni	St. Andrew
Caribbean Products Co. Ltd.		St. Andrew

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Classification 209 (Con't.)

NAME OF PLANT	PROCESS OR PRODUCT	PARISH/CITY
Falmouth Spices Ltd. West Indies Yeast Co. Ltd. Specialist Mfg. Co. Ltd. Caribbean Foods Ltd. Imperial Estate Ltd. Grace Food Processors	Tumeric dried	Falmouth, Tralaway Spanish Town, St. Catherine Bogwalk, St. Catherine Twickenham Park, St. Catherine Innswood, St. Catherine St. Andrew
St. Catherine Ice Factory Clarendon Food Mills Ltd. Karjar's Products Grace Meat Processors Grey's Pepper Products	Canning Vinegar Aches, nectars, soups, tomato ketchup, pineapples juice	Spanish Town, St. Catherine Maypen, Clarendon Newport, Manchester Savanna-la-Mar, Westmoreland Savanna-la-Mar, Westmoreland
Jamaica Sauce Co. Gouron Food Products Louis Howard Madmann Co. Ltd. Hanover Spices Ltd.	Drying and pelletizing animal feed Hams, bacon, sausages Brown sauce, ground red peppers, hot pepper sauce Soy Sauce	Hartlands, St. Catherine Bondbrook, Portland Yallahs, St. Thomas Houghton Court, Hanover
	Tumeric dried	

Classification 211: Distilling fermenting and blending spirits.
The distilling of ethyl alcohol for all purposes. The distilling, rectifying and blending of alcohol liquors such as whiskey, brandy, rum, gin, cordials, and prepared mixed drinks (cocktails).

NAME OF PLANT	PROCESS OR PRODUCT	PARISH/CITY
Doctor Ian Sangster & Co. J. Wray & Nephew Ltd. Kelly's Rum Co. Estate Industries Ltd. Shims Wholesale Liquors	Bottling of rum Spiritous compound Syrup and wine	St. Andrew St. Andrew St. Andrew St. Andrew Kingston

Classification 212: Wine Industries.

The production of wines, cider, perry and other fermented beverages except malt liquors.

NAME OF PLANT	PROCESS OR PRODUCT	PARISH/CITY
Jamaica Wine Manufacturing Ltd. The Portobello Co. D & C Wines Ltd.	Wine Wine and spirits Wine and spirits	St. Andrew St. Andrew St. Andrew

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Classification 220: Tobacco Manufacturers.

Manufacture of tobacco products such as cigarettes, cigars, smoking and chewing tobacco and snuff. Stemming, redrying and other operations after auctioning which are connected with preparing raw-leaf tobacco for manufacturing are also included.

NAME OF PLANT	PROCESS OR PRODUCT	PARISH/CITY
Keynes Tobacco Factory	Manufacture of tobacco products	Kingston
Jamaica Tobacco Co. Ltd.		St. Andrew
Palentine Brothers Tobacco Co. Ltd.		St. Andrew
Griffin Annis of Jamaica Ltd.		St. Andrew
Tobacco Industry Control Authority		Spanish Town, St. Catherine
Cigarette of Jamaica Ltd.	Cigarettes	Spanish Town, St. Catherine

Classification 233: Cordage, rope, and twine industries.

Manufacture of rope, cable, cordage, twine, mat, and other related goods from hemp, jute, cotton, paper, straw, coir, flax, and other fibers.

NAME OF PLANT	PROCESS OR PRODUCT	PARISH/CITY
Jamaica Cordage Co. Ltd.	Rope or sisal	May Pen, Clarendon
Hunts Pen Cordage Co.	Rope	May Pen, Clarendon
Bowden Coir Factory	Coir	Bowden, St. Thomas

Grand total - 117 factories.

Compiled by E. Johnson and J.D. McKennie, Factory Inspectorate Division, Ministry of Labor, September, 1978.

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