

## ANNEX F

### SOCIO-ECONOMY AND AGRO-ECONOMY

#### 1. PRESENT CONDITION OF JAMAICA

##### 1.1 National Background

Jamaica is an island located in the Caribbean Sea, between 76°11' to 78°22' west longitudes and 17°42' to 18°31' north latitudes. It has a maximum length of 235 km (146 miles) and a width varying from 35 km (22 miles) to 82 km (51 miles) with a total land area of 10,947 km<sup>2</sup> (4,231 sq.m). A central mountain ridge runs east to west with the highest summit in the Blue Mountain at an elevation of 2,258 m (7,402 ft). This mountain range is close to the sea in the north, limiting the coastal plain but allows for some of the largest plains of the country in the south. Almost half of Jamaica's land area is over 305 m (1,000 ft) above mean sea level.

Jamaica has a maritime tropical climate characterized by warm trade winds generally known as the North East Trade Winds. The annual average rainfall ranges from nearly 7,600 mm (300 in) in the Blue Mountain to less than 760 mm (30 in) in some part of the south coast. The average rainfall for the whole of Jamaica is 1,970 mm (78 in). The annual mean temperature near sea level is 25.6°C (78°F). The mean maximum temperature occurs in July and August averages 30°C (86°F), while the mean minimum in January and February averages 21°C (70°F).

The population census of 1982 shows that Jamaica had a population of 2.1 million, with a density of 191 persons/km<sup>2</sup> (495 persons/sq.mile). The growth in population between 1970 and 1982 was 0.25 million i.e., an average annual growth rate of 1.1% (see Table F-1). This rate, however, has increased in recent years due to a slowdown in migration.

The labour force in 1982 was estimated to be about 980,000 or 72% of the population 14 years of age and over, with an unemployment rate of 28%. In subsequent years, despite an increase in employment in other sectors of the economy, unemployment has remained high because of reduced migration and sluggish mining and agricultural

sectors. The percentage of persons employed in the agricultural sector was about 33% of the total employed population in 1983, a decrease of 2% compared with the 1981 figures. Table F-2 reflects the decreasing contribution by agriculture to employment.

The decline is also reflected in the rates of urban/rural growths of population. Between 1970 and 1982 these figures were 2.03% and 0.02% respectively.

### 1.2 The Jamaican Economy

The economy of Jamaica is slowly emerging from the decline suffered during the 1970s. Per capita income in Jamaica was about J\$2,700 in 1983 at current prices. This corresponds to 1.6 times that of 1979. Nevertheless, the average annual growth rate of per capita income at constant prices was only about 1.0% during the period of 1979 to 1983. The Gross Domestic Product (GDP) in Jamaica rose from J\$4,380 million to J\$6,750 million in 1983 at current prices. However, the average real growth rate during the same period was -0.2% per annum as shown in Tables F-3 and F-4. Besides after almost a decade of decline, the Jamaican economy has begun to recover in 1981 to 1983. During this period, construction and manufacturing have been the leading growth sectors. On the other hand, both mining and agriculture have shown a decline in growth; with mining averaging an annual real growth rate of about -10% for the same period. Most of the decline in agricultural sector can be ascribed to the greater availability of foreign exchange to finance imported food.

The trade balance of Jamaica has also been under continuous pressure in recent years. The exports of Jamaica were about J\$1,390 million in 1983 at current prices. This is low compared with J\$1,450 million in 1979. On the other hand, the imports of Jamaica have increased from J\$1,750 in 1979 to J\$2,840 million in 1983 thereby incurring a deficit in the trade balance which grew from J\$ -310 million in 1973 to J\$ -1,450 million in 1983 (see Table F-5). This imbalance is mainly due to decreasing bauxite/alumina export earnings and the increasing cost of imports influenced by the price of petroleum products, and also the increasing amount of imports.

### 1.3 Agricultural Setting

#### 1.3.1 General

The land area of Jamaica is 10,957 km<sup>2</sup> (4,231 sq.miles) or 1.1 million ha (2.7 million acres). Less than 40% of the land is classified as level, 33% as moderate to steep slopes, and 27% very steep for agriculture. The land classified in terms of agricultural potential, 3% of land is highly suitable, 22% is suitable but with strong limitations, 20% is suitable only for tree crops, improved pasture and commercial forest, and the rest of 55% is natural pasture, forest and land unsuitable for agricultural use. Jamaican agriculture, therefore, may be classified, topographically, as upland situated on the mountain ranges traversing the island from east to west, and as the coastal plains located primarily to the south of the island with small precipitation.

Upland or hillside agriculture is dominated by small diversified farms of containing less than 2 ha (5 acres) of sloping land. While these provide most of the domestic crops for food supply, they also produce important export crops such as coffee, cocoa, pimento, citrus, ginger and yams. They provide employment for, at least, 25% of the population. On the other hand, the large farms are generally on the plains and are primarily concerned with export crops like sugar, banana, and most recently, the production of winter vegetables. The somewhat larger farmer are usually one-crop oriented, and apply a relatively more advanced technology and mechanization. The farms and acreages involved in export, domestic and other agriculture, and the contribution of the large, medium and small farmers to the sectors are shown in Table F-6.

#### 1.3.2 Contribution of agriculture to the economy

In 1983, the agricultural sector contributed J\$ 446.8 million at current prices or 6.6% of GDP. Its contribution to employment though declining, is still significant (see Table F-2).

1) Contribution to export

Export earnings for the major agricultural commodities over the period of 1979 to 1983 are presented in Table F-7. The value of exports for the products increased by 29% to J\$ 199.1 million in 1983. The increase in value has been attributed partly to increased export prices and partly to the devaluation of the Jamaican dollar which took place during the year.

A significant contribution to export was that of the non-traditional crops. In 1982/83 this sub-sector grew by 31% over 1981/1982, tubers, vegetables and fruits the three major categories showed substantial increases in volume as shown in Table F-8. The position with some of the export crops may be summarized as follows;

(a) Sugar cane and sugar

This is a Jamaican industry over four centuries old, and was once the main-stay of the economy reaching a peak of 506,000 tons of sugar in 1965 but with production declining ever since. In 1981, sugar cane was harvested from 45,400 ha (112,000 acres) scattered over the plains of island, to produce 2.4 million tons of cane and when milled 201,000 tons of sugar.

(b) Bananas

Banana plantation are located in 6 district growing areas where the natural conditions of rainfall, temperatures and soil are especially suitable for banana. Most of the bananas are grown under rainfed conditions but some 2,000 ha (5,000 acres) are sprinkler irrigated. About 21,000 ha (51,200 acres) of banana were grown on 20,820 farms in 1982. Some 96% of these farms were of under 2 ha (5 acres) with banana sometimes planted in mixed stands.

(c) Citrus

The industry occupied an area of 5,500 ha (13,500 acres) in 1981, and produced some 63,000 tons of sweet

oranges, grapefruit, ortaniques and bitter oranges.

Most citrus groves are located in the central plateau of the island and are grown mainly on large farms although many small holders also produce citrus, often in mixed stands. Of the production in 1981, about 32,000 tons were delivered to packing stations and processing plants, and an estimated 31,000 tons of citrus were sold on the fresh market.

(d) Coffee

This crop is scattered all over the Jamaica along the foot hills and in the mountains. In 1981, there were some 3,000 ha (7,500 acres) in production yielding 8,500 tons or 1,300 tons of dried beans (conversion of cherries to dried beans is 0.15). Of greatest economic significance is Blue Mt. coffee grown at the higher altitudes of the Blue Mountain range on which 950 ha (2,500 acres) were planted. In 1981 this area produced 200 tons of dried beans or 15% of the national production. This coffee is of special quality, has gained a world reputation, and enjoys an increasing demand and premium prices in its special markets. Of the 28,200 coffee growers in Jamaica 37% have plantation of less than 0.2 ha (0.5 acres) each, while the Blue Mt. coffee is grown on plots averaging 1.5 ha (3.5 acres).

(e) Cocoa

But for the 1,600 ha (4,000 acres) of cocoa being developed by the Cocoa Industry Board, cocoa is essentially a crop of the small farmers and is grown usually in mixed stands. It is grown mainly at elevations of 150 m (500 feet) to 300 m (1,000 feet) where the rainfall varies from 1,000 mm to 2,500 mm, and on the clayey slopes and valleys. Cocoa production in 1982/83 was 2,800 tons or 95% above the level attained in the previous year. This impressive performance was attributed to

higher prices paid to farmers in recent times, good weather condition, effect of the Board's rehabilitation programme, and contribution of the farms of the Board.

(f) Spices

The primary contributor to this sub-section is pimento but crops such as ginger, turmeric, nutmeg, etc., also make a contribution. Pimento flourishes on the well drained limestone slopes of the country particularly on the slopes of the south coast at altitude of 30 m to 300 m.

2) Domestic food crops

This category includes livestock (meat, fish and dairy products), legumes, vegetables, condiments, fruits, cereals, plantains, yams and other tubers, sorrel and potatoes. The total production of domestic food crops excluding livestock in 1983 was about 380,000 tons, an increase of 19.6% over 1982. The major categories contributing to the increase were : condiments by 48%, cereals by 50%, vegetables by 15% and yams by 11%. Meat production based on estimates of reported slaughter was 47 million tons (103 million lbs) an increase of 1.3% over 1982. Fish production remained at the 1982 level.

In 1983, Jamaica consumed some 60,000 tons of rice (equivalent to approx. 26 kg per capita) at a cost of J\$44.77 million. In the 1950s when consumption was about 1/3 of current level, the local farmers produced 26%. 1960s when consumption was just less than half the current levels, the country produced 10% of its needs. Against the background of constantly increasing demand for rice, contribution of local farmers to its production declined steadily until large new projects were introduced in the 1980s (see Table F-9).

Up to 1981, about 90% of the imported rice came from Guyana. However, the position changed in 1982, and in 1983 some 88% of imported rice came from U.S.A. with serious foreign exchange implications. Jamaica cannot afford to spend its scarce foreign

exchange for a crop that can be produced locally.

As a consequence, Agro-21's national plan for stimulating agricultural expansion in Jamaica gives top priority to the development of projects aimed at self-sufficiency in grains with rice, soya beans, sorghum and corn being the principal targeted items. These crops and especially rice, have now become financially attractive to local farmers.

#### 1.4 Land Tenure System

As regards land tenure in Jamaica, the strategies of the pre-emancipation period laid emphasis on the plantation system. This system clawed continued into the post-emancipation period with peasantry experiencing different conditions of tenure influenced yes by the planter - class some of which experience were harsh and unconsciencable with the result that the Government of the day were actually forced to address the inequitable land tenure system.

Today most agricultural land in Jamaica is held free-hold. The 1968/69 agricultural census showed that 90% of the farm acreage was held free-hold, but since 1972, however, the lease-hold system of tenure has increased considerably, because the Government since then has adopted a policy of leasing publicly owned land.

The types of tenure may be classified as follows:

- (a) Family Land : land passed down to members of family from ancestors
- (b) Paying Tenants : tenants on written contract between tenant and landlord
- (c) Tenants at Will : tenants given rent free permission wherein tenancy will terminate at the the will of the landlord
- (d) Crop Sharing Tenants : tenants must give a percentage of the returns usua-ly 33% as consideration to the landlord.

A significant feature of Jamaica's agriculture is the great diversity in the size of farm holdings. According to the census of agriculture 1978/79, the average farm size was 2.9 ha (7.2 acres), however, farms of less than 2 ha (5 acres) accounted for 82% of the total number of farmers but only 16% of the acreage. At the other extreme, farms of more than 200 ha (500 acres) accounted for 0.2% of the total farmers but represented 44% of the total acreage of farm lands (see Table F-10). A large number of small farmers are located in the hilly region producing mainly domestic crops, while there is a small number of large estates and farmers on the plains producing mostly export crops.

## 1.5 Marketing

### 1.5.1 General

Jamaica's agricultural and food marketing system is dualistic in nature. On the one hand, there is a fairly organized and regulated export marketing system for the traditional exports, notably, sugar, bananas, coffee, cocoa, coconuts and citrus. Those crops are exported by their respective Commodity Boards and Associations (CBA) which are governmental or quasi-governmental organizations with monopsony powers. On the other hand, there is an unorganized domestic food crop marketing system, dominated by small private traders ("Higgler") and to some extent in the past by the Agricultural Marketing Corporation (AMC), green grocers, and supermarkets. Commodities for the domestic market are produced mainly by small farmers.

### 1.5.2 Export crop marketing

Commodity Board and Associations (CBA) are the main entities charged with the regulation and marketing of export crops. They have been responsible for administering the prices received by farmers, marketing crops overseas and promoting the expansion of export activities for which the Board is responsible. It does not appear that any of the CBAs have a price stabilization role, i.e., acting as a buffer between world prices and farm gate prices.



The Boards for specific commodities are:

- a) The Banana Company of Jamaica Ltd.,
- b) The Citrus Growers Association,
- c) The Cocoa Industry Board,
- d) The Coffee Industry Board,
- e) The Sugar Industry Authority, and
- f) The Tobacco Industry Control Authority

Part of the Government of Jamaica's (GOJ) Structural Adjustment Programme is concerned with deregulation of the boards due to declines in the export agricultural sector. The deregulation, which reflects the GOJ's policy of increased private enterprise participation in the economy, including;

- i) termination of the monopsony powers of CBAs except those concerned with sugar and bananas (considered as special cases), and
- ii) reduction in the non-marketing activities of the CBAs (extension and research, credit, input supply and services)

However, since the CBAs would still be responsible for the licensing of exports, quality standards, shipping arrangements, and foreign exchange collection, they would remain the main entities dealing with export crop marketing.

Several other entities are involved in the export marketing system, especially in the market for non-traditional exports like spices (pimentos, ginger, nutmeg, etc.), domestic food crops (yams, dasheen, tomatoes, etc), and kolanuts. The Jamaica National Export Corporation (JNEC), the major GOJ agency charged with the responsibility for the development of non-traditional exports, has two main subsidiaries, namely, the Jamaica Marketing Company (JAMCo) and the Jamaica Export Trading Company (JETCo). The export division of Ministry of Agriculture collects, grades and packages pimento (and other spices) for export by JETCo. The Agricultural Marketing Corporation (AMC), another GOJ agency also procures, grades and packs mainly domestic food crops for export by JETCo. United Produce Traders Ltd., was formed in 1982, at the instigation of the GOJ, by 11 of the leading distributors in Jamaica to purchase and export domestic food crops. A spokesman for the company has indicated that the company is inactive at the moment.

### 1.5.3 Domestic agricultural marketing

The internal distribution of an estimated 500,000 tons of domestic food products and large volume of imported products is carried out annually by a large number of intermediaries who collectively make up the agricultural and food marketing system. These intermediaries include small wholesalers and retailers, large truckers/wholesalers, supermarkets, green-grocers and the Agricultural Marketing Corporation (AMC).

Small retail and wholesale intermediaries numbered about 14,000 in 1976 and today are estimated to number about 20,000. They operate in Parish markets and numerous curbside locations. As a group, they distribute over 80% of total food production. The other 20% is distributed by a small number of large truckers/wholesalers, supermarkets, green-grocers and the AMC.

The Parish markets (100) are located throughout the Jamaica and are generally out-dated, dilapidated, and unsanitary. Many of these are retail outlets while others serve as both retail and wholesale markets. The Coronation Market in Kingston can be termed the terminal or central distribution market for the whole of Jamaica. In spite of its dilapidated and congested condition, about 50% of marketed agricultural and food products move through this market to other markets and consumers.

Due to the highly fragmented nature of the marketing system, inadequate facilities, and the low level of knowledge concerning post-harvest handling and technology, post-harvest loss is high. An estimate by FAO in 1976 placed the post-harvest loss at 25% for fruits, vegetables and other perishables. The FAO study, however, did not take into account other factors including the volume of product that is discarded or rots at the farm level because there is no buyer present on the day the crop must be harvested or because the buyer present can only handle a portion of the available crop. Including these factors, post-harvest losses are estimated at 30 to 40%.

## 1.6 Agricultural Institution

### 1.6.1 General

The Ministry of Agriculture is the planning, implementing and supporting machinery for agriculture in Jamaica. Its administrative structure devolves around

- The potential directorate consisting of the Minister and two Ministers of State
- The administrative head : the Permanent Secretary, his immediate support staff and the following Divisions
  - a) Planning and Policy Review,
  - b) Financial Administration,
  - c) Marketing and Credit,
  - d) Research and Development,
  - e) Production and Extension, and
  - f) Technical Services

The organization of MOA is shown in Fig. F-1. The Ministry implements its programmes through;

- 4 Regional Offices,
- 13 Land Authorities (one in each rural parish)
- 7 Commodity Boards, and
- Agro 21.

### 1.6.2 Planning and policy review

The Planning and Policy Review Division has 4 major units as follows ;

- Rural Physical Planning located in the 4 Regional Offices and Head Office,
- Data Bank and Evaluation,
- Economic Planning, and
- Rural Development

### 1.6.3 Financial administration

This Division prepares the annual Budget and Controls its expenditure. Through its Finance and Accounts Branch it reaches down to the Regional Offices and Land Authorities. For dealing with special projects funded with international assistance it has a project section. There is a unit, too, for dealing with financial analysis and there is a special unit not connected to the Division, which does internal auditing. All accounts are audited by the Auditor General of Jamaica.

### 1.6.4 Marketing and credit

The Marketing and Credit Division (MACD) was established in recognition of the fact that the marketing of agricultural and food products falls under the overall purview of the Ministry of Agriculture. It is an amalgam of disparate units dealing with agriculture and previously scattered over the Ministry.

The policies of MACD relate to three broad areas :

- a) Marketing Development,
- b) Marketing Economics and Credit, Information and Research, and
- c) Quality Assurance.

#### 1) Marketing development

- assisting farmers in identifying markets, upgrading marketing awareness and providing technical know-how to improve quality and value of products.
- assisting market intermediaries by upgrading their marketing skills and knowledge, helping them to identify supplies, providing technical know-how in product handling, transportation, grading and storage, and assistance in arranging for Contractual agreements with farms.
- establishing functional Producer Marketing Organisations (PMO) which will own and operate Assembly and Grading Stations as part of their marketing strategy.

- collaborate with the Jamaica Agricultural Society (JAS) in establishing an input store at each PMO to service the farmers.
- collaborate with the JAS in establishing informal collecting stations where farmers' produce can be assembled and marketed.
- establish subterminal wholesale distribution markets and assist in all aspects of their development and provide technical training in the operation and management of the facility.
- assist in the development and/or expansion of export markets of the farmers
- strengthen the control of the Ministry of Agriculture over the External Marketing Organizations (EMO's) through a meaningful reporting system and in the monitoring of the preparation and the approval of their annual budgets.

2) Markets economics and credit

MACD monitors agricultural credit through the "Agricultural Credit and Stabilisation Secretariat" in which it deals with credit disbursements and collections.

It also deals with the following :

- Government's agricultural incentive programmes
- co-ordinates the agricultural warden's programme
- collects information on all international trade agreements and analyzes their relevance to Jamaica
- studies the interaction of supply and demand on prices with a view to advising the country on proper pricing and pricing policies.

3) Agricultural credit

a) The Agricultural Credit Bank (ACB)

The Agricultural Credit Bank of Jamaica limited was established under the Companies Act in 1981 as a result of Government's decision to rationalize all public sector agricultural credit. The Bank mobilises both foreign and local funds but restricts its activities to wholesale banking, using the Commercial and People's Co-operative Banks, among other lending institutions, for on lending to the farming community.

The objectives of ACB are to assist in the agricultural development of Jamaica by:

- making funds available at a time and place best suited to the farmers' needs,
- encouraging greater participation by commercial banks in the agricultural sector, and
- strengthening and upgrading the PC Banking system and encouraging greater farmer participation and involvement in its operation

ACB was established to channel short-, medium- and long term credit to farmers through commercial banks at somewhat lower than free market interest rate. The approved projects and/or crops for short-term loan are condiments, working capital support, pulses, tobacco, tubers and root crops, pasture upgrading and vegetables. Medium-term loans of up to 7 years and long-term loans of up to 12 years are available for leading to projects for sheep and goats, horticulture, sugar cane, bananas and plantains, agro-industry, dairy and farm buildings. Rice is not included in the above, but should be included. There are forty (40) PC Banks founded by ACB in Jamaica.

b) Jamaica Development and the Agricultural Credit Board

Prior to 1981, development credit, including that for agriculture, was handled through the Jamaica Development Bank (JDB) and credit to small farmers through the Agricultural Credit Board although many such farmers got credit directly from the JDB through the Self-Supporting Farmers Development Programme (SSFDP). Since then, however, the Agricultural Credit Bank has taken over only 40 of the PC Banks managed by the Agricultural Credit Board (ACBd.). The remaining PC Banks service themselves by recycling their collections and from Share Capital.

1.6.5 Research and development

The Research and Development Division was established in the MOA as a separate unit and carries out research on crops, soils, plant protection and livestock. It is the result of an Inter-American Development Bank/Government of Jamaica (IDB/GOJ) project. This project is co-ordinated at the Ministry with the work being done in the regions.

Below is the location of the research stations.

a) Bodles

This is the main research station and is situated in the Central Region. It conducts research mainly in dairy cattle, pastures, animal nutrition, small stock and food crops mostly under irrigated conditions.

b) Grove Place

Located in the Central Region and concentrates its activities on rainfed pasture, beef cattle, as well as crops under rainfed conditions.

c) Montpelier

Located in the Western Region with emphasis on crops and dairy cattle breeding.

d) Orange River

This is located in the Northern Region and carries out research on crops like cocoa, bananas, ackee, etc.

While Research and Development is an important Division of the Ministry, some research is also done by the Caribbean Agricultural Research and Development Institute (CARDI) of the University of the West Indies and also by some of the Commodity Boards like the Sugar Industry Research Institute (SIRI) for sugar and the Coconut Industry Board among others.

Research programmes and budgets are approved by a Standing Ministerial Committee which includes the Permanent Secretary, farmers' representatives, the University of the West Indies, the Planning Institute of Jamaica and the Production and Extension Division of the Ministry. Additional Commodity Committees deal with specific crops. One of the functions of the Standing Ministerial Committee is co-ordination.

Links with the farmers are maintained not only through membership on the Standing Committee but through the Subject Matter Specialist of the Division.

Between 1977 - 1980 a Japanese team of rice researchers carried out rice experiments on mineral soils in BRUMDEC and identified some useful pointers. The results seen were obtained under a system of transplanting. These results should provide very useful data for the agronomy of the Project.

1.6.6 Production and extension

This Division administers the 4 Regional Offices and the 13 Land Authorities and is the main implementing arm of the Ministry. Its subjects include;

- a) Production and Extension,
- b) Works: Development and maintenance activities like building construction, roads, bridges, minor irrigation,



- c) Land administration,
- d) Rural Farm Families Development Programmes, and
- e) Fisheries: Deep sea and Inland

The programmes are co-ordinated at the regional and national levels through the Regional and National Directors and the support staff.

Each Land Authority is administered through an Executive Officer and his Deputy. Reporting to each Executive Officer is a number of Divisional Officers who supervise the Agricultural Extension Officers (AEO). Each AEO supervises 1 Field Assistant and 2 Agricultural Aides. Nationally there are 65 Divisional and 448 Area Extension Officers each AEO servicing, on the average 400 - 500 farmers.

There are three other categories of extension worker - not all government.

- (i) Subject Matter Specialists from the Research and Development Division,
- (ii) Specialists within the Commodity Boards, and
- (iii) Private (i.e.) non-government specialists

The activities of the extension staff are many and varied such as operating subsidy schemes, crop care activities, assistance in farmer training, development and settlements, livestock improvement, the revolving herd scheme, attending and participating in farmers' forums, preparing from plans, and assisting in aspects of marketing and credit, among others.

Over the years, the service has been restructured many times. The last reorientation of the service occurred in 1980, when the TVM System (Training, Visiting and Monitoring) was introduced. In essence, the programme sets out to select and train certain "contact" farmers within an extension area and around a demonstration

plot, and through the contact farmers, reach out to their colleagues. The AEO would then visit and monitor the programme.

This programme has not met with the anticipated success, and presently another attempt at a re-organization is being contemplated.

The premise of this restructuring is:

- (i) Much of the work currently being done is not extension: extension should be crops oriented and the extension officer, a generalist.
- (ii) the size of the extension areas should be increased and number of staff reduced.
- (iii) provision of better working conditions and better qualified staff leading to greater job satisfaction.

It is argued that the constraints of the Ministry is likely to militate against the establishment of such conditions and that, perhaps, a statutory organization would be more suitable.

#### 1.6.7 Technical services

This division is responsible for;

- a) Land Administration,
- b) Forestry and Soil Conservation,
- c) Land Development and Utilization Commission,
- d) Survey Department,
- e) Office of Titles,
- f) Engineering Branch,
- g) Gardens and Zoos, and
- h) Veterinary Services

#### 1.6.8 Training

The Training Unit is an arm of the Personnel and Training Branch of the Ministry of Agriculture. It is funded partly by GOJ, partly by the Agricultural Planning Project and by specific projects which may allocate staff as the unit for staff and farmer training within the project.

There is a residential training centre to each Region with accommodation as follows:

- a) North Region : Eltham 60 trainees
- b) South Region : Twickenham Park 30 trainees
- c) Central Region: Brooklyn 48 trainees
- d) Western Region: Canaan 36 trainees

When necessary, other venues and facilities are used. Each Centre is staffed with a Manager and auxiliary staff.

The Unit, in addition to the executive staff, has 8 trainers: 4 assigned to each of the Regions; 2 to special projects, 1 to Planning, Monitoring and Evaluation, and 1 co-ordinates the Learning Resource Centre. This Centre prepares documentation and information.

Centres are used primarily for farmer training. Staff are usually trained at the Administrative Staff College (Ministry of the Public Service) located in Kingston.

#### 1.6.9 Farmers' organization

The Farmers' organization includes:

- The Commodity Boards/Associations,
- The Jamaica Livestock Association Ltd.,
- The Jamaica Agricultural Society, and
- Farmers Co-operative Groups

##### 1) Commodity Boards/Associations

Among these are listed;

- The Sugar Industry Authority (SIA),
- The Banana Company of Jamaica,
- The Coconut Industry Board,
- The Pimento Growers Association,
- The Cocoa Industry Board,
- The Citrus Growers Association, and
- The Coffee Industry Board

These vary from a simple association of growers e.g., the Citrus Growers Assn. to a statutory Board e.g., the Coconut Industry Board to a Company like the Banana Company of Jamaica. In the last two cases the Board/Company reflects the joint membership of the growers and the government.

Their function is promote the development and marketing of the individual crop which they represent. They organize regular meeting with the growers to discuss the industry, act as pressure groups on the government, promote the marketing of the industry and in some instances they develop subsidiary companies for processing and marketing their products. A few of them are also involved in research.

2) The Jamaica Livestock Association

This is an association of livestock farmers which not only represent the livestock industry but also has a very efficient supplies division with branches all over the island.

3) The Jamaica Agricultural Society (JAS)

This is a statutory body of great significance to small farmers. It has some 1,017 branches all over Jamaica with branch membership, both direct and associate of some 90,000 to 100,000 members. It has been the parent organization for most of the Commodity Boards and the co-operatives now in operation. The branch is organized not only at the village level but also at the parish and national levels. The JAS is a powerful lobby group for the farmers; it promotes national and parish agricultural shows, it organizes the Co-operatives that handle the marketing of such crops as coffee, cocoa, pimento, spices, etc., and through its Jamaica Agricultural Farm Supplies Ltd. (JAFS) which it has developed with the support of the Marketing and Credit Division of the Ministry of Agriculture, it has a network of farm supplies' stores.

4) Farmers Co-operative Groups

The Co-operative Department is located in Kingston and falls under the Ministry of Youth and Community Development. It consists

of a Development Section, an Audit Section, and a Supervisory and Field Services Section. There are 269 Co-op Societies nationally, most of them in agriculture. The two major blocks are;

- a) Credit Unions, and
- b) Agriculture including fishing all with a strong bias towards marketing and services

#### 1.6.10 Agro 21

This is a recent institution formed for the purpose of bringing a new thrust to agriculture. The features of the thrust involve not only acreage, but commercial levels of production, a wide range of new and traditional crops, new markets in North America and Europe, and unprecedented levels of technology.

Some 81,000 ha (200,000 acres) of land have been identified to be developed over the next 4 years. Initially, 19 sub-sectors have been selected for development:

1. Winter vegetables
2. Bananas
3. Coffee
4. Ethnic Crops: Plantain, Dasheen, Yams
5. Tobacco
6. Coconuts
7. Rice
8. Afforestation
9. Citrus
10. Pineapples
11. Beet Keeping
12. Aloe Vera
13. Ornamented Horticulture
14. Cassava
15. Orchard Crops
16. Aquaculture
17. Dairy
18. Beef
19. Cocoa

A further sixteen sub-sectors are being investigated for their economic viability. They include:

1. Spices
2. Small ruminants (goats, sheep)
3. Macademia and other Nuts
4. Mushrooms
5. Strawberry
6. Soya
7. Sorghum
8. Bamboo
9. Grapes
10. Eschalot
11. Sunflower
12. High yielding cane
13. Cotton
14. Corn
15. Jojoba
16. Winged Bean

## 2. PRESENT CONDITION OF THE PROJECT AREA

### 2.1 Location

The Black River Lower Morass is situated in the western part of Jamaica near the southern coast in the parish of St. Elizabeth. The Project area is bounded by the Black River - Santa Cruz Highway on the north and west, the Lacovia - Mountainside road on the east, and by the Mountainside - Black River road on the south. Black River Town (population, 3,577), the capital of the parish, lies in the southwest corner of the Project area, about 160 km (100 miles) west of Kingston.

The Project area covers approximately 11,450 ha (28,270 acres) of which about 6,800 ha (16,790 acres) are marsh land, less than 1.0 m above sea level and mostly covered with sawgrass. The northeast part of the Project area is composed of old and recent alluvial soils sloping gently from north to south. In the centre of the Project area, lies the Slipe - Cataboo area, about 1,000 ha (2,470 acres) with elevation ranging from 1 m to 15 m.

Administratively, the Project area includes five extension areas, some parts of Black River, Mountainside, Burnt Savannah, Holland and Lacovia. The administrative divisions are illustrated in Fig. F-2. The details of the geographical extent of each extension area are given in Table F-11.

### 2.2 Human Resources

#### 2.2.1 Population statistics

Population censuses in Jamaica were made in the years 1970 and 1982. The population figures of Jamaica, the Parish of St. Elizabeth and the Project area in these years are given in Table F-1. According to the 1982 census, the Project area had a population of some 8,200: 2,800 in Black River, 1,400 in Mountainside, 2,000 in Burnt Savannah, 600 in Holland, and 1,400 in Lacovia respectively. The population in the Project area was about 6% of that in the Parish.

### 2.2.2 Population density

According to the population census in 1982, the population density in the Project area was 71 persons/km<sup>2</sup> (184 persons/sq.m). This figure is lower than that for the Parish, 110 persons/km<sup>2</sup> (285 persons/sq.m) and Jamaica, 191 persons/km<sup>2</sup> (495 persons/sq.m). The population density of each extension area in 1982 was 46 persons/km<sup>2</sup> (119 persons/sq.m) in Black River, 97 persons/km<sup>2</sup> (251 persons/sq.m) in Mountainside, 106 persons/km<sup>2</sup> (275 persons/sq.m) in Burnt Savannah, 35 persons/km<sup>2</sup> (91 persons/sq.m) in Holland and 499 persons/km<sup>2</sup> (1,292 persons/sq.m) in Lacovia, respectively (see Table F-1). Such a high density in the extension area of Lacovia is due to the fact that this Project area is an urban area.

### 2.2.3 Growth in population

The average annual growth rate in the Project area during the period from 1970 to 1982 was estimated to be 0.26%, using the formula  $r = (P(n)/P(1))^{1/n} - 1$ , where  $r$  is the average annual growth rate,  $P(1)$  and  $P(n)$  mean the population in the first year and the (n)th year respectively.

The average annual population growth rate in the Project area was very low compared with the Parish average of 0.42% and the entire Jamaica average of 1.05% as shown in Table F-1.

### 2.2.4 Population distribution

The population distribution ratio between urban and rural areas in the Project area, St. Elizabeth and Jamaica is shown in Table F-12. As seen from the table, there was not much change in the population distribution ratio between urban and rural area in St. Elizabeth and Jamaica during the period from 1970 to 1982. However, in the Project area, the annual population growth rate within the urban areas was very large, namely 12.5% during the same period.

Table F-13 shows the population by age and sex groups in the Project area, St. Elizabeth and Jamaica. In the Project area, the population under 18 years of age within the rural areas accounts for



50.5% as compared with 46.8% in the urban area.

These figures seem to indicate that there is considerable population outflow from the rural areas within the Project area to work away from home to obtain even additional income.

#### 2.2.5 Labour force

##### 1) Manpower

In the Project area, the population 14 years of age and over in 1982 was estimated to be about 5,300 or 65% of the total population. According to "Labour Force 1982 in Jamaica" the labour force as a male and 65.2% for female. In the Parish of St. Elizabeth comparable figure were 77.7% for male and 54.1% for female. In the present study, the labour force in the Project area was estimated by applying the percentage of the total population 14 years of age and over for the Parish of St. Elizabeth, because of no comparable data was available for the Project area.

The labour force in the Project area was estimated to be some 3,500 comprising 2,000 male and 1,500 females. This number corresponds to nearly 43% of the total population, which is a little low compared with 47% for Jamaica. These figures are summarized in Table F-14.

##### 2) Employment

In Jamaica, about 33% of the employed labour force in 1983 was in the agricultural sector as shown in Table F-2. It seems that the contribution of this sector to employment has recently been decreasing. However, in the Project area agriculture still continues to be the main source of employment as in 1982 the number of farm households represented about 59% of the total number of households. This percentage is extremely high when compared with 36% for Jamaica as shown in Table F-15.

Consequently, it is logical that development in the Project area should put great emphasis on the agricultural sector.

## 2.3 Social Infrastructure

### 2.3.1 Education

In general, the formal education system in Jamaica consists of pre-primary, primary, all-age, secondary, tertiary and higher education. The period of pre-primary, primary and all-age education is 2 years, 6 years and 10 years respectively. The education at secondary level consists of new secondary, secondary high, comprehensive high, technical high, agriculture high and vocational schools. The period of secondary education is 6 years. The tertiary and higher education consist of university and colleges. On the other hand, in spite of JAMAL (Jamaica Movement for the Advancement of Literacy) about 40% of the adult population of Jamaica is considered to be functionally illiterate.

In St. Elizabeth, there are 74 primary level schools, 10 secondary level schools and 1 tertiary level school, with about 28,000, 16,000, and 1,300 pupils respectively (see Table F-16). A recent survey in the Parish revealed that only 25% of the population was illiterate (29% for male and 21% for female) which is very low for Jamaica.

In and around the Project area, there are 6 primary schools and 2 all-age schools and 2 new secondary schools with about 6,100 pupils as shown in Table F-16. Also there are 7 centres for JAMAL training with 200 trainees in 24 classes and a team of 10 volunteer teachers. It is considered that there are number of schools in and around the Project area is sufficient but staff and facilities need to be expanded.

### 2.3.2 Health and nutrition

#### (1) Health

The health service in Jamaica includes 28 hospitals (23 public and 5 private) which are administered by 9 Regional Hospital Boards. Primary health services are divided into 47 health district which are served by 132 health centres and dispensaries, 10 rural national centres, 232 government maternity homes and child health clinics,

and 69 public dental health clinics. The distribution of the health services in the Project area and in the Parish is shown in Table F-17. There is hospital, 3 clinics type I and II clinics type III in and around the Project area.

In recent years, there has been a decrease in the number of health service personnel and there continue to be shortages in several important areas. The ratio of doctors and dentists to population in St. Elizabeth in 1984 is 1 : 15,000 and 1 : 48,000 respectively. The ratio is very low compared with whole Jamaica of 1 : 7,000 and 1 : 33,500 in 1982 respectively. On the other hand, the ratio of both doctor and dentist in Jamaica is still considerable low compared with the ratio recommended from Pan American Health Organization (PAHO). (See Table F-18)

Therefore, it is considered that the primary health facilities and services should be upgraded in the Project area and throughout Jamaica, and it is necessary to review and rationalize the programmes.

## (2) Nutrition

According to the nutrition survey in 1978, about 1% of children under 5 years were severely underweight for their age (Gomez III), approximately 7% were moderately underweight (Gomez II) and 31% were marginally underweight (Gomez I). By comparison, 1982 data on the nutritional status of children under 5 years attending clinics indicate that about 4% suffered from moderate to severe malnutrition (Gomez II and III) and 23% mildly malnutrition (Gomez I).

While a comparison of the statistics of 1978 to 1982 suggests that the nutritional status of Jamaica children has improved during this period, it is usually found that parents with healthier children are more likely to attend clinic. Therefore, clinic data could tend to underestimate the prevalence of malnutrition.

The main cause of malnutrition is the low income level of most Jamaicans. When it is considered that the minimum weekly wage is J\$40 up to December 1984, then, even among employed adults and their dependents, undernutrition can be a problem. Such unemployed persons as pensioners and those 65 years and over could comprise a nutritionally deprived group.

In St. Elizabeth, according to research carried out on children 0 - 35 months in 1984, about 70% were normal, 26% were marginally underweight for their age (Gomez I), 3% were moderately underweight (Gomez II), and 1% were severely underweight (Gomez III). The more serious cases of nutritional problems tended to occur in the sugar cane areas.

### 2.3.3 Transportation and communication

#### (1) Transportation

Transportation in the Parish as well as the Project area depends mainly on road traffic which is served by a main road and a number of secondary or parochial roads. The main road runs along the northern and western boundaries of the Project area. This road, about 13 km long, is the main route between Kingston and Savanna-la-mar and is well maintained. There are secondary roads linking Black River to Mountain-side and Mountain-side to Lacovia. These roads with about 12 km long, the asphalt paved and well maintained. However, roads inside the Project area are generally in poor condition. Rivers are also used by small canoes as a means of transportation inside the Project area. It seems that such a poor condition of roads inside the Project area is one of the main limiting factors for its development.

#### (2) Communication

##### (a) Postal services

The post Office established in 1671, provides postal and telegraph services of Jamaica. The services are managed by the Post Master General through 11 regions and 12 regional inspectors.

The Project area falls within the St. Elizabeth Region which has 25 post offices and 41 postal agencies all supervised from a regional office in Black River. A post office provides all the postal and telegraphic services which in most instances will include telephone call box services. On the other hand, a postal agency might provide part-time postal service only.

The post offices in the Project area are located in Black River, Middle Quarters, Lacovia and Mountainside.

(b) Telephone

In Jamaica, the telephone service is provided by the Jamaica Telephone Co. Ltd., which operates under a licence granted by the Government. The telephone company operates through its main office in Kingston and 8 regional offices.

The Central District (comprising Clarendon, Manchester and St. Elizabeth) of the Telephone Company is administered from the District office located in Mandeville. The parish of St. Elizabeth is serviced by the Black River exchange (with 70 customers) and the Santa Cruz exchange (with 135 customers). There is a public call box at Lacovia, Santa Cruz, Siloah, Balaclava, Magotty, New Market, Goshen, Brompton and Malvern and two such boxes in Black River. Limited and inefficient service is a major complaint throughout the parish. This service will need to be upgraded.

2.3.4 Water and electric supply

(1) Domestic water

Formerly, three authorities were responsible for providing and distributing water for domestic use. These were the Kingston and St. Andrew Water Commission, the National Water Authority and the Local Government Authorities (Parish Councils). The functions of investigation, designing, constructing and distributing domestic water supply for the country has now been made the responsibility of the National Water Commission since October 1981. The take-over is proceeding on a phased basis. For example, the total domestic water supply of some parishes has already been taken over by the NWC.

In 1983, there were 7,276 metered and 63 unmetered water consumers in St. Elizabeth. About 54% of the total population was supplied from 41 sources with treated water, about 24% of population was supplied from 44 sources with untreated water. The remaining population was not supplied. Of these sources, 65 are operated and distributed by the Parish Council, the major schemes being Parottee,

Hounslow/Pedro Plains, Newton, Burnt Savannah/Lacovia, Santa Cruz, Pepper, Elim, Aberdeen/Siloah and Ginger Hill. Seven sources are operated by the NWC and distributed by the Parish Council. Among these are Bull Savannah Munro/Malvern, Brompton/Dalintober/Black River, Balaclava, Bogue/Elim and Little Park. The water sources included 21 wells, 8 springs, 4 rivers and 52 rain water tanks.

In and around the Project area, there are nearly 900 metered consumers: 120 in Middle Quarters, 147 in Parottee, 70 in Vineyard, 26 in Fullerswood, 416 in Lacovia/Burnt Savannah/Mountainside, 40 in Arlington and 54 in Slipe/Cataboo/Panches/Salt Spring. The water supplied within the Project area is obtained from 3 wells. The Luana and Dalintober wells are operated by the NWC and the third by Burnt Savannah operated by the Parish Council. There is reserve capacity in these wells to meet the projected increase in water demand which will result from implementation of the Project.

## 2) Power supply

In Jamaica, the Jamaica Public Service Co. Ltd., under the franchise granted by the Government is the sole public supplier of electricity. In addition, electricity is also generated for private use by some industrial concerns: the bauxite and alumina companies, the sugar estates, etc.

There are 9 power stations linked together in a national grid: 2 are thermal stations, oil fired; 5 hydroelectric generating and 2 diesel generating. The national demand is for approximately 240 MW and the total capacity is 385 MW.

In St. Elizabeth, there is a hydroelectric power station in Maggoty. The requirement of power supply for the Parish is estimated 4.5 MW with 9,500 customers. The power supply services are limited in major towns and their vicinities with only 48% of households served in 1982.

In and around the Project area, the requirement of power supply is estimated 2 MW with 3,000 customers. The distribution line links Black River, Lacovia and Mountainside along the main road and extends inside the Project area.

### 2.3.5 Housing

The building of houses in Jamaica is confined either to the private or the public sector. The private sector covers dwellings completed by private housing developers as well as private individuals.

The public sector builds through:

- a) The Ministry of Housing
  - the sites - service programme,
  - the urban upgrading programme,
  - a joint venture programme, and
  - the National Housing Cooperation
- b) the Urban Development Corporation (UDC)
- c) Sugar Industry Housing Ltd.

The National Housing Trust is an institution financed from salary deductions and provides capital for special housing mortgages.

The 1982 population census reported that there were 505,155 private dwellings in Jamaica with the average number of person/household being 4.1. For St. Elizabeth the average was 4.2. The recent farm economic survey revealed an average of 5.6 per household in the Project area.

### 2.4 Land Tenure

In St. Elizabeth, 93% of the acreage of farms was held on free-hold basis in 1968/69. This figure is higher than average for Jamaica. The average farm size in the Parish is 3.7 ha in 1978/79, but farms of less than 2 ha accounted for 82% of the total number of farmers and the lower percentage of 13% in acreage compared with Jamaican average of the acreage in farms. However, farms of more than 200 ha accounted for 0.5% of total farmers but represented 65% of the total acreage of farms as shown in Table F-10. The figure is extremely high compared with national figure.

In the Project area, according to the farm economic survey, about 92% of the acreage of farm land is held on a free-hold basis. This is very similar figure to the Parish. The farms of more than 40 ha

(100 acres) account for about 0.4% of the total number of farmers and 62% of the acreage in farms. On the other hand, farms of less than 2 ha account for about 82% total number of farmers. The average farm size in the Project area is 4.4 ha (11 acres). But the average farm size excluding the 0.4% of farmers with more than 40 ha is 1.7 ha (4.2 acres) as shown Table F-19 to F-22. As the crop incomes of these peasant farmers are very small and insufficient to maintain the farmers, most of these are engaged in various sideline businesses.

## 2.5 Marketing

The parish of St. Elizabeth is served by 4 large retail outlets as markets for domestic food production: Black River, New Market, Santa Cruz, and Junction. Smaller retail outlets are also to be found at Shaws, Maggotty, Balaclava, Malvern and Lacovia.

The Project area itself is served mainly by the Black River market and to a limited extent by the New Market, Santa Cruz and Lacovia outlets. Although the road system between major towns in the Project area is fairly good, roads in many producing areas are poor or practically non-existent. Produce is usually carried by donkey or on the back of farmers or higglers from the farm to a central point on the road where a truck, bus, van or other vehicle picks it up. The manner of packing and handling of production results in a high incidence of bruising. Yams, cassava and peanuts are the main farm commodities sold outside. Red peas, gungo peas, cow peas and corn are sold to a limited market, most being retained for home consumption.

Approximately 56,400 tons of sugar cane is produced from 910 ha (2,250 acres) employed at Holland Estate. After the cane is cut, it is transported to a central point in the field. From this central point the cane is taken to a Receiving station from where it is transported some 60 km (40 miles) by trailers to Frome sugar factory in the Parish of Westmoreland where it is milled.

## 2.6 Agricultural Support Services

### 2.6.1 The credit system

Credits are often necessary to enable small farmers to adopt modern systems of production. Within the context of the present



credit systems the small farmers level of poverty mitigate against them obtaining adequate credits. Some of the farmers surveyed have been refused loans because of lack of collateral.

The main source of farm credit has been the People's Cooperative banks (PCB). Fifty six percent (56%) of those who received agricultural loans borrowed from PCB and another 33% from commercial banks. The size of the loans obtained from the PCB were small and ranged from J\$500 - 8,000; while loans from the Commercial Banks were larger and ranged from J\$10,000 - 16,000.

The Agricultural Credit Bank (ACB) of Jamaica Limited was established in 1981 as a result of the Government's decision to rationalize all public sector agricultural credit. The bank mobilizes both foreign and local funds and restricts its activities to wholesale banking, using the commercial and people's cooperative banks, among other lending institutions for on-lending to the farming community.

Due to experiences of a low repayment rate under previous agricultural, current lending policy requires tangible assets as collateral (such as land or a house) for agricultural loans of all types. One effect of the requirement of land title as collateral has been to increase farmers' fear of losing their land in the case of default on their part. The larger the size of the loans in proportion to their current levels of cash earnings, the greater is the farmers' fear of what will happen if they cannot meet payments.

Even if the typical Jamaican farmer owns land (possible collateral) he is often unable to access adequate loan funds for two main reasons:

- 1) The farm holdings are small and in most cases the lands are of poor quality resulting in very low asset valuations.
- 2) Although most farm holdings are wholly owned, the farmers do not possess formal land titles.

In order to overcome the obstacle posed by collateral requirements, the criteria for loan eligibility and risk analysis need

to be examined in greater depth at the time of planning the land settlement programme. The ability of farmers in the designed project to access funds for on-farm production is of extreme importance.

There are ten (10) PCB's in St. Elizabeth at Southfield, Malvern, Palnyra-Nain, Siloah, Balaclava, Magotty, Santa Cruz, New Market, Black River, and Watchwell. Only three PCB such as Watchwell, Santa Cruz and New Market, are serviced by ACB. The other PCBs provide their own financing by re-cycling their collections and share capital.

The banks which are likely to service the Project area are the Santa Cruz and New Market branches. According to the survey the credit officers from the People's Cooperative Banks usually visits farmers for loan assessment and also the supervision of credit. The twenty percent (20%) farmers/credit officer contact reported is therefore understandable, in the light of the fact that only 30% of the farmers reported ever applying for loans. However, the level of development the project is likely to bring to the area may necessitate upgrading the bank at Black River to the one serviced by ACB.

#### 2.6.2 Extension and related services

St. Elizabeth has 36 extension areas in 8 extension divisions. The Authority has in place its executive staff, its a Divisional Officers but only 26 AEOs. This means that some AEOs supervise more than one extension area.

The main duties of AEOs are to:

- 1) provide technical advice and services through farm visits, demonstrations, etc,
- 2) assist in farm credit by preparing farm plans,
- 3) attend farmers' meetings for the mutual benefit of the farmers and themselves,
- 4) assist in seed and other inputs distribution,
- 5) keep an inventory of farmers' production and update these monthly for presentation to the Data Bank as a source of information, and

- 6) organize farming programmes for farmers in collaboration with the Training Division of the MOA as the need arises.

The Project area is served to a greater or lesser extent by 4 divisions and 5 extension areas summarized as follows:

Division/Extension	Staff		
	AEO	Field Assist.	Aide
1. New Market			
- Holland	1	2	1
2. Black River			
- Black River	1	2	1
- Burnt Savannah	1	-	-
3. Watchwell			
- Mountainside	1	2	1
4. Newton			
- Lacovia	1	2	1
Total	5	8	4

The extension support given to the farmers within the Project area seems very limited. The extension officer is known by only 66% of the farmers surveyed and by 28% of the farmers' spouses. More importantly only 38% of the farmers have ever been visited by an extension officer, and of those visited over 50% of them reported seeing the officer as infrequently as less than once every two months. Only 15% of the farmers have ever been at a field day or a demonstration. Proper methods of peanut cultivation seems to be the most frequent area of demonstration, especially in the Burnt Savannah Area.

Thirty percent (30%) of the farmers reported belong to the "Farmers Group for Extension". 25% of them replied that they are involved in the TVM Programme. Over thirty percent (30%) of those involved in TVM Programme have never been actively involved, but two farmers had been "contact farmers".

Forty percent (40%) of the farmers that know the existence of the veterinary officer having been visited by him and this was usually for the purpose of treating sick animals.

The Rural Farm Family Development Programme which is geared mainly towards improving general education and services to rural farm families appears to be non-operative in the Project area. None of the farmers or their wives has any knowledge of such programme.

It is obvious therefore, that if the project is to succeed, the extension delivery system must be re-oriented in favour of more farmer contact. Both the contents of the extension message and methods of delivery will require adjustment to make them appropriate to the activities to be pursued when the project is implemented.

### 2.6.3 Farmers' organization

#### 1) The Jamaica Agricultural Society (JAS)

St. Elizabeth has 1 Organizer and 1 Project Officer, with offices in Santa Cruz, 96 branches and 2,600 members. In the Project area are five (5) branches namely: Slipe, Vineyard, Burnt Savannah, Mountainside and Middle Quarters. Based on the survey, the JAS seems to be very inactive in the Project area. Only fifteen percent (15%) of the farmers reported knowing the JAS officer, and only 13% were members of this organization.

#### 2) Farmers Co-operative Groups

The St. Elizabeth has 9 active Societies. They are:

- Credit Union: 3 ; Alpart, Appleton and St. Elizabeth Coop Credit Union Ltd.
- Agriculture : 4 ; St. Elizabeth Coffee Coop, Newell Irrigation Coop, St. Elizabeth/Manchester Coop Society, and Honslo- Farmers Coop.
- Fishery : 2 ; Calabash Bay Fisherman Coop, and Great Bay Fishermen Coop.

The St. Elizabeth/Manchester Coop Society located in Southfield has a business portfolio in excess of J\$2 million and has been in business for the past 30 years. It markets peanuts and other crops on behalf of its members and supplies agricultural inputs to them.

## 2.7 Farm Economy

### 2.7.1 Purpose of survey

The socio-economic survey was commissioned to a) clarify the prevailing general socio-economic situations of the Project area and particularly the farmers socio-economic situation, in order to facilitate the evaluation of the socio-economic impact on the area after the project is implemented, b) determine the interest of the farmers in the proposed project activities, and c) assess the various constraints and to identify ways the project could overcome them.

### 2.7.2 Survey design and methodology

A stratified random sample of 55 farm households was selected for survey. The Provisional Farmers Register 1982 was used as the sampling frame. The sample size (55) represents 4.7% of total farm holdings in the Project area, as following table.

Extension Division	No. Farm Holdings	Sample Size	Ratio (%)
Black River	271	10	3.7
Mountainside	327	18	5.5
Burnt Savannah	412	18	4.4
Holland	77	4	5.2
Lacovia	74	5	6.6
Total	1,161	55	4.7

Eight (8) interviewers were selected from a pool of Divisional and extension officers within the parish of St. Elizabeth. Training of interviewers was carried out at the St. Elizabeth parish office in Santa Cruz. Interviews were conducted over a two (2) week period, between July 30th, and August 13th, 1984. Fifty four (54) interviews were conducted, one of which was incomplete. This effectively reduced the sample size to fifty three (53) farm households.

### 2.7.3. Survey findings

The findings of the survey are summarized as follows:

- 1) The population of the Project area was 8,161 and the number of households 1,955. Farm households constitute 59% or 1,161 of this. (see Table F-15)
- 2) The average household size in the Project area was 4.2 whereas the average farm household size was 5.6.
- 3) The average age of a farmer was 54 years. Ninety four percent (94%) of the farmers had not gone beyond primary school.
- 4) Farmers indicated that there was an adequate supply of labour but in general they could not afford to hire labour. The rate at which farmers hire labour ranges from J\$6 to J\$20; the modal rate is J\$15. Twenty one percent (21%) of the farmers are involved in labour exchange.
- 5) Eighty eight percent (88%) of the farmers have their own land. Eighty one percent (81%) of the farm holdings are 2 ha (5 acres) or less and 40% are 0.4 ha (1 acre) or less. The average farm size is 0.8 ha (2 acres).
- 6) The main economic activities are crop cultivation (legumes, sugar cane, yams, rice and miscellaneous crops), livestock rearing, fishery - mainly shrimp fishing -, and the making of craft items from thatch. Traditional methods of production prevail. These economic activities yield low earnings. In the case of a fisherman his estimated annual earnings is J\$4,370.
- 7) A typical farm household spent J\$9,691 in the previous year and about one third of this was allocated to food (see Table F-23). Seventy five percent (75%) of the farmers do not or cannot depend on income derived from farming alone to meet their household expenses; over half (55%) of them fund purchases of food from gifts.

- 8) The extension delivery system is identified as a possible serious constraint to the farmers of the Project area (or to any small farmer) for optimum involvement in the Project. Within the context of the present credit system some farmers' level of poverty militates against them obtaining adequate credit. There is limited farmer - Extension officer contact; only 38% of the farmers have been visited by an extension officer.
- 9) Only 6% of the farmers grow rice at present; but 44% of those that not growing rice indicated that non-availability of land accounts for this. Thirty eight percent (38%) of the farmers actually stated that they would want to grow rice if the project is implemented.

### 3. MARKETING AND PRICE PROSPECTS

#### 3.1 Marketing Prospects

The marketable surplus of products in the Project area after implementation of the project is estimated based on the following assumptions:

- 1) Population in the Project area will increase to 8,880 based on socio-economic findings, plus 1,040 new settlers for rice growing.
- 2) Seeds and waste requirements are taken as 10% of total production.
- 3) Milling recovery rate from paddy to rice is 60%.
- 4) Per capita consumption of rice is assumed at 30 kg (66 lbs) of rice per annum.

The results of the above discussion are summarized in the table below:

	(Unit: ton)
Item	Paddy
1. Total production	28,950
2. Seeds and waste requirement	2,895
3. Conversion to rice	15,633
4. Consumption in the study area	266
Marketable surplus	15,397

From above study, the expected marketable surplus of products is about 15,400 tons of milled rice (25,660 tons of dried paddy). In addition, marketable surplus of about 1,950 tons of soya beans will be expected.



### 3.2 Price Prospects

The estimation of economic prices for the farm inputs and products was examined on the basis of the following conditions:

- 1) Agricultural products such as paddy/rice and soya bean will be imported supplementally, and hence, the prices of these crops were estimated on the basis of import substitution.
- 2) Because of limited assembly and manufacture in Jamaica, the prices of farm inputs other than seeds and miscellaneous consumables were estimated on the basis of import substitution.
- 3) The other prices of farm inputs such as seeds etc., were estimated by applying price indices in the short term to current prices.

In setting the prospective prices of farm inputs and production, a shadow exchange rate (SER) was determined to assess economic variant of the proposed agricultural development realistically. Based on the average external trade value of last 5 years in Jamaica, the SER was estimated to be 1.02 as shown in Table F-24. Thus the current exchange rate of US\$1.00 equal to J\$4.00 (as of 1984) in financial terms is equivalent to a US\$1.00 equal to J\$4.1 in economic terms. In addition, conversion between international market prices and farm gate prices is made by reference to "The price Prospects for Major Primary Commodities (IBRD, December 1983)".

Based on the conditions listed above and constitutional factors affecting price prospects, the economic prices of farm inputs and products were estimated as shown in Tables F-27 to F-30, and as summarized in Tables F-25 and F-26.

Financial prices are the present farm gate prices. Economic prices are the price for the economic evaluation of the Project in view of its place in the national economy. Financial prices are the prices used for appraising the financial viability of the Project. The financial prices of farm inputs and products are given in Tables F-25 and F-26.

#### 4. PROJECT BENEFITS

##### 4.1 Crop Production Cost

The crop production costs of paddy and upland crops were estimated into the future with and without project conditions. The present agricultural condition would not be changed significantly unless a new irrigation and drainage project were implemented. For the estimation of production costs "without project", therefore, only unit prices of production expenses are forecast by using the economic farm gate prices of farm inputs, without changing the unit requirement for farm inputs and labour. Estimated crop production cost without the proposed development are shown in Tables F-31 and F-32.

After implementation of the Black River Lower Morass Agricultural Development Project, the economic crop production cost of small farm and mother farm would increase by about J\$7,330 per ha on mineral soil and J\$4,030 on peat soil and about J\$7,640 per ha on mineral soil and J\$4,210 on peat soil respectively. This anticipated increase is primarily attributable to increase in expenses for fertilizer, agro-chemicals, farm machinery and labour cost, etc., as shown in Tables F-33 to F-36.

##### 4.2 Crop Production Value

The annual net crop production values "without project" is estimated at about J\$880 for sugar cane, J\$2,770 for upland crops and -J\$440 for rice per ha on the basis of the forecast unit yield, prices of crops and production costs already mentioned (see Table F-37). After completion of the Project, the annual net crop production value of small farm will amount to J\$15,350 per ha on mineral soil and J\$9,660 per ha on peat soil at the full development stage. While the annual net crop production value per ha of mother farm will amount to J\$15,040 on mineral soil and J\$9,480 on peat soil as shown Table F-38.

##### 4.3 Project Benefits

The Project benefits of the Black River Lower Morass Agricultural Development Project are primarily derived from the increased crop production attributable to stable irrigation water supplies and drainage. These benefits were estimated as the difference of annual net crop production

values projected into the future "with" and "without" the project conditions. The net production value is defined as the difference between the gross production value and the crop production cost. The projected crop production without project condition has been estimated on the basis of actual yields and production data.

The agricultural development for the whole area will be completed in 4 years and after another 7 years of development, full production will be attained in 1977. The increased crop production value at full development stage is estimated at J\$33.7 million per annum (US\$2,730/ha). The net direct benefits amount to about J\$33.3 million per annum (US\$2,710/ha) at the full development stage of 3,080 ha. The details of calculation is given in Tables F-39 and F-40.

## 5. FARM BUDGET ANALYSIS

### 5.1 Selection of Farm Size

Farm sizes of a settler both on mineral and peat soils were designed on a provisional basis for the following conditions:

- 1) A farm should be practical with the limited number of family labour,
- 2) A farm allocated to settler should have the potential of producing a net annual reserve of J\$10,000 to 12,000 (policy of the government).
- 3) The farms on mineral and peat soils should produce the same level of net annual reserve.

In order to determine the farm size, farm budget analyse for each farm size were made both on mineral and peat soils at full development stage as shown in Table F-41. According to the labour balance study, the maximum farm size practiced by family labour is about 6 ha (15 acres) as shown in Annex G.

Based on the above conditions and the results of study, the farm size for a settler should be 3 ha (7.5 acres) on mineral soil and 5 ha (12.5 acres) on peat soil, respectively.

### 5.2 Evaluation of Farm Economy

For evaluating project feasibility from the view point of the farmers' economy, a farm budget analysis is made for the mineral and peat soils with the projected development as shown in Table F-42.

Payment capacity is the ability of farmers to bear the expenses required for development of irrigation and drainage facilities. Such capacity is measured by the increase in net disposable income which the project-benefitted farmers can earn annually from the project.

The settler will reach the maximum net annual reserve 7 years after settlement both on mineral and peat soils due to the increase in productivity. After 7 years, the net reserve of settlers on mineral soil

(3 ha) will be J\$21,310 and on peat soil (5 ha) will be J\$25,390 per annum. The increased net reserve would offer incentives for further development to the farmers, and the substantial payment capacity would enable them to pay some charge for irrigation water.

However, the net annual reserve of a settler stands at a very low level in the initial stage especially on peat soil as shown in Table F-42. Hence it is considered that some financial arrangement such as a government subsidy will be necessary for the execution of his annual farm production plan in the initial stages of settlement.

## 6. AGRICULTURAL SETTLEMENT

### 6.1 Settlement Pattern

There are 3,080 ha (7,600 acres) of land to be settled.

Table F-43 projects the following pattern of settlement.

Mother Farm	800 ha (1,980 acs.)
Pilot Scheme	70 ha (170 acs.)
Small Farmers	2,210 ha (5,460 acs.)
	<hr/>
	3,080 ha (7,610 acs.)

According to the farm budgets analysis, the size of average farm units settled on mineral and peat soils should be 3 ha and 5 ha, respectively.

### 6.2 Cropping System

The Project is immediately concerned with:

- (i) triple cropping on the mineral soils, i.e., double cropping of rice and 1 crop of soya bean annually;
- (ii) double cropping of rice on the peat soils.

### 6.3 Settlement Component

#### 6.3.1 Mother farm

Table F-43 sets out the size and location of the mother farm which will comprise 4 sections totalling 800 ha (1,980 acs.). The Project is designed that this farm will be private sector or joint venture operated and will perform 4 main functions:

- developing the agricultural lands in accordance with the project
- multiplication of seed for distribution
- providing certain agreed services to the satellite farms
- purchasing and market the crop.

It will lease or own all equipment except those involved in irrigation and drainage.

### 6.3.2 Training

#### 1) Farmer training

Table F-43 tentatively allocate the number of farms for which settlers will be recruited and trained as follows:

- Black River R.B.	117
- Black River L.B.	169
- Broad River R.B.	116
- Broad River L.B.	116
Total	<u>518</u>

It is expected that the construction of the Project will commence in the 4 agricultural sections simultaneously, and that immediately thereafter, the lands will be leveled and made available for farming.

As soon as farming is possible, recruitment should commence as follows:

- Black River R.B.	25 per batch
- Black River L.B. (Hatfield & Styx, Frenchman & Holiday Pen)	} 50 per batch each.
- Broad River R.B.	
- Broad River L.B.	

The programme should include:

- observation and training in the field: 80% of time.
- classroom setting: 20% of time to include:
  - (i) aims and objectives of the project;
  - (ii) technical knowledge: soils, crops, etc;
  - (iii) money, water and farm management;
  - (iv) family life and community education;
  - (v) the role and function of farmers' association;
  - (vi) aspects of cooperatives;
  - (vii) in cases where necessary, recommend joining JAMAL.

The field training should include the following:

- (i) employment under supervision for one crop, either on the mother farm or pilot farm;

- (ii) part-time work on 0.25 ha (1 acre) under supervision, giving each farmer some scope for initiative.

The time-table should be agreed on with each farmer since he has to maintain his family; his family should assist him in the programme if he requests, and he should be given the net income from his acre of rice. The farmer will need to earn an income as he will not be paid during training. How he uses his time will reflect his initiative.

Individual records on each trainee should be kept.

## 2) Staff Training

After recruitment, Settlement Officers and Extension Officers in particular, should be provided with a short-term orientation course in the technology of rice growing, particularly on peat lands. Such a course should include some exposure to the work being done at Meylersfield and BRUMDEC and, if finances are available, a short period of training either at the Central Institute of Tropical Agriculture (CIAT) in Columbia or at the International Rice Research Institute (IRRI) in the Philippines is advisable.

## 3) Role of Training Division, MOA and Training Centre, Elim

Both the Training Division, MOA, and the Training Centre, Elim, should be involved in planning the curriculum and programme and should serve as resource persons (sources of instructors and know-how).

### 6.3.3 Pilot farm

The Pilot Farm should be established for adaptive research in aspects of rice growing that are relevant to the industry. It should be designed in collaboration with the Research and Development Division, MOA, and should complement work now being done at BRUMDEC and Meylersfield. Trainee farmers should be involved in the programme, and an important part of their practical training as well as extension, after they have been settled, should include the reasons for and results of this research.

### 6.3.4 Seed farm

Seed for planting will be the responsibility of the mother farm.



This will form an important part of the work of the mother farm since the Project will need about 170 metric tons of seed per year.

#### 6.3.5 Recruitment and settlement

##### 1) Criteria for Recruitment

Criteria for selection should include that trainees:

- should have proven experience as a farmer especially since one of the crops will be rice;
- should be credit worthy
- should be between 18 - 50 years of age and of either sex
- should be prepared to attend the training course
- should be prepared, if recruited, to work for long hours since the training programme will demand additional time
- should be recommended by a reputable citizen of the community.

Selection will be the responsibility of the Farm Liaison Committee of the Holding Company.

While preference will be given to farmers from the Project areas and adjacent areas as recruits, this preference should not take precedence over the recruitment of capable and responsible farmers.

##### 2) Settlement

Recruits who have successfully pursued the training course will be settled on lands closest to their areas of residence. For others not from the immediate area, provision for accommodation will need to be considered.

#### 6.3.6 Land tenure

The lands owned by the Government will be leased by the Commissioner of Land to each settler on conditions which he will determine. The Land Officer in the Land Management unit of the Holding Company will be his nominee. Such conditions will include:

- a reasonable duration of lease subject to the conditions of the lease being kept
- a reasonable annual rental

- emphasis on the necessity to plant the stipulated crops; to maintain certain irrigation and drainage canals; and to be a good corporate citizen.

#### 6.3.7 Credit

Individual settlers will need supervised credit. They will first have to prepare an annual farm production plan which he will complete with the help of his Extension Officer. On the basis of this, credit may be provided for such services as land preparation and harvesting, seed material and other inputs through the local People's Cooperative Bank. Farmers will not have access to cash except in so far as part of the loan includes the advance of an amount towards his labour bills, and even this will be monitored.

On the recommendation of his Farm Manager the Development Company will act as guarantor for these loans which will be repaid on the sale of the crops.

Farmers needing a loan of \$50,000 or less may borrow this through the local People's Cooperative Bank. At present the banks affiliated to the Agricultural Credit Bank that are nearest to the Project area are at Santa Cruz and New Market, which are several miles away.

It will be necessary to upgrade the bank at Black River to service the Project.

#### 6.3.8 Inputs

Chemicals, small tools and equipment and fertilizers are all part of the technical package and will be provided on credit through a central store run by the Farm Development Company. These will be supplied on a voucher signed by the farmer and counter-signed by his Extension Officer. This voucher will be forwarded to the accounting section of the Development Company where it will be paid in accordance with the loan agreement with the bank and where the repayment transaction with the bank will be settled upon the sale of the farmer's crop.

### 6.3.9 Extension

Rice growing is not as widespread a farming occupation as the growing of bananas or yams. Where it is practised among the small farmers, the level of production is very low and the areas limited. In many countries it is a way of life; it is cultural and to this end, many Jamaicans of Indian origin still pursue this occupation in the areas of Jamaica where it is grown.

The Project is aspiring to developing a new appeal for rice production and, in time, to lift production levels to world standard.

This is going to take careful farmer selection, time, reliable source of inputs and services, and an adequate, competent and committed extension service. The nature of some of the peat soils aggravates the condition.

It is felt that, for such a task 1 extension officer to about 100 farmers would be a reasonable ratio. Accordingly, the proposed extension staff is as follows:

- Black River R.B.	1	Extension Officer
- Black River L.B.	2	" "
- Broad River R.B.	2	" "
- Broad River L.B.	2	" "
	<hr/>	
Total	7	" "

After training, selection, and settlement, extension will become a function of the mother farm and the Development Company.

### 6.3.10 Water management

While water is generally adequate, the cost of pumping to irrigate and drain the lands will be a significant item in the cost of production.

The Black River Lower Morass Irrigation and Drainage Unit will manage the system. A fee to recover capital and operational costs will be charged to each farmer and collected through the mother farm from the sale of paddy.

Each farmer, as a condition of his lease, will be expected to maintain the farm drains which service his immediate farm while the Unit will maintain the main drains, regulate the flow of water through the irrigation and drainage system, and service the pumps.

#### 6.3.11 The use and maintenance of equipment

All farm equipment and vehicles will be owned and controlled by the Farm Development Company. Each agricultural section will have its allocation of farm equipment and implements, and will be provided with a service centre for general servicing and simple maintenance. There will, however, be a larger central workshop and a central store with replacement parts for major repairs.

#### 6.3.12 Drying, milling and marketing

Paddy harvested in the agricultural sections will be purchased, dried to 14% moisture content and stored and then transported to the milling and marketing unit of the Farm Development Company, to be milled and sold. The control of these services will be the responsibility of the Commercial Department of the Farm Development Company.

#### 6.3.13 Farm liaison committee

The functions of this Committee has already been discussed in 6.3.5.

#### 6.3.14 Association of farmers

The Project will be handicapped if the corporate views of the farmers cannot find expression for support and action. The formation of an association, therefore, should be recognized as essential. The geography of the agricultural sections could be a hindrance to unity but the problem is not insurmountable.

## 7. PROPOSED SOCIAL INFRASTRUCTURE

### 7.1 General

Agricultural development necessitates other kinds of developments that will support, complement and stimulate its progress. Well planned agricultural production requires adequate communication and transportation systems that will facilitate easy access to information, agro-inputs and market outlets; it requires a reasonably healthy population with reasonably sufficient provision of water, electricity and housing; it requires the support of and stimulation of adequate educational and training facilities for children, as well as adults (particularly the farmers themselves and participants in specialized additional programmes). The social/psychological value of such developments must never be under-estimated. It is only when the farmers, their families and the community of which they are a part, experience a sense of security, achievement and social well-being that they can be truly motivated.

### 7.2 Housing

The population census of 1982 reports that the total number of private dwellings in Jamaica was 505,155 with an average number of 4.1 persons per household; the census gives the number per household for the parish of St. Elizabeth as 4.2. The Socio-economic study conducted for the Project reported an average of 5.6 persons per household within the Project area; this is well over national average and nearly 1.5 persons above parish average.

Apart from the larger number per household, the Project area shows a substantially low standard of dwellings for the most part. Inadequate space, old tottering structures of flimsy material such as decaying thatch, mortar, small wooden posts, earthen or broken wooden floors and embarrassingly hideous little huts make a fitting description of about 50% of the current housing facilities of the Project area. The table below shows the projected needs and costs for the housing components of the Project.

I. Farm Family and Housing Numbers

Project Area Housing	Estimated No. of Families
Expected farm families in the Project	520
Present farm families in the Project area	260
Present project area families in reasonably acceptable dwellings	65
Expected to need upgraded housing	195
Expected to need new housing	260
<b>Total expected to need housing assistance</b>	<b>455</b>

II. Unit Size by Cost per Unit

Area (m <sup>2</sup> )	Size of Unit	Cost per Unit (J\$)	Cost per Lot (J\$)
28 (300 Sq Ft.)	1 bedroom, bath, kitchen, dining area	25,000	7,000
42 (450 Sq Ft.)	2 bedrooms, bath, kitchen, dining area	35,000	8,000
56 (600 Sq Ft.)	6 bedrooms, bath, kitchen, dining area	55,000	8,000

III. Estimated Housing Cost for the Project Area

(Unit: J\$)				
No. of Units	Unit Size	Total Cost per Unit Size	Lot Cost	Total
I. Upgrade				
195	15,000	2,925,000	-	2,925,000
II. New				
65	25,000	1,625,000	455,000	2,080,000
130	35,000	4,550,000	1,040,000	5,590,000
65	55,000	3,575,000	520,000	4,095,000
<b>Total</b>	<b>455</b>	<b>-</b>	<b>12,675,000</b>	<b>2,015,000</b>
				<b>14,690,000</b>

### 7.3 Schools

The Project area has a total of ten (10) schools in and around it. The schools are:

- Middle Quaters All-Age School
- Fuller's Wood All-Age School
- Black River Infant and Primary School
- Burnt Savanna Primary School
- Slipe Primary School
- Holland Primary School
- Lacovia Primary School
- Mountain Side Primary School
- Black River Secondary School
- Lacovia Secondary School

The most critical in terms of the project are Slipe Primary School and Fuller's Wood All-Age School.

#### 1) Slipe Primary School

The Slipe School is situated in the central section of the Project area. It has accommodation for 180 students but the number on roll up to September, 1984 was 259. It is staffed with an acting principal and five assistant teachers.

The school is used as a community centre where dances are held even when permission for such dances has been refused. Other problems include vandalism (damaged doors and locks among other things).

The school is situated on 3 acres of land; only one acre is actually used at present for housing the building and providing playfield. The other two acres become water-logged when it rains and would require reclamation for further use. Water for serving the school population is adequate.

#### 2) Fuller's Wood All-Age School

The Fuller's Wood School is situated towards the south-eastern section of the Project area. It has accommodation for 400 students with a present enrollment of 351 although the education officer for

the area thinks that space is only just adequate for the present enrollment. Staffing is also adequate but the teachers live outside of the school environment making their extra-school influence very limited.

The Middle Quarters School has accommodation for 340 students and enrollment of 490 and is said to suffer from severe overcrowding. With the Black River Infant and Primary School which has space for 600 but 874 on roll the problem is similar.

The Project envisages an additional 260 families in the Project area and estimates a need for an additional 520 school places. Such places will be distributed over all the Project area schools although most will depend on Slipe and Fuller's Wood Schools. The Project proposes to upgrade and expand these schools rather than constructing new ones. The table below shows the estimated costs.

Additional Places	Cost (J\$)		Total
	Building	Equipment	
325 (2 upgraded and expanded schools)	1,080,000	195,000*	1,275,000
195 (scattered over remaining 9 schools)	800,000	117,000*	917,000
Total			2,192,000

\*: 1982 Equipment Base of J\$600 per student

#### 7.4 Health Care

The Parish of St. Elizabeth has one hospital which is situated in the Black River Project area. The Project area also has three of the 16 Type I Health Centres and two of the seven Type III Health Centres of the parish. Health Centres are organized as follows:

Type I : Serves a population not exceeding 4,000 and is staffed by a midwife and at least two health aides.



- Type II : Serves a population of about 12,000 and has Type I staffing in addition to a Public Health Inspector, a resident staff nurse and a visiting doctor and or a nurse practitioner and pharmacist.
- Type III: Serves a population of 20,000 and has Type II staffing in addition to a resident doctor and nurse practitioner.
- Type IV : Consists of the administrative centres of health care in each parish.
- Type V : Consists of the comprehensive health centres and are located in the urban areas of Kingston St. Andrew, Spanish Town and Portmore.

In keeping with the Health Care plan for the area, the present observed need of the area and the estimated inflow of 260 additional families, the Project recommends a Type I Health Care centre for the Slipe area. This will be staffed by one midwife and two health aides and will need a cottage for the midwife. The estimated cost is shown in the table below:

Items	Cost (J\$)
Health Centre	232,000
Midwife's residence	40,000
Equipment	272,000
<b>Total</b>	<b>272,000</b>

#### 7.5 Transportation and Communication

##### 1) Roads

The Project area is fairly well serviced with roadways. Roadways will then comprise the following:

	Length (km)
Salt Spring Junction to Lacovia via Slipe	13 (8.0 miles)
Frenchman to Slipe	2 (1.5 miles)
Total	15 (9.5 miles)

The entire roadway system of 15 km will be upgraded to a secondary road. Upgrading will include widening to 6.7 m (22 feet), cleaning, marling, compacting, metalling, surface raising, asphaltting and draining and other general improvements where necessary. The estimated cost is shown below:

Items	Cost (J\$)
Upgrading 15 km at J\$187,500 per km	2,812,500
Contingency 20%	562,500
Total	3,375,000

## 2) Telephone

The Telephone Company has a Five Year Development Programme which includes:

- Replacing the existing of exchange in Black River
- Upgrading facilities within the parish
- Placing another call box in Black River and at Santa Cruz
- Placing call boxes at Bull Savanna and Burnt Savanna

In view of the importance of the project for national development and in view of all of the above, the project should seek to obtain the following additional telephone services:

- Office lines
- Call boxes in business areas of project
- A central call box at Slipe/Cataboo (new community) area

## 7.6 Water and Electric Supply

### 1) Water

The source is adequate for both existing and project development needs. A well, located in Burnt Savanna, produces 14.7 lit/sec which is less than 50% of its installed capacity. Water production can be doubled by merely increasing its hours of operation; the incremental production will be adequate to meet the augmented demand.

Adequate 8" pipe lines already exist along the Lacovia-Burnt Savanna mainroad; the need then is to run an additional 8" pipe to connect with the existing Lacovia-Burnt Savanna main line at the point where the Burnt Savanna - Slipe farm road will originate. The Slipe line will follow the 3.7 km (2.3 mile) farm roadway from Burnt Savanna to Slipe/Cataboo. The following table shows the estimated cost:

Items	Cost (J\$)
21,820' x 8" pipeline at \$75/ft.	1,584,000
To construct 21,820' pipeline at \$23/ft.	422,450
Booster pump 350 imperial gallons per minute	60,000
Upgrade electricity supply	20,000
Total	J\$2,086,450

### 2) Electricity

At present some sections of the Project area (districts within it as well as its entire periphery) are supplied with electricity. The Project will make a requisition for the upgrading and extension of such service within the Project area in order to satisfy its light and power needs. Assurance has already been given by Jamaica Public Service Company personnel in the area that the Project needs will be met.

### 7.7 Community Centre

The parish of St. Elizabeth has a total of 8 community centres, 265 youth clubs (65 of which are active) and a youth club membership of 2,700. The Project area has three community centres (located in Black River, Lacovia, and Vineyard) and 27 youth clubs. The Community centres are organized around training, recreation and extra-school education: Activities include craft work (needle work and work in straw, bamboo, wicker and other indigenous materials), home economics, personal and human development, and recreational/cultural activities.

The total Project includes the expansion and development of housing to accommodate 2,220 families (based on socio-economic findings plus 260 new families for rice growing) including 560 rice-farming and 860 other-farming families. Provisions are to be made to service this new and enlarged community in terms of the organization, objectives and activities of the community centre.

The Project should provide for the construction of one community centre inside of the Project area (preferably in the Slipe/Cataboo area where the new township (community) of farmer residence and commercial activity is likely to be developed). The cost of this would be about J\$25,000.

### 7.8 Cost of Proposed Social Infrastructure

The table below summarizes the total cost of the proposed social infrastructure which should be provided for the Project area:

Item	Cost	
	(J\$ 10 <sup>3</sup> )	(US\$ 10 <sup>3</sup> )
Housing	14,690	3,673
Schools	2,192	548
Health Care	272	68
Roads	3,375	844
Water Supply	2,086	522
Community Center	25	6
Total	22,640	5,661

Table F-1 POPULATION IN JAMAICA, ST. ELIZABETH  
AND THE PROJECT AREA IN 1970 AND 1982

Region	Area (km <sup>2</sup> )	Population Census		Annual Growth Rate(%)	Population Density per km <sup>2</sup>
		1970	1982		
1. Jamaica	10,957	1,848,500	2,095,878	1.05	191
2. St. Elizabeth	1,207	125,900	132,353	0.42	110
3. The Project Area	115	7,909	8,161	0.26	71
- Black River	60.8	2,697	2,776	0.24	46
- Mountainside	14.9	1,375	1,446	0.42	97
- Burnt Savannah	18.4	1,937	1,950	0.06	106
- Holland	18.2	562	641	1.10	35
- Lacovia	2.7	1,338	1,348	0.06	499

Source: Population census 1970 and 1982  
Census office, Department of Statistic.

Table F-2 PERCENTAGE OF EMPLOYED PERSONS BY  
INDUSTRIAL ORIGIN IN JAMAICA

Industrial Origin	1981	1982	1983
1. Agriculture, Forestry & Fishing	35.4	34.5	33.4
2. Mining, Quarrying & Refining	1.2	1.0	0.9
3. Manufacture	11.1	11.3	12.7
4. Construction & Installation	4.2	4.5	4.7
5. Transport, Communication & Public Utilities	4.5	4.4	4.3
6. Commerce	13.6	14.1	14.3
7. Public Administration	14.0	13.8	13.5
8. Other Services	15.5	15.7	15.9
9. Industry not specified	0.5	0.7	0.3
Total	100.0	100.0	100.0

Source: The Labour Force, 1983

Table F-3 GDP AND NATIONAL INCOME PER CAPITA OF JAMAICA, 1979-1983

Description	1979	1980	1981	1982	1983	Average
						Annual Growth Rate (%)
<u>I. At current prices</u>						
1. GDP (J\$10 <sup>6</sup> )	4,376.6	4,727.8	5,297.1	5,799.1	6,750.4	11.4
Change in %	17.3	8.0	12.1	9.5	16.4	-
2. National Income per						
Capita (J\$)	1,685.3	1,834.8	2,186.2	2,417.4	2,728.8	12.8
Change in %	11.4	8.9	19.2	10.6	12.9	-
<u>II. At 1974 constant prices</u>						
1. GDP (J\$ 10 <sup>6</sup> )	1,940.6	1,827.9	1,888.1	1,888.7	1,922.9	-0.2
Change in %	-1.4	-5.8	3.3	0.0	1.8	-
2. National Income per						
Capita (J\$)	747.3	709.4	779.2	787.3	777.3	1.0
Change in %	-5.9	-5.1	9.8	1.0	-1.3	-

Source: Economic and Social Survey Jamaica, 1983

Table F-4 SHARE AND AVERAGE ANNUAL GROWTH RATES  
BY INDUSTRIAL ORIGIN AT 1974 CONSTANT  
PRICES, 1979-1983

(Unit: %)

Industrial Origin	Year					Average Annual Growth Rate
	1979	1980	1981	1982	1983	
1. Agriculture, Forestry & Fishing	8.1	7.9	8.0	7.3	7.6	-1.5
2. Mining & Quarrying	7.4	8.6	8.4	6.0	5.9	-5.5
3. Manufacture	15.9	14.8	14.5	15.4	15.5	-0.8
4. Electricity & Water	1.2	1.2	1.2	1.2	1.2	1.5
5. Construction & Installation	6.9	5.2	5.1	5.8	5.9	-3.8
6. Transportation, Storage & Communication	6.5	6.6	6.4	6.5	6.7	0.4
7. Distributive Trade	14.7	14.4	14.8	15.8	14.5	-0.5
8. Financial Institutions	4.6	5.5	6.1	5.1	5.6	5.2
9. Real Estate	10.8	11.4	11.4	11.7	11.8	2.1
10. Producers of Government Services	18.1	18.5	18.4	18.9	18.8	0.8
11. Others	5.8	5.9	5.7	6.3	6.5	2.4
Whole Industries	100.0	100.0	100.0	100.0	100.0	-0.2

Source: Economic and Social Survey Jamaica, 1983.

Table F-5 VALUE AND PERCENTAGE DISTRIBUTION OF EXPORT AND IMPORT 1979-1983

(Unit: J\$ 10<sup>6</sup>)

Item	1979		1980		1981		1982		1983	
	Value	%	Value	%	Value	%	Value	%	Value	%
I. Export	1,445	100	1,718	100	1,735	100	1,367	100	1,392	100
1. Food	194	13.1	177	10.3	165	9.5	175	12.8	234	16.8
2. Crude Materials	1,035	71.6	1,319	76.8	1,363	78.6	924	67.6	838	60.2
3. Mineral fuels	60	4.2	34	2.0	30	1.7	39	2.9	55	4.0
4. Chemicals	30	2.1	27	1.6	29	1.7	40	2.9	48	3.4
5. Manufactured goods	28	1.9	26	1.5	26	1.5	24	1.8	33	2.4
6. Machinery	21	1.5	45	2.6	23	1.3	46	3.4	34	2.6
7. Others	77	5.3	90	5.2	99	5.7	119	8.6	150	10.8
II. Import	1,754	100	2,099	100	2,623	100	2,460	100	2,841	100
1. Food	227	12.9	352	16.8	408	15.6	391	15.9	397	14.0
2. Crude materials	77	4.4	64	3.0	77	2.9	77	3.1	97	3.4
3. Mineral fuels	587	33.5	818	39.0	886	33.8	759	30.9	857	30.2
4. Chemicals	186	10.6	222	10.6	324	12.4	276	11.2	291	10.2
5. Manufactured goods	322	18.4	288	13.7	389	14.8	364	14.8	461	16.2
6. Machinery	250	14.3	247	11.8	389	14.8	422	17.2	522	18.4
7. Others	105	5.9	108	5.1	150	5.7	171	6.9	216	7.6
Balance of Trade	-309	-	-381	-	-888	-	-1,093	-	-1,449	-

Sources: External Trade, 1979-1983



Table F-6 NUMBER AND ACREAGE OF FARMS BY MAJOR INCOME EARNING AGRICULTURAL ACTIVITY

Major Income Earning Agricultural Activity	No. of Farms	%	Acreage (ha)	%	Average Acreage
Export Crops	56,723	30.8	229,642	42.7	4.0
Domestic Crops	86,803	47.2	107,813	20.1	1.2
Mixed Crops	15,703	8.5	43,092	8.0	2.7
Livestock and Poultry	10,669	5.8	124,396	23.2	11.7
Other	6,505	3.6	14,624	2.7	2.2
None	7,585	4.1	17,887	3.3	2.4
TOTAL	183,988	100.0	537,454	100.0	2.9

Source: Census of Agriculture, 1978/1979

Table F-7 VALUE OF SELECTED AGRICULTURAL EXPORT, 1979-1983

Item	(Unit: JS10 <sup>3</sup> )				
	1979	1980	1981	1982	1983
Sugar	100,358	97,447	82,776	87,339	101,898
Bananas	32,205	18,691	7,577	8,326	13,222
Citrus (Fresh Fruit)	1,067	3,015	1,746	1,671	1,592
Spices	8,426	7,759	8,469	8,904	17,489
Cocoa	9,047	8,015	8,977	5,203	9,291
Coffee	7,355	9,692	10,086	13,475	19,744
Rum	13,710	17,086	19,794	19,334	18,024
Molasses	4,293	1,295	7	320	2,144
Root Crops	4,371	6,350	9,430	9,820	15,707
Total	180,832	169,350	148,862	154,392	199,111

Source: Economic and Social Survey, 1983

Table F-8 NON-TRADITIONAL AGRICULTURAL EXPORTS 1980/81-1982/83

(Unit: tons)			
Commodities	1980/81	1981/82	1982/83
Tubers	3,975	5,545	6,537
Yellow Yam	1,616	2,290	3,132
Negro Yam	441	869	892
Lucea Yam	81	64	58
Sweet Yam	335	370	329
Sweet Potato	369	489	605
Cassava	13	16	18
Dasheens	805	999	962
Cocoa	269	402	473
Others	46	46	68
Vegetables	992	1,168	2,026
Breadfruit	38	36	73
Pumpkin	666	694	983
Sweet Pepper	61	96	200
Cho Cho	55	70	33
Cucumber	10	38	128
Tomato	1	117	391
Hot Pepper	32	52	130
Others	59	65	88
Fruits	404	586	777
Avocados	52	74	51
Plantains	65	63	88
Mangoes	240	359	334
Soursop	21	24	43
Naseberries	6	11	16
Cantalopes	-	19	-
Melon	-	10	183
Others	20	26	62
Miscellaneous	947	552	958
<b>Total</b>	<b>6,248</b>	<b>7,851</b>	<b>10,298</b>

Source: Economic and Social Survey Jamaica, 1983

Table F-9 RICE PRODUCTION AND IMPORTS

Yrs	Local Prod. (tons)	Import Volume (tons)	Import Value-CIF (J\$ '000')	Consumption (tons)	Local Cont. (%)
1950's	5,571	15,821	NA	21,392	26
1960's	2,556	25,413	NA	27,969	10
1970's	721	37,288	NA	38,009	1.9
1980	133	52,037	44,685	52,170	0.25
1981	2,083	42,771	42,847	44,854	4.6
1982	1,720	39,146	29,862	40,866	4.2
1983	2,032	56,953	44,768	58,985	3.4

Source: Agro 21 SELF SUFFICIENCY PROGRAMME with local production adjusted to metric tons.

Table F-10 PERCENTAGE DISTRIBUTION ACREAGE IN FARMS  
AND NO. OF FARMERS BY SIZE GROUPS

Farm size (ha)	(Unit : %)			
	Jamaica		St. Elizabeth	
	Acreage	No. of Farmer	Acreage	No. of Farmer
All Farmers	100.0	100.0	100.0	100.0
Less than 2	16.0	81.9	12.6	81.6
2 - 10	19.3	16.2	16.0	16.3
10 - 40	8.1	1.3	3.7	1.0
40 - 200	12.3	0.4	4.4	0.6
More than 200	44.3	0.2	63.3	0.5
Average Farm Size	2.9 ha		3.7 ha	

Source: Census of Agriculture 1978/79

Table F-11 THE PROJECT AREA

Extension Area	Area (ha)	Ratio to The Project Area (%)	Ratio to Whole Extension Area (%)
Black River	6,080	53	53
Mountainside	1,490	13	41
Burnt Savannah	1,840	16	35
Holland	1,820	16	35
Lacovia	270	2	5
Total	11,500	100.0	-

Table F-12 POPULATION DISTRIBUTION RATIO BETWEEN  
URBAN (SPECIAL AREAS) AND RURAL AREAS

Region	1970		1982		Average Annual Growth Rate (%)
	Number	%	Number	%	
1. Jamaica					
urban	902,350	48.8	1,147,939	54.8	2.03
rural	946,150	51.2	947,939	45.2	0.02
<u>Total</u>	<u>1,848,500</u>	<u>100.0</u>	<u>2,095,878</u>	<u>100.0</u>	<u>1.05</u>
2. St. Elizabeth					
urban	28,403	22.6	35,555	26.9	1.89
rural	97,497	77.4	96,789	73.1	-0.06
<u>Total</u>	<u>125,900</u>	<u>100.0</u>	<u>132,353</u>	<u>100.0</u>	<u>0.42</u>
3. The Project Area					
urban	621	7.9	2,552	31.3	12.50
rural	7,288	92.1	5,609	68.7	-2.16
<u>Total</u>	<u>7,909</u>	<u>100.0</u>	<u>8,161</u>	<u>100.0</u>	<u>0.26</u>

Source: Population Census 1982  
Census Office, Department of Statistics

Table F-13 POPULATION DISTRIBUTION BY AGE AND SEX IN 1982

Region	Total	Age		18 and Over		Sex			
		0 - 18		Male		Female			
		Number	%	Number	%	Number	%		
1. Jamaica	2,095,878	1,030,544	49.2	1,065,344	50.8	1,025,788	48.9	1,070,090	51.1
2. St. Elizabeth	132,355	67,950	51.3	64,403	48.7	66,698	50.4	65,655	49.6
3. The Project Area									
Urban	2,552	1,195	46.8	1,357	53.2	1,246	48.8	1,306	51.2
Rural	5,609	2,831	50.5	2,778	49.5	2,809	50.1	2,800	49.9
<u>Total</u>	<u>8,161</u>	<u>4,026</u>	<u>49.3</u>	<u>4,135</u>	<u>50.7</u>	<u>4,055</u>	<u>49.7</u>	<u>4,106</u>	<u>50.3</u>

Source: Population Census 1982  
Census Office, Department of Statistics

Table F-14 POPULATION OF 14 YEARS AND OVER OF AGE  
AND LABOUR FORCE IN THE PROJECT AREA,  
ST. ELIZABETH AND JAMAICA, 1982

Description	Jamaica	St. Elizabeth	The Project Area
1. Population of 14 Years and over			
- Male	646,246	42,020	2,555
- Female	710,540	43,595	2,726
<u>Total</u>	<u>1,356,786</u>	<u>85,615</u>	<u>5,281</u>
2. Labour Force as Percentage of Population 14 years and over			
- Male	79.9	77.7	-
- Female	65.2	54.1	-
3. NO. of Labour Force			
- Male	516,350	32,650	1,990/1
- Female	463,270	23,590	1,480/1
<u>Total</u>	<u>979,620</u>	<u>56,240</u>	<u>3,470</u>

Remarks: /1 : These figures were estimated using the labour force as percentage of population 14 years and over for St. Elizabeth, because lack of available data for the project area.

Source: Population Census, 1982  
The Labour Force, 1982  
Census Office, Department of Statistics.

Table F-15 NO. OF FARM HOUSEHOLD IN THE PROJECT AREA  
ST. ELIZABETH AND JAMAICA IN 1982

Region	No. of Household		Proportion of Farm Household (%)
	Farmer	Total	
1. Jamaica	183,988/1	505,710	36.4
2. St. Elizabeth	19,174/1	30,943	62.0
3. The Project Area	1,161	1,955	59.4
- Black River	271	687	39.4
- Mountainside	327	353	92.6
- Burn Savannah	412	487	84.6
- Holland	77	157	49.0
- Lacovia	74	311	23.8

Remarks: /1 ; Census of Agriculture, 1978/1979

Source: Population Census, 1982

Provisional Farmers' Register St. Elizabeth, 1982  
Census Office, Department of Statistics.

Table F-16 NO. OF SCHOOLS EACH TYPE OF INSTITUTION

Institution	Jamaica	St. Elizabeth		The Project Area	
		No.	Enrol	No.	Enrol
1. Pre- primary	<u>29</u>	<u>2</u>	-	<u>0</u>	<u>0</u>
Infant	29	2	-	-	-
2. Primary and					
All -age	<u>790</u>	<u>74</u>	<u>27,978</u>	<u>8</u>	<u>3,766</u>
Primary	289	31	10,686	6	2,767
All-age	495	43	17,292	2	999
Special	6	-	-	-	-
3. Secondary	<u>140</u>	<u>10</u>	<u>16,193</u>	<u>2</u>	<u>2,333</u>
New secondary	78	6	7,164	2	2,330
Secondary high	46	2	7,453	-	-
Comprehensive high	6	-	-	-	-
Technical high	7	1	1,283	-	-
Agriculture high	2	-	-	-	-
Vocational	1	1	293	-	-
4. Tertiary	<u>21</u>	<u>1</u>	<u>1,283</u>	<u>0</u>	<u>0</u>
Teachers' college	8	1	1,283	-	-
C.A.S.T	7	-	-	-	-
Community college	4	-	-	-	-
The College of Agriculture	1	-	-	-	-
University of West Indies	1	-	-	-	-

Source; Economic and Social Survey Jamaica, 1983.



Table F-17 DISTRIBUTION OF THE HEALTH SERVICES

Service	Jamaica	St. Elizabeth	The Project Area
1. Hospital	28	1	1
2. Health Centre			
- Type I	203	16	3
- Type II	88	8	-
- Type III	77	7	2
- Type IV	2	-	-
- Type V	1	-	-

Source: Economic and Social Survey Jamaica, 1983

Table F-18 RATIO OF HEALTH PERSONNEL TO POPULATION

Category	Jamaica	St. Elizabeth	Recommendation of P.A.H.O*
Doctors	1: 7,033	1:15,000	1:910
Dentist	1:33,485	1:48,000	1:2,857

Remark: \* Pan American Health Organization.

Source: Pocket Book of Statistics, 1983.

Table F-19

## LAND USE PATTERN BY LAND TENURE

Land Use Category	Owned Lands	Rented/Leased Lands	Captured Lands	Total
Grassland	27.9	1.6	-	29.5
Legumes	10.4	2.2	1.0	13.6
Orchards	11.3	-	-	11.3
Other root crops	4.6	1.2	-	5.8
Yams	2.8	0.5	-	3.3
Sugar Cane	0.9	0.3	-	1.2
Rice	0.4	0.5	-	0.9
Vegetables	0.5	-	-	0.5
Forest	0.2	-	-	0.2
Idle Lands	32.5	1.2	-	33.7
Total	91.5	7.5	1.0	100.0

Source: Farm economic survey in the project area.

Table F-20

## LAND TENURE CONDITION IN THE PROJECT AREA

Extension Area	Owned	Rented/Leased	Rented/Leased	Owned + Captured
Black River	66.7	22.2	11.1	0.0
Burnt Savannah	72.2	5.6	16.6	5.6
Mountainside	88.2	5.9	5.9	0.0
Holland	25.0	75.9	0.0	0.0
Lacovia	80.0	0.0	20.0	0.0
Average	73.6	13.2	11.3	1.9

Source: Farm economic survey in the project area.

Table F-21 LAND HOLDING SIZE DISTRIBUTION IN THE PROJECT AREA

(Unit: No. of Farmer)

District	Land Holding Size (ha)						TOTAL
	0	0-0.4	0.4-2.0	2.0-4.0	4.0-40	40	
1. Black River	0	111	106	19	34	1	271
2. Mountainside	2	145	131	29	19	1	327
3. Burnt Savanna	5	124	213	38	30	2	412
4. Holland	0	17	45	12	2	1	77
5. Lacovia	0	30	23	13	8	0	74
Total	7	427	518	111	93	5	1,161
(%)	(0.6)	(36.8)	(44.6)	(9.6)	(8.0)	(0.4)	(100.0)

Source: Provisional Farmer's Register St. Elizabeth, 1982

Table F-22 AVERAGE FARM SIZE IN THE PROJECT AREA

District	No. of Farmers	Total Area (ha)	Average Farm Size (ha)
1. Black River	271 (270)	1,403 (594)	5.2 (2.2)
2. Mountainside	327 (326)	510 (415)	1.6 (1.3)
3. Burnt Savannah	412 (410)	1,495 (683)	3.6 (1.7)
4. Holland	77 (76)	1,930 (108)	25.1 (1.4)
5. Lacovia	74	179	2.4
Total/ Average	1,161 (1,156)	5,157 (1,979)	4.4 (1.7)

Remark: Figures in parentheses show the No. of farmers, total area and average farm size excluding the farm more than 40 ha.

Source: Provisional Farmers' Register St. Elizabeth, 1982.

Table F-23 RESULT OF FARM ECONOMIC SURVEY ON LIVING EXPENSES

Item	(Unit : J\$)					
	Black River	Burnt Savannah	Mountain side	Holland	Lacovia	Total/Average
1. No. of sampling farmers	9	18	17	4	5	53
2. Average family size	7.9	4.6	5.0	4.8	5.4	5.4
3. Food	4,627	2,708	2,511	2,370	2,219	2,940
4. Clothing	2,573	977	1,037	540	792	1,249
5. Residence	3,587	1,973	1,974	285	1,889	2,133
6. Luxury	347	155	1,204	36	226	508
7. Education	1,733	1,174	664	570	1,241	1,083
8. Medical care	987	836	797	165	943	807
9. Others	527	1,257	1,324	492	420	971
Total	14,381	9,080	9,511	4,458	7,730	9,691

Table F-24

## CALCULATION OF SHADOW EXCHANGE RATE

Major Commodities	Average Value of last 5 years (J\$ 10 <sup>6</sup> )	Share of Total (%)	Tax & Duty (%)	Weighted Average of Tax & Duty (%)
<b>I. Import (CIF)</b>				
Food	355	15.5	2.8	0.43
Crude Materials	78	3.4	0.2	0.01
Mineral Fuels	779	34.0	0.2	0.07
Chemicals	260	11.4	1.4	0.16
Manufactured Goods	365	15.9	3.5	0.56
Machinery	366	16.0	13.5	2.16
Manufactured Articles	87	3.8	5.6	0.21
<u>Total and Average</u>	<u>2,290</u>	<u>100.0</u>	<u>-</u>	<u>3.60</u>
<b>II. Export (FOB)</b>				
Food	188	12.6	-	-
Beverages and Tobacco	58	3.9	-	-
Crude Materials	1,096	73.6	-	-
Mineral Fuels	41	2.7	-	-
Chemicals	34	2.3	-	-
Manufactured Goods	26	1.7	-	-
Manufactured Articles	47	3.2	-	-
<u>Total and Average</u>	<u>1,490</u>	<u>100.0</u>	<u>-</u>	<u>-</u>

**III. Calculation of Shadow Exchange Rate (SER)**

$$\text{SER} = (\text{IMP} (1 + \text{Tax}^{\text{imp}}) + \text{Ex} (1 - \text{Tax}^{\text{ex}})) / (\text{IMP} + \text{Ex}) = 1.02$$

Where; IMP = Total value of major import Commodities

Ex = " " " export "

Tax<sup>imp</sup> = Weight average of import tax ratio

Tax<sup>ex</sup> = " " " export " "

Source: External Trade Statistics, 1979 - 1983

Table F-25 PRICE OF FARM PRODUCTS AND INPUTS

(Unit: J\$)

	Unit	Financial Price <sup>/1</sup> (1984)	Economic Price <sup>/2</sup> (1995)	
<b>I. Farm Products</b>				
1.	Paddy	kg	1.1	1.5
2.	Soya bean	kg	1.3	2.4
3.	Sugar cane	ton	54	68
4.	Gungo Peas	kg	5.4	6.2
5.	Peanut	kg	4.8	5.4
6.	Corn	kg	1.3	1.4
7.	Yam	kg	1.1	1.2
8.	Cassava	kg	0.5	0.6
<b>II. Farm Inputs</b>				
<b>1. Seed</b>				
-	Sugar cane	kg	50.0	72.9
-	Gungo pea	kg	6.6	7.5
-	Peanut	kg	9.9	11.3
-	Corn	kg	3.3	3.8
-	Yam	kg	1.5	1.7
-	Cassava	100 Sticks	3.0	3.4
-	Paddy	kg	1.2	1.7
-	Soya bean	kg	2.7	3.0
<b>2. Fertilizer</b>				
-	DAP	kg	1.0	2.2
-	TSP	kg	0.9	1.7
-	Urea	kg	0.9	2.1
-	Muriate of potash	kg	0.7	1.4
-	12 - 24 - 12	kg	0.8	1.1
-	Copper Sulphate	kg	2.2	3.1
<b>3. Agro - Chemical</b>				
-	Benticarb	lit	15.0	19.8
-	2,4 - D	lit	14.5	19.1
-	Diphenamid	kg	56.0	73.9
-	Bentazon	kg	21.9	28.9
-	Trichlorphon	kg	51.6	68.1
-	Fenitrothion	lit	25.5	33.6
-	Mancozeb	kg	0.2	0.3
-	Monocrotophos	lit	66.1	87.2
<b>4. Labour</b>				
-	Family	MD	-	15.8 <sup>/3</sup>
-	Hired	MD	22.5	22.5

Remarks: <sup>/1</sup> : These data are based on "Cost of Production", Data Bank, MOA and obtained from JCTC.

<sup>/2</sup> : Calculated from the data given in "Price Prospects for Major Primary Commodities", IBRD December 1983.

<sup>/3</sup> : Economic Price of family labour cost is assured 70% of the price of hired labour.

Table F-26 PRICE OF FARM MACHINERY

Machinery/ Equipment	(Unit : J\$)	
	Financial Price <sup>/1</sup> (1984)	Economic Price <sup>/2</sup> (1995)
<b>I. Procurement Cost</b>		
1. Disk harrow	13,000	14,400
2. Rotary harrow	18,420	20,400
3. Land leveller	11,920	13,200
4. Ridger	7,580	8,400
5. Cultivator	8,670	9,600
6. Tractor	32,500	35,990
7. Cage wheel	6,500	7,200
8. Combine harvester	250,000	276,880
9. Power sprayer	3,250	3,600
10. Manual seeder	650	720
11. Dump truck	25,800	28,570
<b>II. Cost per hr</b>		
1. Mineral Soil		
- Disk harrow	22.7	23.3
- Rotary harrow	29.5	30.8
- Land leveller	33.1	34.8
- Ridger	26.6	27.6
- Cultivator	27.9	29.1
- Combine harvester	99.4	107.6
- Power sprayer	9.5	9.9
- Dump truck	35.2	36.3
2. Peat Soil		
- Disk harrow	28.0	29.1
- Rotary harrow	29.3	30.6
- Land leveller	32.8	34.4
- Combine harvester	138.2	150.6
- Power sprayer	9.5	9.9
- Dump truck	40.4	42.1

Remarks: /1 : CIF Price of Kingston in 1984.

/2 : Calculated from the data given in "Price Prospects for Major Primary Commodities" IBRD, December, 1983.

Table F-27 CALCULATION OF 1995 ECONOMIC FARM GATE  
PRICE OF RICE/PADDY

		(Unit: J\$/ton)
Item	Value	
1. International Market Price of Milled Rice (CIF Kingston, USA 20% Broken) US\$585 <sup>1/</sup>		2,399
2. Adjust Quality to 15% Broken		2,549
3. Port Handling Charge and Storing Cost		+192
4. Price of Middle Rice at Ex-store Gate		2,741
5. Inland Transportation Cost (Kingston - Black River)		-59
6. Milling Charge		-110
7. Price of Milled Rice at Ex-mill Gate		2,572
8. Conversion to Price of Dried Paddy (0.6)		1,543
9. Handling and Transportation Cost (Farm gate to mill)		-22
10. Farm Gate Price of Dried Paddy		1,521

Remark: <sup>1/</sup>: Calculated as follows:

			(Unit: US\$/ton)
Year (x <sub>1</sub> )	FOB Bangkok* (x <sub>2</sub> )	CIF Kingston** (y)	
1978	368	339	
1979	331	-	
1980	434	485	
1981	483	537	
1982	293	366	
1983	279	321	
1995 Projected price	873	1,287***	
	(397)****	(585)****	

\* The data given in "Price Prospects for Major Primary Commodities", IBRD, December 1983.

\*\* The data give in "External Trade" 1978-1983.

\*\*\* This projected price was calculated using the formula as follows:

$$y = 19.69x_1 + 1.19x_2 - 39,033$$

(correlation coefficient:  $r = 0.98$ )

\*\*\*\* 1984 constant price

- Note:
1. Border price is converted at the shadow rate of US\$1.0 = J\$4.1 (shadow exchange rate is 1.02)
  2. All the data were obtained from JCTC.



Table F-28 CALCULATION OF 1995 ECONOMIC FARM GATE  
PRICE OF UPLAND CROPS

		( Unit :J\$/ton)
Item		Value
<u>I Soya Bean</u>		
1. International Market Price of Soya Bean (FOB US Rotterdam )US\$ 385		1,579
2. External Transportation Cost to Kingston		849
3. Port Handling Charge and Storing Cost		25
4. Inland Transportation Cost (Kingston to Black River )	-	50
5. Marketing Cost, Black River	-	26
6. Farm Gate Price		2,377
<u>II Sugar Cane</u>		
1. International Market Price of Sugar (FOB Greater Caribbean Ports) US\$ 379		1,554
2. Port Handling Charge and Storing Cost	-	138
3. Inland Transportation Cost (Ocho Rios - Frome)	-	34
4. Price of Sugar at Ex-Factory		1,382
5. Milling Cost	-	300
6. Conversion to Price of Sugar Cane (0.08)		87
7. Handling and Transportation Cost		19
8. Farm Gate Price		68

- Remarks :
1. Price Prospects for Major Primary Commodities, IBRD, December 1983 (1995 Projection in 1984 constant price)
  2. Border price is converted at the shadow rate of US\$ 1.0 = J\$ 4.1 (shadow exchange rate is 1.02).
  3. All the data were obtained from JCTC.

Table F-29 CALCULATION OF 1995 ECONOMIC FARM GATE  
PRICE OF FERTILIZER

		( Unit :J\$/ ton)
Item		Value
<b>I Muriate of Patash</b>		
Export Price FOB, Vancouver US\$	113	463
External Transportation Cost to Kingston		722
Port Handling Charge and Storing Cost		138
Inland Distribution Cost		48
Farm Gate Price		1,371
<b>II DAP</b>		
Export Price FOB, US Gulf US\$	330	1,353
External Transportation Cost to Kingston		677
Port Handling Charge and Storing Cost		138
Inland Distribution Cost		48
Farm Gate Price		2,216
<b>III TSP</b>		
Export Price FOB, US Gulf US\$	199	816
External Transportation Cost to Kingston		677
Port Handling Charge and Storing Cost		138
Inland Distribution Cost		48
Farm Gate Price		1,679
<b>IV Urea</b>		
Export Price FOB, Europe US\$	281	1,152
External Transportation Cost to Kingston		791
Port Handling Charge and Storing Cost		138
Inland Distribution Cost		48
Farm Gate Price		2,129

- Remarks :
1. Price Prospects for Major Primary Commodities, IBRD, December 1983 ( 1995 Projection in 1984 Constant Price.)
  2. Border price is converted at the shadow rate of US\$ 1,0 = J\$ 4,1 ( shadow exchange rate is 1.02)
  3. All the data were obtained from JCTC.

Table F-30 CALCULATION OF FARM MACHINERY COST PER HOUR

I. Expression																		
Cha	=	$P \cdot Fc/h + F + O + (T) + D$																
where;	Cha	=	Economic cost per hour															
	P	=	Procurement cost of machinery															
	Fc	=	Ratio of maintenance cost per year															
	h	=	Working hour per annum															
	F	=	Cost of fuel per hour															
	O	=	Cost of lubricant per hour															
	T	=	Maintenance cost per hour															
	D	=	Cost of operator per hour															
II. Assumption and Calculation		(Unit : J\$)																
Item	Tractor	Disk Harrow	Rotary Harrow	Land Leveller	Ridger	Culti-vator	Combine Harvester	Truck	Power Sprayer									
1. Procurement Cost																		
- Economic	35,990	14,400	20,400	13,200	8,400	9,600	276,880	28,570	3,600									
- Financial	32,500	13,000	18,420	11,920	7,580	8,670	250,000	25,800	3,250									
2. Ratio of Maintenance Cost (%)	25	33	34	33	33	33	23	30	30									
3. Cost of Fuel per hr	5.3	5.3	5.3	5.3	5.3	5.3	9.2	11	4.4									
4. Cost of Lubricant per hr	1.6	1.6	1.6	1.6	1.6	1.6	2.8	3.3	1.3									
5. Cost of Operator per hr	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5									
I. Mineral Soil																		
1. Working hr per Annum	1,330	808	518	250	272	272	748	748	256									
2. Operation Cost per hr																		
- Economic	-	23.3	30.8	34.8	27.6	29.1	107.6	36.3	9.9									
- Financial	-	22.7	29.5	33.1	26.6	27.9	99.4	35.2	9.5									
II. Peat Soil																		
1. Working hr per Annum	661	405	525	256	-	-	497	497	256									
2. Operation Cost per hr																		
- Economic	-	29.1	30.6	34.4	-	-	150.6	42.1	9.9									
- Financial	-	28.0	29.3	32.8	-	-	138.2	40.4	9.5									

Table F-31 ECONOMIC COST OF FARM INPUTS PER HA UNDER WITH PROJECT

			(Unit: J\$)
Inputs	Unit Price	Quantity	Amount
<b>I. Rice</b>			
<b>1. Mineral soil</b>			
- Seed	1.7	112.5 Kg	191
- 12 - 24 - 12	1.1	200 Kg	220
- DAP	2.2	70 Kg	154
- Urea	2.1	141 Kg	296
- Muriate of Potash	1.4	60 Kg	84
- Bentiocarb	19.8	5.7 lit	113
- 2,4 - D	19.1	2.9 lit	55
- Trichlorphon	68.1	1.5 Kg	102
- Fenitrothion	33.6	0.6 lit	20
- Mancozeb	0.3	1.7 Kg	1
Total	-	-	<u>1,236</u>
<b>2. Peat soil</b>			
- Seed	1.7	112.5 Kg	191
- TSP	1.7	222 Kg	377
- Muriate of potash	1.4	50 Kg	70
- Copper sulphate	3.1	9 Kg	28
- Bentiocarb	19.8	5.7 lit	113
- 2,4 - D	19.1	2.9 lit	55
- Trichlorphon	68.1	1.5 Kg	102
- Fenitrothion	33.6	0.6 lit	20
- Mancozeb	0.3	1.7 Kg	1
Total	-	-	<u>957</u>
<b>II. Soya bean</b>			
- Seed	3.0	56.3 Kg	169
- TSP	1.7	249 Kg	423
- Muriate of Patash	1.4	112 Kg	157
- Diphenamid	73.9	5 Kg	370
- Bentazon	28.9	2.5 Kg	72
- Monocrotophos	87.2	10 lit	872
Total	-	-	<u>2,063</u>

Table F-32 FINANCIAL COST OF FARM INPUTS PER HA UNDER WITH PROJECT

(Unit: J\$)			
Inputs	Unit Price	Quantity	Amount
I. Rice			
1. Mineral soil			
- Seed	1.2	112.5 Kg	135
- 12 - 24 - 12	0.8	200 Kg	160
- DAP	1.0	70 Kg	70
- Urea	0.9	141 Kg	127
- Muriate of potash	0.7	60 Kg	42
- Bentiocarb	15.0	5.7 lit	86
- 2,4 - D	14.5	2.9 lit	42
- Trichlorphon	51.6	1.5 Kg	77
- Fenitrothion	25.5	0.6 lit	15
- Mancozeb	0.2	1.7 Kg	0
Total	-	-	<u>754</u>
2. Peat soil			
- Seed	1.2	112.5 Kg	135
- TSP	0.9	222 Kg	200
- Muriate of potash	0.7	50 Kg	35
- Copper sulphate	2.2	9 Kg	20
- Bentiocarb	15.0	5.7 lit	86
- 2,4 - D	14.5	2.9 lit	42
- Trichlorphon	51.6	1.5 Kg	77
- Fenitrothion	25.5	0.6 lit	15
- Mancozeb	0.2	1.7 Kg	0
Total	-	-	<u>610</u>
II. Soya bean			
- Seed	2.7	56.3 Kg	152
- TSP	0.9	249 Kg	224
- Muriate of Patash	0.7	112 Kg	78
- Diphenamid	56.0	5 Kg	280
- Bentazon	21.9	2.5 Kg	55
- Monocrotophos	66.1	10 lit	661
Total	-	-	<u>1,450</u>

Table F-33

## ECONOMIC FARM OPERATION COST OF SMALL FARM

## I. Soya Bean

(Unit: J\$)

Farm Operation	Unit Price	Quantity	Amount
1. Tillage	23.3	3.0 hr	69.9
2. Pulverizing	30.8	1.5 hr	46.2
3. Ridging	27.6	1.5 hr	41.4
4. Moulding	29.1	2.0 hr	58.2
5. Planting	15.8	1.0 md	15.8
6. Weed Control	15.8	3.0 md	47.4
	9.9	8.0 hr	79.2
7. Pest Control	15.8	3.0 md	47.4
	9.9	12.0 md	118.8
8. Fertilizing	15.8	1.0 md	15.8
9. Water Management	15.8	8.0 md	126.4
10. Harvesting	107.6	2.0 hr	215.2
11. Transporting	36.3	1.0 hr	36.3
Total	-	-	918

## II. Rice

Farm Operation	Unit Price	Spring Rice		Fall Rice	
		Quantity	Amount	Quantity	Amount
I. Mineral Soil					
1. Tillage	23.3	3.0 hr	69.9	3.0 hr	69.9
2. Pulverizing or Paddling	30.8	3.0 hr	92.4	3.0 hr	92.4
3. Leveling	34.8	2.0 hr	69.6	0	0
4. Pregerminate and Planting	15.8	1.0 md	15.8	1.5 md	23.7
5. Weed Control	15.8	3.0 md	47.4	3.0 md	47.4
	9.9	8.0 hr	79.2	8.0 hr	79.2
6. Fertilizing	15.8	3.0 md	47.4	3.0 md	47.4
7. Pest Control	15.8	1.0 md	15.8	2.0 md	31.6
	9.9	4.0 hr	39.6	8.0 hr	79.2
8. Supplementary Transplanting	15.8	1.0 md	15.8	1.0 md	15.8
9. Water Management	15.8	5.0 md	79.0	5.5 md	86.9
10. Harvesting	107.6	3.2 hr	344.3	2.6 hr	279.8
11. Transportation	36.3	1.6 hr	58.1	1.3 hr	47.2
12. Total			<u>974</u>		<u>900</u>
II. Peat Soil					
1. Tillage	29.1	3.0 hr	87.3	3.0 hr	87.3
2. Pulverizing or Paddling	30.6	2.0 hr	61.2	3.0 hr	91.8
3. Leveling	34.4	2.0 hr	68.8	0	0
4. Pregerminate and Planting	15.8	1.0 md	15.8	1.5 md	23.7
5. Weed Control	15.8	3.0 md	47.4	3.0 md	47.4
	9.9	8.0 hr	79.2	8.0 hr	79.2
6. Fertilizing	15.8	1.0 md	15.8	1.0 md	15.8
7. Pest Control	15.8	2.0 md	31.6	2.0 md	31.6
	9.9	8.0 hr	79.2	8.0 hr	79.2
8. Supplementary Transplanting	15.8	1.0 md	15.8	1.0 md	15.8
9. Water Management	15.8	4.5 md	71.1	5.0 md	79.0
10. Harvesting	150.6	3.2 hr	481.9	2.6 hr	391.6
11. Transportation	42.1	1.6 hr	67.4	1.3 hr	54.7
12. Total			<u>1,122</u>		<u>997</u>

Table F-34

## ECONOMIC FARM OPERATION COST OF MOTHER FARM

## I. Soya Bean

(Unit: J\$)

Farm Operation	Unit Price	Quantity	Amount
1. Tillage	23.3	3.0 hr	69.9
2. Pulverizing	30.8	1.5 hr	46.2
3. Ridging	27.6	1.5 hr	41.4
4. Moulding	29.1	2.0 hr	58.2
5. Planting	22.5	1.0 md	22.5
6. Weed Control	22.5	3.0 md	67.5
	9.9	8.0 hr	79.2
7. Pest Control	22.5	3.0 md	67.5
	9.9	12.0 md	118.8
8. Fertilizing	22.5	1.0 md	22.5
9. Water Management	22.5	8.0 md	180.0
10. Harvesting	107.6	2.0 hr	215.2
11. Transporting	36.3	1.0 hr	36.3
Total	-	-	1,025

## II. Rice

Farm Operation	Unit Price	Spring Rice		Fall Rice	
		Quantity	Amount	Quantity	Amount
I. Mineral Soil					
1. Tillage	23.3	3.0 hr	69.9	3.0 hr	69.9
2. Pulverizing or Paddling	30.8	3.0 hr	92.4	3.0 hr	92.4
3. Leveling	34.8	2.0 hr	69.6	0	0
4. Pregerminate and Planting	22.5	1.0 md	22.5	1.5 md	33.8
5. Weed Control	22.5	3.0 md	67.5	3.0 md	67.5
	9.9	8.0 hr	79.2	8.0 hr	79.2
6. Fertilizing	22.5	3.0 md	67.5	3.0 md	67.5
7. Pest Control	22.5	1.0 md	22.5	2.0 md	45.0
	9.9	4.0 hr	39.6	8.0 hr	79.2
8. Supplementary Transplanting	22.5	1.0 md	22.5	1.0 md	22.5
9. Water Management	22.5	5.0 md	112.5	5.5 md	123.8
10. Harvesting	107.6	3.2 hr	344.3	2.6 hr	279.8
11. Transportation	36.3	1.6 hr	58.1	1.3 hr	47.2
12. Total			1,068		1,088
II. Peat Soil					
1. Tillage	29.1	3.0 hr	87.3	3.0 hr	87.3
2. Pulverizing or Paddling	30.6	2.0 hr	61.2	3.0 hr	91.8
3. Leveling	34.4	2.0 hr	68.8	0	0
4. Pregerminate and Planting	22.5	1.0 md	22.5	1.5 md	33.8
5. Weed Control	22.5	3.0 md	67.5	3.0 md	67.5
	9.9	8.0 hr	79.2	8.0 hr	79.2
6. Fertilizing	22.5	1.0 md	22.5	1.0 md	22.5
7. Pest Control	22.5	2.0 md	45.0	2.0 md	45.0
	9.9	8.0 hr	79.2	8.0 hr	79.2
8. Supplementary Transplanting	22.5	1.0 md	22.5	1.0 md	22.5
9. Water Management	22.5	4.5 md	101.3	5.0 md	112.5
10. Harvesting	150.6	3.2 hr	481.9	2.6 hr	391.6
11. Transportation	42.1	1.6 hr	67.4	1.3 hr	54.7
12. Total			1,206		1,088

Table F-35

## FINANCIAL FARM OPERATION COST OF SMALL FARM

## I. Soya Bean

(Unit: J\$)

Farm Operation	Unit Price	Quantity	Amount
1. Tillage	22.7	3.0 hr	68.1
2. Pulverizing	29.5	1.5 hr	44.3
3. Ridging	26.6	1.5 hr	39.9
4. Moulding	27.9	2.0 hr	55.8
5. Planting	0	1.0 md	0
6. Weed Control	0	3.0 md	0
	9.5	8.0 hr	76.0
7. Pest Control	0	3.0 md	0
	9.5	12.0 md	114.0
8. Fertilizing	0	1.0 md	0
9. Water Management	0	8.0 md	0
10. Harvesting	99.4	2.0 hr	198.8
11. Transporting	35.2	1.0 hr	35.2
Total	-	-	632

## II. Rice

Farm Operation	Unit Price	Spring Rice		Fall Rice	
		Quantity	Amount	Quantity	Amount
I. Mineral Soil					
1. Tillage	22.7	3.0 hr	68.1	3.0 hr	68.1
2. Pulverizing or Paddling	29.5	3.0 hr	88.5	3.0 hr	88.5
3. Leveling	33.1	2.0 hr	66.2	0	0
4. Pregerminate and Planting	0	1.0 md	0	1.5 md	0
5. Weed Control	0	3.0 md	0	3.0 md	0
	9.5	8.0 hr	76.0	8.0 hr	76.0
6. Fertilizing	0	3.0 md	0	3.0 md	0
7. Pest Control	0	1.0 md	0	2.0 md	0
	9.5	4.0 hr	38.0	8.0 hr	76.0
8. Supplementary Transplanting	0	1.0 md	0	1.0 md	0
9. Water Management	0	5.0 md	0	5.5 md	0
10. Harvesting	99.4	3.2 hr	318.1	2.6 hr	258.4
11. Transportation	35.2	1.6 hr	56.3	1.3 hr	45.8
12. Total			<u>711</u>		<u>613</u>
II. Peat Soil					
1. Tillage	28.0	3.0 hr	84.0	3.0 hr	84.0
2. Pulverizing or Paddling	29.3	2.0 hr	58.6	3.0 hr	87.9
3. Leveling	32.8	2.0 hr	65.6	0	0
4. Pregerminate and Planting	0	1.0 md	0	1.5 md	0
5. Weed Control	0	3.0 md	0	3.0 md	0
	9.5	8.0 hr	76.0	8.0 hr	76.0
6. Fertilizing	0	1.0 md	0	1.0 md	0
7. Pest Control	0	2.0 md	0	2.0 md	0
	9.5	8.0 hr	76.0	8.0 hr	76.0
8. Supplementary Transplanting	0	1.0 md	0	1.0 md	0
9. Water Management	0	4.5 md	0	5.0 md	0
10. Harvesting	138.2	3.2 hr	442.2	2.6 hr	359.3
11. Transportation	40.4	1.6 hr	64.6	1.3 hr	52.5
12. Total			<u>867</u>		<u>736</u>