

(4) Tertiary education

In the public education system, formal post-secondary educational institutions include; seven (7) teachers' colleges, four (4) community colleges, the College of Agriculture, the College of Arts, Science and Technology (CAST) and the University of the West Indies (UWI).

In parallel with the formal education system mentioned above, education of the illiterates has been a major concern to the Government of Jamaica since 1972. In 1972, the National Literacy Programme was established with the aim of eradicating illiteracy in four (4) years. In 1974, this programme was restructured and renamed the Jamaican Movement for the Advancement of Literacy (JAMAL).

The Communication Skills (Literacy) Survey in 1981 revealed that there was a noticeable decline in both the number and the rate of functionally illiterates in Jamaica since 1975, as shown in Table F-13. The rate of illiteracy in 1981, however, is still high, being 24.3% of the total population 15 years and over. Illiteracy was higher among the males with a 30.1% illiteracy rate compared to the females with a rate of 19.4% as shown in Table F-14. The illiteracy rates increased gradually with the increase in age and reached the highest rate of 45.3% at the age group 65 years and over. About 50.5% of the farmers were illiterate based on this survey, the highest rate of 58.7% being among the mixed farming community. (see Table F-15) It is also reported that only 12.0% of the total number of functionally illiterates were students of JAMAL at the time of this survey.

1.4.3 Housing

The building of houses in Jamaica is confined either to the private or the public sector. These sectors have the following activities:

(1) Private sector

Private sector essentially covers dwellings completed by private housing developers under the Mortgage Insurance Law and Regulations, but now it includes construction of other private dwellings.

(2) Public sector

The role of providing public sector housing is performed by eight (8) agencies as follows:

(a) Ministry of Construction (Housing)

This is intended to be the principal public sector housing developer, is also engaged in providing primary mortgages and making monthly collections.

(b) National Housing Corporation

This was established to develop middle income housing, but is also involved in low income housing projects for which it is ill-equipped.

(c) Urban Development Corporation

This is intended to be the principal catalyst of comprehensive urban development, is also engaged in building houses for different income groups.

(d) National Housing Trust

This is intended to be the principal supplier of mortgage financing for public sector housing, is also engaged in performing the role of a developer.

(e) Jamaica Mortgage Bank

This is intended to ensure a steady flow of funds to the housing sector through institutional loans and secondary market operations, is also engaged in providing interim financing and primary mortgages.

(f) Sugar Industry Housing Limited

This focuses on the provision of housing for workers in the sugar industry.

(g) Ministry of Agriculture

This focuses on the provision of subsidized housing for low income farmers.

(h) Ministry of Local Government

This focuses on the provision of subsidized housing for indigents.

Between 1972 and 1981, a total of approximately 40,250 new housing units were constructed representing an average annual rate of production of just over 4,000 units. Of this number, approximately 75% were constructed by the public sector and 25% by the private sector.

It is generally accepted that adequate housing in Jamaica will be achieved when an average of 4.0 persons per dwelling is realized. According to the population census of 1982, the total number of dwellings in Jamaica was 508,710 and the average family size per dwelling was 4.3. This indicated that a demand for approximately 38,150 new housing spaces existed in 1982.

1.5 Social Infrastructures

1.5.1 Transportation

The total length of roads in Jamaica is about 16,640 km (10,340 miles) excluding private and forestry roads, and approximately 11,650 km or 70% of the total are presently paved. The island is divided by a central mountain range, the most lofty portion of which lies in the east, tapering off to more level country in the west. The main road system generally follow the coast-line in a "belt-line" system with loop on the plains of St. Andrew, St. Catherine and St. Elizabeth parishes and with three (3) main cross connections from south to north. One from Kingston to Annotto Bay, a second from Spanish Town to St. Ann's Bay and a third from Savanna-La-Mar to Montego Bay, which cross the central mountain range at elevations of 411 m (1,350 ft.), 549 m (1,800 ft.) and 305 m (1,000 ft.) respectively. The original main road system passes through all the principal ports and towns of the island. Using this as a basis, there have been constructed, either as new roads or more generally reconstructed from bridle paths, a very large number of other main roads, creating with the original roads a network over the whole of the inhabited portion of the island and affording communication between the north and south sides by some 15 different roads.

The Jamaica railway has undergone many changes during its existence. As the old colonial railway, its life began in 1843 when a private company, the Jamaica Railway Company, was launched, and from 1845 began operating a service. Operations began in 1845 between Kingston and Angels, near Spanish Town, a distance of about 23 km (14.5 miles). From 1900, the railway was operated as a government department under the name of Jamaica Government Railway. On April 1960, the Jamaica Railway Corporation (JRC) was formed. JRC is entirely responsible for operation of the railway and for its finances, and is free from the Government control except in matters of public importance. In order to meet the needs of the expanding bauxite industries, a dieselization programme started in 1967. This programme also brought an increase in passenger revenue due to the introduction of railcars. Traffic operations consist of combined passenger and freight trains, freight services, railcar services and excursion trains.

In 1985, the total route length was about 235 km (147 miles) of which about 180 km (112 miles) are Main line from Kingston to Montego Bay and about 55 km (35 miles) are the Bauxite line. In 1984, approximately 81% of JRC's revenue came from the bauxite industries, 17% from passenger and 2% from freight. JRC carried about 196,000 passengers and a total of about 4.2 million tons of bauxite, alumina and freight in 1984. With the downturn in the bauxite industries however, revenues from the bauxite industries for 1985 declined by 67%. To compensate for this decline in revenue, JRC has been pursuing, more vigorously, a campaign to attract other heavy cargo, by using its cost-competitive edge over road transport.

1.5.2 Communications

The Postal and Telegraph Department is the national body responsible for the administration of postal and telecommunications activities in the island of Jamaica.

Some 336 post offices, 474 postal agencies and 20 postal sub-agencies currently exist in Jamaica. Thus well over half of the towns and villages throughout the island have postal services of one type or another. There are different grades of postal agencies with the daily hours of service depending on the grade. Postal sub-agencies are delivery and collection services only.

In Jamaica, the Citizen Band (CB) service is a private two-way short distance voice communication service for personal, public or business activities. At present, operation of CB services is governed by the Radio and Telegraph Control Act, 1972 through the relevant regulations. In 1985, there are approximately 5,000 licenced CB users with an estimated 15,000 sets and a CB club existing in each parish. However, the actual number of sets in the island is somewhere in between two (2) to three (3) times of this figure. At present CB users are trying to establish a new national body which will make management of the services that much easier. It is considered that the CB radio services are especially valuable in areas where telephone facilities are not available.

Telephone services in Jamaica is provided by the Jamaica Telephone Company Ltd. (JTC) which operates under a licence granted by the Jamaican Government. The telephone service started with the installation of the first instrument in Kingston in 1878. The first directory of subscribers, 50 in all, was distributed in 1883. JTC, which was incorporated in 1892, took over responsibility for the all island system in 1945, when the total number of telephones in service comprised of about 8,200. In addition to basic local telephone service, JTC provides island-wide long distance services and overseas services to most countries of the world. The service has expanded steadily since 1945 and in 1985 JTC had in operation 45 automatic exchanges through its main office in Kingston and five (5) district offices, serving about 144,160 telephones, out of which 90,490 are for business and 53,670 for residence. In addition, there are approximately 420 call boxes operating in the island.

1.5.3 Domestic water supply

Formerly three (3) authorities were responsible for providing and distributing water for domestic use. These were the Water Commission, the National Water Authority and the 13 Local Government Authorities (parish councils). Since October 1981, the following principal functions have been made the responsibility of the National Water Commission (NWC) which agency is an amalgamation of the National Water Authority and the Water Commission:

- (1) Investigation of the water supply needs of Jamaica.
- (2) The planning design and construction of water supply systems capable of meeting these needs.
- (3) The production of portable water for sale in bulk to parish councils.
- (4) The design, construction, maintenance and operation of sewerage systems.

NWC also has certain supervisory responsibilities in respect of the water supply operations of parish councils. These responsibilities are in respect of the water quality control, technical and other services, including training, preparation of forms and records, distribution of systems, maps, specific engineering studies and services, metre repair facilities and the standardization of equipments and materials.

Between July and September 1985, NWC took full responsibility from the parish councils for production and distribution of water to the entire island. Prior to this, NWC was in charge only of production and distribution in most of the rural areas. The added responsibility has increased NWC supplied customers from 99,005 to 199,953. The average consumption for NWC traditional customers excluding rural areas was 682 m³/year/connection. This figure is very high, however, and consumption has been steadily declining in recent years.

1.5.4 Electric power supply

The first public electricity in Jamaica was produced in 1892. In 1907, a new company was formed, the Jamaica Light and Power Company Limited. The new company's principal operation was the tramway operation in Kingston and St. Andrew. At that time, only a few isolated areas outside of Kingston and Spanish Town had electricity services. Jamaica Public Service Company Limited (JPS) is wholly owned by the Government and operates on an all island franchise which was granted in 1977, giving sole rights to produce and market electric power. JPS is headed by a managing director reporting to the Board of Directors. The organization is structured into six (6) functional divisions, having responsibility for power generation, electric operations, engineering, commercial development, finance and personnel/industrial relations.

In 1985, JPS had an average of 226,123 residential customers, 23,849 commercial and small industrial customers, 22 large industrial customers, and 2,069 miscellaneous customers. The residential customers represent approximately two fifths of the total dwellings of Jamaica. This indicates that more than 50% of the dwellings do not yet have connections with electric power lines.

The existing generating system consists of about 482 MW of installed capacity, of which 373 MW is thermal, 88 MW is gas turbine and 20 MW is hydroelectric. The transmission system operates at two (2) voltage levels, 138 kv and 69 kv. Approximately 262 km (164 miles) of 138 kv and 559 km (394 miles) of 69 kv transmission lines were installed, and are in operation. In addition to electric power supplied by JPS, electricity is also generated for private use by some industrial concerns: the bauxite and alumina companies, cement company, and so on. Electricity generated by these industries amounted to 448 million kwh in 1985 or approximately 30% of the electricity generated by JPS. However, recently this ratio has been declining.

2. REGIONAL SOCIO-ECONOMIC BACKGROUND

2.1 General

The parish of St. Catherine falls administratively into the county of Middlesex and is situated between 76°50' to 77°12' west longitude and 17°50' to 18°15' north latitude, immediately west of the capital city of Kingston. It has an area of approximately 1,195 km² (461 square miles) and can be divided into two (2) regions, the coastal plains in the south and the central mountain range in the north. The annual average rainfall of the coastal plain and the central mountain ranges varies from 760 to 1,010 mm (30 to 40 inches) and 1,520 to 1,730 mm (60 to 68 inches) respectively. Spanish Town, the capital of the parish, was the first capital of Jamaica and is part of the present metropolitan area.

The study area comprising both the Rio Cobre and St. Dorothy irrigation schemes, which are situated between 10 km (6 miles) to 48 km (30 miles) west of Kingston and near the southern coast of the parish of St. Catherine, is bounded by the foot of central mountain range on the north, the Ferry river and Portmore township to the east, the foot of Hellshire hills and the coast to the south, and the Bowers river on the west. The study area is located between 76°50' to 77°08' west longitude and 17°55' to 18°02' north latitude. The study area covers approximately 27,400 ha (67,700 acres) gross. The annual average rainfall of the study area varies from 721 mm (28 inches) to 1,183 mm (47 inches). Spanish Town lies to the centre of the study area, and about 22 km (14 miles) west of Kingston.

2.2 Economic Situation

The parish of St. Catherine consists of two (2) regions; the coastal plain and the central mountain range and economic activities of these regions may be characterized as follows:

(1) The region of coastal plain (the study area is situated in this region)

This region is one of the main agricultural regions in Jamaica. Its agriculture is characterized by an estate type of farming having with intensive to semi-intensive farming of sugarcane and pasture as the main crops. Other crops of economic importance include vegetables, rice, tobacco, etc.

Industries in this region include sugar, alcohol, and other mainly light industries. Areas used for industrial estates in this region are at Portmore, Central Village, Twickenham Park, Old Harbour, Old Harbour Bay, etc.

(2) The region of central mountain range

This region is important agriculturally by virtue of two (2) interior basins. The crops of economic importance are sugarcane, citrus, banana and pasture. The limestone hills are used for subsistence farming by small farmers who grow root crops as well as some tree crops.

In this region most of the industries are agriculturally based, e.g. citrus processing, sugar mills, condensed milk and so on. While in the Ewarton area, there is a bauxite and alumina processing industry.

2.3 Demographic Conditions

2.3.1 Population

Population censuses in Jamaica were carried out in the years 1970 and 1982. The population figures for the parish of St. Catherine and for the study area from these censuses are given in Table F-16. According to the population census of 1982, the population of the parish and the study area was estimated at about 332,670 and 129,690 respectively. The population in the study area was about 40% of that in the parish.

According to the population census of 1982, the population density in the study area was estimated to be 473 persons/km² (1,223 persons/square mile). This figure is much higher than for the parish, 278 persons/km² (722 persons/square mile) and the entire Jamaica, 203 persons/km² (527 persons/square mile). Such a high density in the study area is due to the urban areas, e.g. Spanish Town, Old Harbour, Old harbour Bay and Central Village, falling within the boundary of the study area.

The average annual growth rate in the study area during the period from 1970 to 1982 was estimated at 5.6%, using the formula $r = (P_n/P_1)^{(1/n-1)} - 1$, where r is the average annual growth rate, and P_1 and P_n are the populations in the first and the (n)th year respectively. The average annual population growth rates of both the parish and the study area are very high when compared with the whole of Jamaica which has a rate of 1.4%. It is considered that these high population growth rates are due mainly to the reasons of new housing development, new industrial development, migration from rural areas, and population moving from Kingston.

The proportion of the population under 20 years of age in the parish and the study area in 1982, as given in Table F-17, was estimated at 52.3% and 51.6% respectively. These figures are relatively high when compared with those for the whole of Jamaica of 50.4%. It is shown that the population of the parish and the study area remains very young.

2.3.2 Labour force

According to the population census of 1982, the total labour force in the parish and the study area was estimated at about 107,550 and 43,420 respectively. Of the total population, these numbers represent 32.3% for the parish and 33.5% for the study area. The labour force is shown to be 60.6% male and 39.4% female in the parish, and 59.1% male and 40.9% female in the study area. These figures are summarized in Table F-18.

The proportion of the employed labour force in the productive sectors within the parish was estimated to be 40.4% on the basis of the population census 1982 and mostly in Agriculture, Forestry and Fisheries which make up about half of the employed labour force in the productive sectors. Of the 49.6% employed labour force in the services sectors, the Public administration sector accounted for about 60%. (see Table F-19)

Table F-19 shows the proportions of unemployed labour in the industrial sectors of the parish. The sector "Industry not specified" was highest with 60.1%, because labour in this sector is generally unskilled and less flexible. The unemployment rate was estimated to be 30.1% for the parish and 33.0% for the study area in 1982. (see Table F-18) These rates are much higher than that for Jamaica as a whole where in 1982 it was 28.2%. The rapid population growth of both the parish and the study area accounts for this higher figure.

2.4 Social Services

2.4.1 Health

The distribution of the health services in the parish of St. Catherine and the study area is given in Table F-20. The parish has two (2) hospitals; Linstead hospital, and Spanish Town hospital which is located in the study area. The study area also has one (1) of the nine (9) Type I health centres, three (3) of the nine (9) Type II health centres, one (1) of the six (6) Type III health centres and one (1) of the one (1) Type IV health centre of the parish.

The ratio to population for each type of health centre both for the parish and the study area is given in Table F-20. The ratio for each type of health centre to population both for the parish and the study area was estimated to be about 1:37,000 and 1:129,700 for Type I; 1:37,000 and 1:43,200 for Type II; and 1:55,400 and 1:129,700 for Type III respectively. The ratios for each type of health centre both for the parish and the study area are remarkably low when compared with the ratio that is recommended by the Ministry of Health.

It is considered that the primary health services and facilities both for the parish and the study area are not adequate. Upgrading of the primary health services and establishment of new facilities are required.

2.4.2 Education

In 1984, the parish of St. Catherine had four (4) pre-primary level schools, 87 primary level schools, 17 secondary level schools and one (1) tertiary level school, with about 1,980, 63,020, 20,510 and 80 enrollments respectively. (see Table F-21) The percentage of attendance for pre-primary, primary and secondary levels schools was estimated at 75%, 69% and 78% respectively. According to the Communications Skills (Literacy) Survey done in 1981, 23.3% of the population of 15 years age and over was illiterate (26.3% being male and 20.6% female). This is relatively low when compared with the figure for the entire Jamaica of 24.3%. (see Table F-13)

In 1984, the study area had a total of 37 schools. There were four (4) pre-primary level schools, 24 primary level schools, eight (8) secondary level schools and one (1) tertiary level school, with about 1,980, 32,870, 13,100 and 80 enrollments respectively. The percentage of attendance for each educational level school except the tertiary level school was estimated at 75%, 73% and 79% respectively. These figures are slightly high when compared with that for the parish. In addition to the above formal educational schools,

there are 15 JAMAL training classes for the illiterates, with 748 trainees and 23 volunteer teachers in 1985. (see Table F-22) It is considered that the number of schools in the study area is sufficient but staff and facilities need to be expanded.

2.4.3 Housing

The population census of 1982 reported that there were about 74,220 dwellings in the parish of St. Catherine with an average number of persons per dwelling being 4.5. (see Table F-16) This figure is slightly high when compared with that for the entire Jamaica of 4.3. From the viewpoint of adequate dwelling (4.0 persons/dwelling), it is considered that approximately 8,950 housing spaces are still insufficient in the parish. According to the population census of 1982, about 56% of the outer walls in housing unit in the parish is made of concrete and blocks, and 25% of wood. (see Table F-23)

In the study area, the total dwellings were estimated to be about 28,940 with an average number of persons per dwelling of 4.5 in 1982. The shortage of housing spaces in the study area was estimated at about 3,480 from the viewpoint of adequate dwelling. In the study area, about 49% of the outer walls of housing units is made of the concrete and blocks. This figure is relatively low when compared with that for the parish. Construction of about 460 of the Starter Homes for low income group and of 410 Complete Homes is in progress by the Ministry of Construction (Housing) in the study area. In addition to the above on going programme, construction of about 800 Complete Homes and improvement of about 560 low income houses are planned. However, the new housing developments still do not meet the demand for housing spaces in the study area.

2.5 Social Infrastructures

2.5.1 Transportation

Road traffic is served by a main road and a number of secondary or parochial roads and so on. Transportation in the parish of St. Catherine and the study area is mainly by road. The total length of roads in the parish is estimated to be 1,500 km (940 miles). About 1,050 km (660 miles) are presently paved. Two (2) main roads pass through the parish, one of which is a "belt-line" road for the island. It connects Kingston to Savanna-La-Mar, running through the coastal plain. The second is a road which crosses the central mountain range, this road connects Spanish Town to St. Ann's Bay via Mount Diablo.

The main road runs across the study area from east to west. This road, about 33 km (20 miles) long, is the main route between Kingston to Savanna-La-Mar, having a dual carriageway, which is well maintained. There are about 56 km (35 miles) of secondary roads, paved with asphalt and relatively well maintained, which link the principal points in the study area. There are also many roads used mainly for transportation of agricultural commodities in the study area. Most of these roads are paved, however, maintenance of these roads is generally poor.

The railway in the parish of St. Catherine consists of two (2) lines, i.e. Main line from Kingston to Montego Bay, and the lines used for transport of bauxite and alumina between Spanish Town, Ewarton and Port Esquivel. Total length of railways in the

parish is estimated at about 68 km (43 miles) of which 38 km (24 miles) are Main line and 30 km (19 miles) for bauxite and alumina transport. In addition to the above lines, there is a line from Bog Walk to Port Antonio which has been closed since 1981. For the reopening of this line, a feasibility study is in progress. The rehabilitation programme, involving the changing of the rails from short to long, for both Main and Bauxite lines is also in progress.

Approximately 33 km (20 miles) of the Main line runs in parallel with the main road and across the study area from east to west. This line mainly carries passengers and consumer goods between Kingston and Montego Bay. There is also the Bauxite line from Bodles to Port Esquivel in the study area. This line belongs to the bauxite industry, however, maintenance and locomotive supply are done by the Jamaica Railway Corporation under contract with the bauxite industry.

2.5.2 Communications

In the parish of St. Catherine, there are 29 post offices, 51 postal agencies and seven (7) postal sub-agencies all supervised by the regional office in Spanish Town. The post offices in the study area are located at Bridgeport, Bushy Park, Gregory Park, Hartlands, Old Harbour, Old Harbour Bay, Spanish Town (two (2) post offices) and Waterford. A further, eleven (11) postal agencies and three (3) sub-agencies operate in the study area. It seems that the postal facilities and services both for the parish and the study area are satisfactory. It is estimated that approximately 700 Citizen Band (CB) sets exist in the study area.

The parish of St. Catherine falls within the south east district. The parish is serviced by the Linstead exchange, Old Harbour exchange and Spanish Town exchange. In the study area, Jamaica Telephone Company services 1,381 telephones, of which 565 are for business and 816 for residential use, through the Spanish Town and Old Harbour exchanges. In addition, 21 call boxes are located in Spanish Town and five (5) in Old Harbour. Increase in the capacities for both Spanish Town and Old Harbour exchanges are now in progress. In addition to this programme, installation of usable cable pairs will be completed between 1987 and 1990. Commencing in 1987, the existing set of call boxes will be replaced with modern automatic units. This programme will coincide with the introduction of tokens (as the medium of exchange).

2.5.3 Domestic water supply

According to the population census of 1982, the public authorities supplied domestic water to about 69% of the total dwellings in the parish of St. Catherine. (see Table F-24) The UNDP/Underground Water Authority (the Draft Water Development Master Plan Jamaica 1985) reported that about 31 million m³ of water is consumed annually for the domestic uses in the parish. Average consumption of domestic water per capita in the urban and rural areas was estimated at 143 m³/year and 15 m³/year respectively. The domestic water supply sources in the parish include 16 wells (13 from limestone and three (3) from alluvial), one (1) spring and one (1) river. The amount of domestic water supplied from wells, spring and river is estimated at 26 million m³/year, 2 million m³/year and 3 million m³/year respectively.

The water supplied within the study area is obtained from ten (10) limestone wells and the Rio Cobre river. Of the ten (10) limestone wells, six (6) are located in Spanish Town and four (4) in Old Harbour. The domestic water from the Rio Cobre river is supplied to Spanish Town through a full treatment plant. In the study area, the public authorities supplied domestic water to approximately 77% of the total dwellings. The figure is based on the population census of 1982. This figure is high when compared with that of the parish.

2.5.4 Electric power supply

In the parish of St. Catherine, there is a thermal generating station at Old Harbour Bay. The capacity of this station is approximately 230 MW. About 38,490 dwellings received electricity in 1982 based on the population census. (see Table F-25) This is equivalent to about 52% of the total dwellings in the parish. This percentage is high when compared with the entire Jamaican figure. However, the electric power supply services are limited in major towns and their vicinities. Both the 138 kv and 69 kv transmission lines run south to north on the central mountain range and east to west on the coastal plain in the parish.

The Old Harbour Bay thermal generating station is located to south western part of the study area. According to the population census of 1982, the dwellings receiving electricity in the study area were estimated at 16,080 or 56% of total dwellings. This figure is higher than that for the parish and for the Jamaica as a whole. The 138 kv transmission lines link Old Harbour Bay power station to Spanish Town and Kingston through the northern and southern part of the study area. A 69 kv transmission line links Old Harbour Bay power station to Spanish Town along the main road. Distribution lines extend into the study area mostly along the secondary roads.

REFERENCES

- (1) Economic and Social Survey Jamaica 1983, 1984 and 1985, Planning Institute of Jamaica
- (2) The Jamaican Economy 1985, A Statistical Assessment, Statistical Institute of Jamaica
- (3) The Labour Force 1985, Statistical Institute of Jamaica
- (4) Production Statistics 1985, Statistical Institute of Jamaica
- (5) Population Census 1983, Volume I, II, III and VI, Statistical Institute of Jamaica
- (6) Commonwealth Caribbean Population Census 1970, Jamaica, Volume 5 Part 14 Parish of St. Catherine, Division of Census and Surveys Department of Statistics
- (7) Demographic Statistics 1985, Statistical Institute of Jamaica
- (8) A National Physical Plan for Jamaica 1970-1990, Town Planning Department Ministry of Finance and Planning
- (9) National Atlas of Jamaica 1971, Town Planning Department Ministry of Finance and Planning
- (10) A Report on JAMAL Communication Skills (Literacy) Survey 1975, Department of evaluation and Research JAMAL Foundation
- (11) National Literacy Survey 1981, Department of Evaluation and Research JAMAL Foundation
- (12) Directory of Educational Institutions 1983-1984, Ministry of Education
- (13) Educational Statistics 1983-1984, Annual Statistical Review of the Education Sector, Ministry of Education
- (14) A National Housing Policy for Jamaica 1982, Ministry of Construction
- (15) Draft Water Resources Development Master Plan Jamaica 1985, Part 2 Water Demand Inventory, UNDP/Underground Water Authority, Ministry of Agriculture
- (16) Statistical Yearbook of Jamaica 1982, Statistical Institute of Jamaica
- (17) Pocketbook of Statistics Jamaica 1986, Statistical Institute of Jamaica
- (18) The Agricultural Development Project on the Black River Lower Morass 1985, Volume II Annex Report, Japan International Cooperation Agency/Ministry of Agriculture

Table F-1 GROSS DOMESTIC PRODUCT (GDP) AT 1974 CONSTANT PRICES

	(Unit : J\$ million)					
Industrial Sectors	1975	1981	1982	1983	1984	1985
1. Productive Sectors						
Agriculture, Forestry & Fisheries	156.6	156.1	143.8	154.2	169.6	163.9
Mining & Quarrying	157.2	164.8	117.0	117.7	118.5	95.4
Manufacturing	396.0	283.9	302.1	311.6	291.6	291.0
Construction & Installation	210.7	99.0	114.7	121.9	115.3	99.7
Sub-total	920.5	703.8	677.6	705.4	695.0	650.0
2. Services Sectors						
Public Administration	265.1	360.3	368.6	374.0	364.2	344.4
Financial & Insurance	87.4	117.2	114.4	140.2	131.3	125.6
Distribution	415.4	289.6	309.0	283.0	288.2	284.0
Others	522.5	485.0	500.4	517.0	516.0	508.6
Sub-total	1,290.4	1,252.1	1,292.4	1,314.2	1,299.7	1,262.6
3. Less: Imputed Service Charge	58.3	81.0	76.9	88.2	70.9	59.9
4. Total GDP	2,152.6	1,874.9	1,893.1	1,931.4	1,923.8	1,852.7

Source : National Income and Production, Statistical Institute of Jamaica

Table F-2 RATE OF GROWTH OF GDP AT 1974 CONSTANT PRICES

	(Unit : %)					
Industrial Sectors	1975	1981	1982	1983	1984	1985
1. Productive Sectors						
Agriculture, Forestry & Fisheries	1.7	2.2	-7.9	7.2	10.0	-3.4
Mining & Quarrying	-20.2	1.3	-29.0	0.6	0.7	-19.5
Manufacturing	2.3	1.1	6.4	3.1	-6.4	-0.2
Construction & Installation	-1.3	0.4	15.9	6.3	-5.4	-13.5
Sub-total	-3.3	1.3	-3.7	4.1	-1.5	-6.5
2. Services Sectors						
Public Administration	5.5	2.5	2.3	1.5	-2.6	-5.4
Financial & Insurance	1.6	8.8	-2.4	22.6	-6.3	-4.3
Distribution	3.2	5.0	6.7	-8.4	1.8	-1.5
Others	0.2	2.5	3.2	3.3	-0.2	-1.4
Sub-total	2.3	3.7	3.2	1.7	-1.1	-2.9
3. Less: Imputed Service Charge	8.0	10.2	-5.1	14.7	-19.6	-15.5
4. Total GDP	-0.3	2.5	1.0	2.0	-0.4	-3.7

Source : National Income and Production, Statistical Institute of Jamaica

Table F-3 SELECTED GDP INDICATOR

Description	1975	1981	1982	1983	1984	1985
1. GDP at Current Prices						
J\$ million	2,600.4	5,267.2	5,841.9	6,897.0	9,144.8	11,024.8
Percentage Change	20.4	10.9	10.9	18.1	32.6	20.6
2. GDP at 1974 Constant Prices						
J\$ million	2,152.6	1,874.9	1,893.1	1,931.4	1,923.8	1,852.7
Percentage Change	-0.3	2.5	1.0	2.0	-0.4	-3.7
3. Per Capita GDP (J\$)						
Current Prices (J\$)	1,291.9	2,435.9	2,655.4	3,077.9	4,011.2	4,770.4
Current Prices (US\$)	1,419.7	1,368.5	1,491.8	1,099.3	1,015.5	867.3
1974 Constant Prices (J\$)	1,069.5	867.1	860.5	861.9	843.8	801.7

Source : National Income and Production, Statistical Institute of Jamaica

Table F-4 SHARE OF GDP AT 1974 CONSTANT PRICES

Industrial Sectors	(Unit:%)					
	1975	1981	1982	1983	1984	1985
1. Productive Sectors						
Agriculture, Forestry & Fisheries	7.3	8.3	7.6	8.0	8.8	8.8
Mining & Quarrying	7.3	8.8	6.2	6.1	6.2	5.1
Manufacturing	18.4	15.1	16.0	16.1	15.2	15.7
Construction & Installation	9.8	5.3	6.1	6.3	6.0	5.4
Sub-total	42.8	37.5	35.9	36.5	36.2	35.0
2. Services Sectors						
Public Administration	12.3	19.2	19.5	19.4	18.9	18.6
Financial & Insurance	4.0	6.3	6.0	7.3	6.8	6.8
Distribution	19.3	15.4	16.3	14.6	15.0	15.3
Others	24.3	25.9	26.4	26.8	26.8	27.5
Sub-total	59.9	66.8	68.2	68.1	67.5	68.2
3. Less: Imputed Service Charge	2.7	4.3	4.1	4.6	3.7	3.2
4. Total GDP	100.0	100.0	100.0	100.0	100.0	100.0

Source : National Income and Production, Statistical Institute of Jamaica

Table F-5 EXPORT AND IMPORT OF GOODS AND SERVICES AS A PROPORTION OF CURRENT GDP

Description	1975	1981	1982	1983	1984	1985
1. Values (J\$ million)						
Export of Goods and Services	917.0	2,510.3	2,239.9	2,621.1	5,033.5	6,076.9
Import of Goods and Services	1,186.1	3,057.6	2,918.9	3,465.0	5,570.9	7,335.8
Total Transaction	2,103.1	5,567.9	5,158.8	6,086.1	10,604.4	13,412.7
Balance of Import and Export	269.1	547.3	679.0	843.9	537.4	1,258.9
2. GDP at Current Prices	2,600.4	5,267.2	5,841.9	6,897.0	9,144.8	11,024.8
3. Percentage of GDP (%)						
Export of Goods and Services	35.3	47.7	38.3	38.0	55.0	55.1
Import of Goods and Services	45.6	58.0	50.0	50.2	60.9	66.5
Total Transaction	80.9	105.7	88.3	88.2	116.0	121.7
Balance of Import and Export	10.3	10.4	11.6	12.2	5.9	11.4
External Dependence Index	100.0	130.7	109.1	109.0	143.3	150.3

Source : National Income and Production, Statistical Institute of Jamaica

Table F-6 POPULATION RATE OF INCREASE

Years	Population	Growth Rate (%)	Density (Person/Km ²)
1970	1,868,900	1.4	170
1975	2,029,500	1.7	185
1980	2,143,100	0.9	196
1981	2,181,500	1.8	199
1982	2,218,600	1.7	203
1983	2,263,000	2.0	207
1984	2,296,600	1.5	210
1985	2,325,500	1.3	212
1990	2,473,100	1.2	226
1995	2,629,900	1.2	240
2000	2,757,400	1.0	264
2005	2,895,100	1.0	252
2010	3,037,200	1.0	277
2015	3,175,200	1.0	290

Source: Demographic Statistics, Statistical Institute of Jamaica

Table F-7 COMPONENTS OF POPULATION GROWTH

Years	Births	Deaths	Natural Increase	Net Emigration
1970	64,400	15,200	49,200	23,000
1975	61,500	15,800	45,700	12,100
1980	58,600	14,500	44,100	24,300
1981	59,400	15,200	44,200	5,900
1982	61,500	14,500	47,000	9,800
1983	61,400	12,600	48,800	4,300
1984	57,500	13,400	44,100	10,500
1985	56,200	13,900	42,300	13,400

Source: Demographic Statistics, Statistical Institute of Jamaica.

Table F-8 POPULATION BY AGE GROUP AND SEX

Age Group	1970 Census		1982 Census	
	Male	Female	Male	Female
0-4	144,679	142,427	134,648	133,112
5-9	151,092	149,802	142,740	141,609
10-14	122,755	121,356	145,759	142,510
15-19	81,176	84,692	130,748	132,375
20-24	59,440	66,630	102,148	110,726
25-29	48,872	52,794	74,432	81,348
30-34	38,517	42,484	59,095	61,712
35-39	37,495	43,113	47,466	49,793
40-44	37,013	40,489	41,869	43,335
45-49	33,274	35,832	34,565	37,001
50-54	32,337	35,028	36,028	38,823
55-59	29,207	29,614	29,277	30,327
60-64	25,352	27,250	26,620	30,864
65-69	18,893	20,234	24,602	25,656
70-74	12,286	14,322	20,879	22,931
75-79	6,963	8,989	12,618	14,932
80+	6,527	12,661	11,139	18,670
Total	885,878	927,717	1,074,633	1,115,724

Source: Population Census, Statistical Institute of Jamaica

Table F-9 NUMBER OF EMPLOYED AND UNEMPLOYED LABOUR FORCE

Industrial Sectors	(Unit: 1,000 persons)					
	1975			1981		
	Employ	Un-	Total	Employ	Un-	Total
1. Productive Sectors	234.8	12.1	246.9	268.8	15.7	284.5
Agriculture, Forestry & Fisheries	7.2	1.3	8.5	8.3	0.5	8.8
Mining & Quarrying	70.1	15.5	85.6	80.2	20.4	100.6
Manufacturing	42.7	3.4	46.1	31.1	4.9	36.0
Construction & Installation	354.8	32.3	387.1	388.4	41.5	429.9
Sub-total	93.0	15.4	108.4	101.5	28.4	129.9
2. Services Sectors	79.4	13.6	93.0	99.1	15.6	114.7
Public Administration	30.3	12.1	42.4	32.3	9.1	41.4
Commerce	111.8	48.5	160.3	113.7	50.9	164.6
Transportation, Communication & Public Utilities	314.5	89.6	404.1	346.6	104.0	450.6
Other Services	2.6	0.9	3.5	4.0	2.3	6.3
Sub-total	0.0	52.7	52.7	0.0	106.2	106.2
3. Industry not Specified	671.9	175.5	847.4	739.0	254.0	993.0
4. No Previous Industry						
5. Total						
	249.7	8.3	258.0	254.2	8.7	262.9
1. Productive Sectors	6.8	1.4	8.2	7.4	0.6	8.0
Agriculture, Forestry & Fisheries	94.8	25.2	120.0	98.7	25.3	124.0
Mining & Quarrying	34.5	6.5	41.0	34.3	6.9	41.2
Manufacturing	385.8	41.4	427.2	394.6	41.5	436.1
Construction & Installation	102.0	23.2	125.2	100.5	21.2	121.7
Sub-total	108.3	17.7	126.0	111.7	18.4	130.1
2. Services Sectors	32.5	14.7	47.2	35.4	13.3	48.7
Public Administration	119.7	57.8	177.5	136.0	57.0	193.0
Commerce	362.5	113.4	475.9	383.6	109.9	493.5
Transportation, Communication & Public Utilities	2.1	4.8	6.9	1.3	3.8	5.1
Other Services	0.0	116.3	116.3	0.0	112.8	112.8
Sub-total	750.4	275.9	1,026.3	779.5	268.0	1,047.5
3. Industry not Specified						
4. No Previous Industry						
5. Total						

Source: The Labour Force, Statistical Institute of Jamaica

Table F-10 NUMBER OF HOSPITALS AND HEALTH CENTRES BY PARISH IN 1984

Parish	Number of Hospitals	Number of Health Centres
Kingston and St. Andrew	2	46
St. Thomas	2	21
Portland	2	19
St. Mary	2	30
St. Ann	2	28
Trelawny	2	21
St. James	1	27
Hanover	1	22
Westmorland	1	25
St. Elizabeth	1	31
Manchester	1	32
Clarendon	4	45
St. Catherine	2	25
Total	23	372

Source: Ministry of Health

Table F-11 RATIO OF HEALTH PERSONNEL TO POPULATION BY PARISH IN 1984

Parish	Doctors		Dentists	
	Number	Ratio	Number	Ratio
Kingston and St. Andrew	465	1 : 1,262	32	1 : 18,432
St. Thomas	9	1 : 8,937	1	1 : 80,440
Portland	11	1 : 6,696	2	1 : 36,830
St. Mary	10	1 : 10,597	1	1 : 105,970
St. Ann	23	1 : 5,988	3	1 : 45,915
Trelawny	6	1 : 11,578	1	1 : 69,470
St. James	60	1 : 2,282	6	1 : 20,660
Hanover	9	1 : 6,982	2	1 : 31,420
Westmorland	17	1 : 7,095	2	1 : 60,310
St. Elizabeth	17	1 : 8,053	2	1 : 68,450
Manchester	45	1 : 8,472	2	1 : 72,015
Clarendon	30	1 : 6,771	3	1 : 67,707
St. Catherine	78	1 : 4,265	3	1 : 110,890
Total	780	1 : 2,808	60	1 : 36,506
Recommended by PAHO	-	1 : 910	-	1 : 2,857

Source: Ministry of Health
Pocketbook of Statistics, 1986

Table F-12 NUMBER OF EDUCATIONAL INSTITUTIONS BY TYPE IN EACH PARISH

Parish	Kingston and										Total	
	St. Andrew	Thomas	Portland	Mary	St. Ann	Trelawny	James	Hanover	West-morland	St. Elizabeth		Manchester
1. Basic												
Recognized	192	53	55	53	80	37	63	52	65	82	86	147
Unrecognized	134	24	20	21	21	11	11	10	12	11	18	71
2. Government												
Infant	7	0	2	2	3	1	2	1	2	0	3	4
Primary	49	18	12	23	14	11	11	11	21	31	16	37
All-age	53	25	33	37	52	20	29	23	35	44	43	50
New secondary	15	4	3	5	4	3	4	2	6	6	5	12
Secondary high	19	1	2	2	3	2	3	1	1	2	3	4
Comprehensive high	3	0	0	0	0	0	1	0	0	0	0	0
Technical high	3	0	0	0	0	0	0	0	0	1	1	1
Vocational/Agriculture	0	0	0	1	0	0	0	1	0	1	0	0
Special	5	0	0	0	1	0	0	0	0	0	0	0
3 Independent												
Preparatory	41	1	3	1	2	1	7	2	5	3	7	4
Primary/All-age	4	0	1	0	1	0	0	0	1	4	1	0
Secondary high	21	0	1	2	5	0	4	0	2	0	2	6
Comprehensive high	1	0	0	0	0	0	0	0	0	0	3	0
Business education	15	0	2	1	3	0	3	1	1	1	2	4
Community college/Evening	7	0	1	0	0	0	0	0	2	0	2	0
Vocational	4	0	0	0	1	0	0	0	0	2	0	1
Special	3	0	0	0	0	1	0	0	0	0	3	0
4. Tertiary												
Community college	1	0	0	0	1	0	1	0	0	0	0	0
Teachers' college	3	0	1	0	1	0	1	0	0	1	1	0
Other institutions	3	0	0	0	0	0	0	0	0	0	0	1
Total	1100	147	135	26	71	390	1100	147	135	26	71	390

Source: Ministry of Education

Table F-13 FUNCTIONAL ILLITERACY RATE BY PARISH

Parish	1975			1981		
	Illiterate	Literate	Unclassified	Illiterate	Literate	Unclassified
Kingston	20.3	49.6	30.1	11.0	85.2	3.8
St. Andrew	21.8	46.5	31.7	14.5	82.8	2.7
St. Thomas	30.5	48.1	11.4	32.9	63.3	3.8
Portland	40.2	45.3	14.5	31.5	65.2	3.3
St. Mary	29.0	53.5	17.5	33.1	63.7	3.2
St. Ann	32.0	44.5	23.5	27.1	70.8	2.1
Trelawny	38.3	43.2	18.5	33.5	65.6	0.9
St. James	38.7	53.4	7.9	22.6	75.7	1.7
Hanover	35.0	49.5	15.5	29.1	68.2	2.7
Westmorland	48.7	39.5	11.8	36.4	60.9	2.7
St. Elizabeth	44.0	43.8	12.2	35.8	60.0	4.2
Manchester	31.3	49.0	19.7	25.9	72.3	1.8
Clarendon	38.3	52.7	9.0	30.2	67.9	1.9
St. Catherine	24.9	44.1	31.0	23.3	74.3	2.4
Total	32.0	47.0	21.0	24.3	73.1	2.6

Source : Communication Skills Survey in 1981, JAMAL

Table F-14 ILLITERACY RATE BY AGE GROUP BY SEX

Age Group	Total	
	Male	Female
15-19	19.7	5.4
20-24	19.1	9.2
25-29	21.5	8.4
30-34	22.0	13.2
35-39	29.3	17.2
40-44	36.5	25.1
45-49	39.4	29.0
50-54	42.3	29.6
55-59	38.9	33.6
60-64	43.0	35.2
65+	48.0	43.1
Total	30.1	19.4

Source : Communication Skills Survey in 1981, JAMAL

Table F-15 ILLITERACY RATE BY FARMING ACTIVITIES

Farming Activity	(Unit: %)		
	Illiterate	Literate	Unclassified
Cane Farming	52.2	45.7	2.1
Banana Farming	51.4	45.1	3.5
Citrus Growing	27.9	72.1	0.0
Cocoa Planting	53.6	31.3	15.1
Coffee Planting	53.2	43.5	3.3
Livestock Farming	32.2	59.7	8.1
Dairy Farming	0.0	100.0	0.0
Pig Farming	28.7	60.1	11.2
Poultry Farming	15.1	84.9	0.0
Vegetable Farming	43.0	55.2	1.8
Mixed Farming	58.7	38.8	2.5
Root Crops Cultivating	51.0	47.2	1.8
Others	41.9	53.7	4.4
Not Stated	46.9	45.6	7.5

Source : Communication Skills Survey in 1981, JAMAL

Table F-16 POPULATION IN THE PARISH AND THE STUDY AREA

Description	St. Catherine	Study Area
1. Area		
Km2	1,195	274
Square mile	461	106
2. Population		
a) 1970		
Male	87,727	32,323
Female	91,391	34,889
Total	179,118	67,212
b) 1982		
Male	163,046	63,322
Female	169,628	66,366
Total	332,674	129,688
3. Average Annual Growth Rate From 1970 to 1982 (%)	5.29	5.50
4. Population Density (1982)		
per Km2	278	473
per Square mile	722	1,223
5. No. of Dwellings	74,216	28,943
6. Average No. of Persons per Dwellings	4.48	4.48

Source: Population Census 1970 and 1982, Statistical Institute of Jamaica

Table F-17 AGE GROUP IN THE PARISH AND THE STUDY AREA IN 1982

Age Group	St. Catherine			Study Area		
	Male	Female	Total	Male	Female	Total
0 - 4	21,318	20,813	42,131	8,434	8,293	16,727
5 - 9	22,899	22,723	45,622	8,694	8,821	17,515
10 - 14	23,030	22,850	45,880	8,389	8,635	17,024
15 - 19	19,711	20,628	40,339	7,607	8,096	15,703
20 - 24	15,276	16,864	32,140	6,511	7,075	13,586
25 - 29	11,356	12,630	23,986	4,866	5,259	10,125
30 - 34	9,774	10,573	20,347	3,780	3,992	7,772
35 - 39	8,036	8,406	16,442	3,100	3,367	6,467
40 - 44	6,887	6,713	13,600	2,744	2,768	5,512
45 - 49	5,269	5,356	10,625	2,168	2,145	4,313
50 - 54	5,074	5,354	10,428	2,011	2,099	4,110
55 - 59	3,804	3,922	7,726	1,545	1,448	2,993
60 - 64	3,255	3,720	6,975	1,183	1,317	2,500
65 - 69	2,739	2,897	5,636	917	1,015	1,932
70 - 74	2,210	2,527	4,737	674	814	1,488
75 - 79	1,277	1,649	2,926	389	562	951
80 - 84	696	1,105	1,801	192	375	567
> 85	435	898	1,333	118	285	403
Total	163,046	169,628	332,674	63,322	66,366	129,688

Source: Population Census, Statistical Institute of Jamaica

Table F-18 LABOUR FORCE IN THE PARISH AND THE STUDY AREA IN 1982

Description	St. Catherine	Study Area
1. Labour Force		
Male	65,140	25,677
Female	42,412	17,747
Total	107,552	43,424
2. Employed Labour Force		
Male	47,983	18,023
Female	24,185	11,067
Total	75,168	29,090
3. Unemployed Labour Force		
Male	17,157	7,654
Female	15,227	6,680
Total	32,384	14,334
4. Unemployment Rate (%)	30.1	33.0

Source: Population Census, Statistical Institute of Jamaica

Table F-19 RATIO OF EMPLOYED AND UNEMPLOYED LABOUR FORCE IN THE PARISH 1982

Industrial Sector	Total	Employed	Unemployed
1. Productive Sectors			
Agriculture, Forestry and Fishing	17.0	19.2	4.7
Mining and Quarrying	1.2	1.3	0.7
Manufacturing	14.1	15.2	8.3
Construction and Installation	5.0	4.7	6.8
Sub-total	37.3	40.4	20.5
2. Services Sectors			
Public Administration	26.9	29.7	12.5
Commerce	10.2	11.3	4.5
Transportation, Communication and Public Utilities	5.4	6.1	2.0
Other Services	2.2	2.5	0.4
Sub-total	44.7	49.6	19.4
3. Industry not Specified	18.0	10.0	60.1
4. Total	100.0	100.0	100.0

Source: Population Census, Statistical Institute of Jamaica

Table F-20 DISTRIBUTION OF HEALTH SERVICES IN THE PARISH AND THE STUDY AREA

	Parish		Study Area	
	Number	Ratio	Number	Ratio
1. Hospital	2	-	1	-
2. Health Centre				
Type I (1 : 4,000)	9	1 : 36,964	1	1 : 129,688
Type II (1 : 12,000)	9	1 : 36,964	3	1 : 43,229
Type III (1 : 20,000)	6	1 : 55,446	1	1 : 129,688
Type IV	1	-	1	-
Sub-total	25	-	6	-

Remark: Numbers in the parentheses are the ratio recommended by MOH
Source: Ministry of Health

Table F-21 NUMBER OF SCHOOLS IN THE PARISH AND THE STUDY AREA

Institution	St. Catherine		Study Area			
	Number	Enrollment	Attendance	Number	Enrollment	Attendance
1. Pre-Primary Level						
Infant	4	1,981	1,487	4	1,981	1,487
2. Primary Level						
Primary	37	29,640	21,076	13	19,354	14,149
All Age	50	33,375	22,192	11	13,515	9,770
Special	0	0	0	0	0	0
Sub-total	87	63,015	43,268	24	32,869	23,919
3. Secondary Level						
New Secondary	12	13,604	9,573	6	9,033	6,555
Secondary High	4	5,443	5,046	2	4,067	3,777
Comprehensive	0	0	0	0	0	0
Technical High	1	1,463	1,325	0	0	0
Vocational/Agriculture	0	0	0	0	0	0
Sub-total	17	20,510	15,944	8	13,100	10,332
4 Tertiary Level						
Community College	0	0	-	0	0	-
Teachers' College	1	77	-	1	77	-
Other Institutions	0	0	-	0	0	-
Sub-total	1	77	-	1	77	-

Source: Ministry of Education

Table F-22 JAMAL IN THE PARISH AND THE STUDY AREA

Description	Study Area	
	St. Catherine	Study Area
Number of classes	67	15
Number of students	1,771	748
Number of teachers	86	23

Source: Ministry of Education

Table F-23 TYPE OF HOUSING UNIT IN THE PARISH AND THE STUDY AREA

Description	St. Catherine	Study Area
1 Concrete and Blocks	32,224	10,894
2 Stone	129	22
3 Brick	165	109
4 Nog	2,545	466
5 Wattle and Daub	743	111
6 Wood	14,510	7,778
7 Wood and Concrete	4,345	2,006
8 Wood and Brick	139	81
9 Other	731	431
10 Not Stated	1,741	477
Total	57,272	22,375

Source: Population Census, Statistical Institute of Jamaica

Table F-24 SOURCE OF DOMESTIC WATER SUPPLY IN THE PARISH AND THE STUDY AREA

Description	St. Catherine	Study Area
1 Piped into house		
- public	22,490	8,187
- private	4,798	1,861
2 Public piped into yard	22,757	13,133
3 Private catchment not piped	2,706	644
4 Public standpipe	4,758	811
5 Public tank	1,373	116
6 Others	8,205	1,855
7 Not stated	7,129	2,636
Total	74,216	28,943

Source: Population Census, Statistical Institute of Jamaica

Table F-25 TYPE OF LIGHTING PER DWELLING IN THE PARISH AND THE STUDY AREA

Description	St. Catherine	Study Area
1 Electric	38,489	16,083
2 Kerosene	28,055	10,005
3 Other	326	159
4 Not Stated	7,346	2,696
Total	74,216	28,943

Source: Population Census, Statistical Institute of Jamaica

ANNEX - G
AGRO-ECONOMY

ANNEX-G

AGRO-ECONOMY

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1. AGRICULTURAL INSTITUTION AND SUPPORTING SYSTEM

1.1 Ministry of Agriculture

The Ministry of Agriculture (MOA) is the main agency for planning, implementing and supporting agriculture in Jamaica, and administers the following divisions:

- (1) Planning and Policy Review division,
- (2) Marketing and Credit division,
- (3) Production and Extension division,
- (4) Technical Services division, and
- (5) Research and Development division

MOA implements and supports its programme through land authorities in thirteen rural parishes, under four (4) regional offices in western, central, northern and southern region, and through the Sugar Industry Authority, Banana Industry Board, Coffee Industry Board, Coconut Industry Board, Cocoa Industry Board, Tobacco Industry Control Authority and the Agricultural Development Corporation. The organization chart of MOA is shown in Fig. G-1.

There are also various statutory agencies such as the Jamaica National Investment Promotion and Agro 21 Corporation Limited that promote investment for agricultural development in association with MOA.

1.1.1 Planning and Policy Review division

The Planning and Policy Review division has three (3) major sub-divisions as follows:

- (1) Economic Planning division,
- (2) Rural Physical Planning division, and
- (3) Data Bank and Evaluation division

The Economic Planning division includes the farm management, Micro Planning and Data Analysis units. The Data Bank and Evaluation division has responsibility for data collection, storage, dissemination and evaluation of programmes and projects carried out by the Agricultural Planning unit including the collection of general agricultural data and evaluation of programmes and completed projects. This division has three (3) main branches, namely the Data Collection and Statistics branch, Evaluation branch, and the Data Processing unit.

1.1.2 Marketing and Credit division

The Marketing and Credit division (MACD) was recently formed by merging units and personnel involved in aspects of agricultural marketing previously dispersed throughout MOA, in recognition of the fact that the marketing of agricultural and food products falls within the overall purview of MOA.

MACD functions through the following units and branches:

- (1) Commodity Organizations and Promotions unit,
- (2) Agricultural Credit and Stabilization secretariat,
- (3) Stabilization board,
- (4) Marketing Extension branch,
- (5) Marketing Information branch,
- (6) Marketing Development branch, and
- (7) Quality Assurance branch

MACD implements its policies and programmes related to the following three (3) areas:

(1) Marketing development

The marketing development strategy gives priority to the establishment of Assembly and Grading Stations as selected places and promotes development of Producer Marketing Organizations. Through these establishments and development the marketing development strategy aims at implementing policies as follows:

- (a) assisting farmers in identifying markets, upgrading marketing awareness and providing technical knowledge to improve the quality and value of agricultural products,
- (b) assisting market intermediaries by upgrading their marketing skills and knowledge, helping them to identify supplies, providing technical know-how in products handling, transportation, grading, packaging and storage, and assistance in arranging contractual agreement with farms,
- (c) collaborating with the Jamaica Agricultural Society in establishing a farm input supply store at each Producers Marketing Organization, and informal collecting stations where farmers' products can be assembled and marketed, and
- (d) establishing subterminal wholesale distribution markets, assisting in all aspects of their development and providing technical training in the operation and management of the facility.

(2) Marketing economics, credit, information and research

MACD monitors agricultural credit through the Agricultural Credit and Stabilization secretariat, collects and disseminates wholesale market information, monitors and supervises the External Marketing Organization.

(3) Quality assurance

MACD publishes grades and standards for perishable products, floricultural and meat products, and maintains an inspection programme for monitoring quality levels of agricultural products.

1.1.3 Production and Extension division

The major objectives of the Production and Extension division (PED) are improvement in agricultural productivity and rural living standards through technical and farm family extension. PED is responsible for planning, directing, implementing and coordinating all extension programmes and projects in MOA.

The extension programmes and projects include subsidy assistance schemes, soil conservation works, nursery production, rural infrastructure, minor irrigation projects, livestock improvement projects, fishing projects and land administration.

These programmes and projects are implemented through four (4) regional offices in the Western, Central, Southern and Northern regions and 13 Land Authorities in each parish and the Fishery Division.

Each Land Authority is administered through an Executive Agricultural Officer and his Deputy. Reporting to each Executive Office is a number of Divisional Officers who supervise the Agricultural Extension Officers (AEO). Each AEO supervises Field Assistant and Agricultural Aides.

The activities of the extension staff are many and carry out such functions 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 farm plans, and assisting in aspects of marketing and credit, among others. There are three other categories of extension worker-not all governmental:

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

1.1.4 Technical Services division

The Technical Services division (TSD) includes a wide variety of units and departments whose functions are vital for the performance of MOA. These functions are provided by:

- (1) Land Administration and Property department,
- (2) Department of Forestry and Soil Conservation,
- (3) Land Development and Utilization commission,
- (4) Survey department,
- (5) Office of Titles,
- (6) Agricultural Engineering division,
- (7) Public Garden and Zoo division, and
- (8) Veterinary division

The Office of Titles, Survey department, Land Administration division and the Land Development and Utilization commission are responsible for land records, land administration and land use. Veterinary and Agricultural Engineering division provide

specialized and professional services. Department of Forestry and Soil Conservation provides services such as wood production, forestry maintenance, watershed management and soil conservation. Public Garden and Zoo division provides public recreational facilities. The objectives, programmes and projects of major departments and units of TSD are outlined as follows:

(1) Office of Titles

Office of Titles is responsible for administering the Registration of the Titles Act and the Registration Act, ensuring that records are satisfactorily maintained and that facilities for servicing the titling needs of the public and private sectors are adequate. The Office of Titles promotes programmes to rectify the incompleteness of existing records, and to produce a comprehensive cadastral map of Jamaica in the long run.

(2) Survey department

The Survey department provides surveying and mapping services to satisfy land acquisition, land disposal, land development and site planning activities of the Government. This is achieved through a programme of national mapping, project mapping, surveys and cadastral surveys.

(3) Land Administration and Property department

The Land Administration and Property department is responsible for implementing programmes of land acquisition and land disposal by the Government, and is responsible for administering free hold and leasehold properties of the Government. Through the utilization of existing government lands or by acquisition of suitable land, the Land Administration and Property department seeks to meet the land requirements for MOA and Agencies of the Government, land settlement schemes, housing developments, diverse agricultural projects, infrastructure. Rental assessments and evaluations are also undertaken by Land Administration and Property department on behalf of Ministry of Construction and the Statutory Boards.

(4) Lands Department and Utilization commission

The Land Development and Utilization commission (LDUC) was established to administer Land Development and Utilization Act. The Act provides LDUC with a wide administrative control over agricultural land use, and LDUC encourages land holders to develop their holdings and collects information on land matters, which is available to other agencies engaged in implementing national land use policies. LDUC inspects properties, prepare land capability maps, examines and monitors property development plans and issues notices and orders under the provision of the Act.

(5) Department of Forestry and Soil Conservation

The Department of Forestry and Soil Conservation is responsible for:

- (a) administering forest estates owned by the Government through Forestry division,

- (b) providing services such as advice, training and extension in soil conservation through the Soil Conservation division.

The projects promoted by the department include afforestation on government and private land, timber construction, building, training, soil conservation and maintenance works, demonstration, watershed surveys and production of utility poles and fence posts.

(7) Agricultural Engineering division

The Agricultural Engineering division consists of the Central workshop, Construction branch, Special Project branch, Support Services unit and Transport and Machinery branch.

The Central workshop formerly provided the services of repair and maintenance for machinery and equipments owned by MOA, is now divested of these services and retains responsibility for inspection and preventive maintenance.

The Construction branch provides support services to the Land Authorities and to other agencies of MOA in construction of roads, buildings, water supplies and other civil engineering projects. This support service includes designing construction works and estimating construction cost on client funding.

The Special Project branch provides the services for supervising the establishment of eleven (11) veterinary clinics, repairing and construction of domestic water supply tanks in farming areas, and promoting the microdam construction projects.

The Support Services unit strengthens the organization of the Technical Services division by training staff, establishing proper classification of posts and hiring suitable persons for executing the personnel, administrative and account functions.

The Transport and Machinery branch monitors the utilization and deployment of machinery and equipments owned by MOA, implementing an energy conservation drive and establishing a data base on unit performance and operational costs.

1.1.5 Research and Development division

The Research and Development division (RDD) was established in 1972 in MOA as a separate division. RDD carries out agricultural research on crops, soil, plant protection and livestock, and coordinates research programme with commodity boards which legally fall under the purview of MOA. RDD has Project Execution, Management Support Service, Biometrics, Library and Technical Documentation units and four (4) Research Stations, one in each region.

The Project Executing and Management Support Service units are responsible for establishment and supporting services for Research Stations, which are funded by the Inter-America Development Bank. The Biometrics unit provides services for planning and evaluation of research programmes such as design and experiments, analysis of information and data, monitoring the cost and benefit of research programmes. The

Library and Technical Documentation unit provides services for publishing reports and collecting the bulletins of other research institutes. The Research Stations may be outlined as follows:

(1) Bodles Research Station

Bodles Research Station is the main central research station in Jamaica and is located in the parish of St. Catherine, in the county of Middlesex (the central region). This station conducts research and experiments on dairy cattle breeding, pasture management, animal nutrition and food crops mostly under irrigated conditions.

This station has Top Mountain Research Sub-station at Cinchona in the parish of St. Andrew. This Sub-station is situated on the mountain side at an elevation of 1,400 m (4,500 ft.), and carries out experiments on high altitude crops and vegetables such as cauliflower, celery, lettuce, string bean and strawberry.

(2) Grove Place Research Station

Grove Place Research Station is located in the parish of Manchester, the central region. This station concentrates on pasture and beef cattle research such as plant introduction and test, grassland utilization, forage conservation, grass/legume compatibility trials and sorghums trials.

(3) Montpelier Research Station

Montpelier Research Station is in the parish of St. James, in the county of Cornwall (western region) and conducts research and experiments on crops and dairy cattle breeding.

(4) Orange River Research Station

Orange River Research Station is located at Highgate in the parish of St. Mary, the northern region. This station carries out research on crops like cocoa, banana, ackee, etc. and is to be transferred to the Cocoa Industry Board.

1.2 Farmers' Organizations

The Farmers' Organizations include:

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

(1) The Commodity Boards/Associations

Among these are listed as follows:

- Sugar Industry Authority (SIA)
- Jamaica Cane Farmers Association,
- Banana Company of Jamaica
- All Island Banana Growers Association,
- Coconut Industry Board,
- Coconuts Growers Association,
- Pimento Growers Association,
- Cocoa Industry Board,
- Citrus Growers Association, and
- Coffee Industry Board

These vary from a simple association of growers to a statutory Boards. Their function is to promote the development and marketing of the individual crop which they represent. They organize regular meetings 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) Jamaica Livestock Association Ltd.

Jamaica Livestock Association Ltd. (JLA) was founded in 1971 as Cattle Owner's Association and now is a Public Company, which issued Participating Preference Shares in 1970. JLA is primarily a representative body of livestock farmers, and has been dedicated to the overall improvement in the livestock industry. JLA provides members with following services:

- (a) Planning and execution of Animal Health Programmes and Farmer Educational Programmes,
- (b) Promotion and improvement of breeding, feeding and management system through Breed Society activities,
- (c) Permanent administrative function for negotiation with commercial, industrial, international and governmental bodies on price and other relevant matters affecting livestock farmers,
- (d) Collection and dissemination of statistical information relating to the industry,
- (e) The establishment of Retail Outlets throughout the island for the distribution of animal and poultry feed, drugs and farm equipment,
- (f) Keeping Jamaican farmers in touch with technological developments on the international scene,
- (g) Setting up of specific standing committees to deal with specialized areas of livestock production and administration:

- Dairy committee

- Beef committee
- Poultry committee
- Pig committee
- Cost Production committee
- Executive Finance and Planning committee

(3) Jamaica Agricultural Society

Jamaica Agricultural Society (JAS) was established in 1895 as a statutory body of great significance to small farmers. JAS receives a subvention from the Government to carry out its roles. JAS has 1,015 branch societies throughout Jamaica, which is composed of about 10,000 members. It has been the parent organization for most of the Commodity Boards/Associations and the Fig. G-2 shows the organization chart of JAS.

JAS is a powerful lobby group for farmers and its main roles are representation, information and publication, organization and marketing, and farm input supply for the farmers. Activity and function of JAS is to:

- (a) Promote and encourage agriculture, horticulture, agriculture and stock-raising,
- (b) Hold the Agricultural and Livestock Shows and Farm Competitions,
- (c) Assist in the procurement of planting materials on behalf of farmers and in the marketing of their farm products,
- (d) Provide farm inputs, feeds, etc. with easy access and at reasonable prices to the farmer through Jamaica Agricultural Farm Supplies Ltd. which has developed with the support of MACD of MOA,
- (e) Make representations to the appropriate authorities on matters affecting the social and economic development of the farmer,
- (f) Organize branch meetings, field demonstration and training days to disseminate information to farmers,
- (g) Organize cooperative societies, Saving and Buying Clubs, Mutual Aid Projects, Marketing Project Groups and other entitles.

(4) The Farmers Cooperative Groups

Cooperative department is located in Kingston and falls under Ministry of Youth and Community Development. It consists of Development, Audit, and Supervisory and Field Services sections. There are 269 Coop Societies nationally, most of them in agriculture. The two (2) major blocks are:

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

1.3 Agricultural Credit

Financing for agriculture production development of agricultural projects in Jamaica is available through both public and private banking institutions. Many domestic institutions provide a favourable circumstance for agricultural finance. Fig. G-3 shows the banking structure in Jamaica.

Jamaica has a well developed commercial banking system through branch offices in major towns and villages. Several commercial banks have been active in financing agriculture and has a long history of financing the traditional crops of sugar cane and bananas. These commercial banks have concentrated on short term credit.

Government financing institutions have been active in agricultural credit, particularly for medium and long term loans. The Agricultural Credit Bank (ACB) is the major government source of funds for agriculture. ACB obtains funds from the Government as well as funding agencies such as European Community, United States Agency for International Development, Caribbean Development Bank, Canadian International Development Agency and World Bank, and wholesales funds to commercial banks and the Peoples' Cooperative Banks (PCB's), but ACB does not provide services at the retail level.

The objectives of ACB are to provide financial assistance in the agricultural development in Jamaica by:

- (1) making funds available at the time and place best suited to the farmers' needs,
- (2) encouraging greater participation by commercial banks in financing the agricultural sector,
- (3) strengthening and upgrading the Peoples' Cooperative Banking system and encouraging greater farmer participation and involvement in its operation.

ACB provides services of staff assistance and training in financial management and credit analysis for the commercial banks and PCB's obtaining funds from the ACB and delivering credit to farmers.

The Jamaican Development Foundation is another source of finance for agriculture and agricultural industry. This foundation began operations in 1983 and is funded through the agreement with the United States. Financing activities of the foundation are increasing as operating experience expands.

There are 114 of PCB's throughout Jamaica for supplying general credit in rural areas. ACB selected 40 PCB's to participate in a programme to deliver credit to agriculture. The Agriculture Credit Board is the authority for staffing PCB's and has supervising and audit responsibility for the PCB's. Some of the board member at ACB serve with the Agricultural Credit Board.

1.4 Research in Other Agencies

While RDD in MOA has major responsibility for agricultural research, some research activities are conducted by the Statutory Body such as Commodity Boards, the Scientific Research Council (Ministry of Finance and Planning) and the Jamaica Industrial Development Corporation (Ministry of Industry and Commerce). There are also several other organizations that are engaged in agricultural research activities, including the Caribbean Agricultural Research and Development Institute, the Storage and Infestation division of Ministry of Industry and Commerce, the University of the West Indies (Mona Campus), Pioneer Hi-Breed Inc., and Alcan Jamaica Ltd. Research activities conducted by above organizations are as follows:

(1) Banana Industry Board

Research efforts are mainly devoted to plant protection work and soil fertility. This board has no research land of its own, but is allocated land on some of its research stations by MOA.

(2) Coffee Industry Board

The Coffee Industry Board conducts very little research like agricultural chemicals, some variety trials and some work with resuscitation of older trees by pruning. The Board is collecting research recommendations developed in other countries through the Inter-America Institute of Agricultural Science.

(3) Coconut Industry Board

Research activity of Coconut Industry Board is mainly devoted to varietal improvement, soils and fertility work. The board uses land on the research stations of MOA to conduct its research, and has a small chemical laboratory to analyze leaf tissue and copra.

(4) Sugar Industry Authority

The Sugar Industry Authority has Sugar Industry Research Institute (SIRI), which is located at Mandeville in the parish of Manchester in order to facilitate quarantine and evaluation of varieties introduced from abroad. SIRI is equipped with laboratories and greenhouses facilities, for tissue analysis and varietal improvement such as breeding. SIRI has no experimental land and relies on cooperative arrangement with sugar estates and farms in the conduct of field trial. Also, SIRI conducts an annual "cane survey" to collect data on production, yield and input.

(5) Cocoa Industry Board

The Cocoa Industry Board is responsible for regulating and promoting the development of the cocoa industry, arranging for purchasing, processing and marketing, and advising MOA on factors affecting the cocoa industry. Although this board does not itself engage in research activity, MOA has responsibility for research of cocoa.

(6) Agricultural Development Corporation

The mandate of the Agricultural Development Corporation (ADC) is to activate, stimulate and facilitate agricultural development. ADC has no formal research arm, but carries out a small amount of applied research designed to modify production systems and provide land and facilities for experimental works conducted by their staff for MOA. ADC has major responsibility for small livestock (pigs, sheep and goats), and operates a national breeding programme for pigs, sheep and goat.

(7) Tobacco Industry Control Authority

The research unit of Tobacco Industry Control Authority is located on five (5) acres under irrigated condition near Old Harbour, and has responsibility for plant breeding, plant protection, cultural practices and nutrition research.

(8) Scientific Research Council

The Agro-Industry division conducts research on the economic utilization of agricultural crops and by-products including oil seed crops, essential oils and spices and by-products of the sugar industry. The Food Science and Nutrition division is conducting research on the development of composite flours and enriched foods, and is assessing the storage and qualities of Irish potatoes, cassava and guava.

(9) Jamaica Industrial Development Corporation

The Jamaica Industrial Development Corporation, which was established in 1952 for the purpose of encouraging and facilitating industrial development, has conducted feasibility studies, market research, evaluation and training activities. The Food Technology Institute of this corporation focussed on the development of new food products from raw materials, and has a well equipped pilot plant and staff.

(10) Caribbean Agricultural Research and Development Institute

The Caribbean Agricultural Research and Development Institute (CARDI) was created under an agreement signed by the governments of the Caribbean Community in 1975, and is headquartered in Trinidad. The Jamaican Unit of CARDI is located on the grounds of the University of the West Indies (Mona Campus). Major activities include participation in the Seed Farm work, research on cropping systems on hill farms, introduction and evaluation of trials of crops such as peanuts, onions, cowpeas, beans and intercropping trials with sugar cane.

(11) Storage and Infestation division

This division carries out research programmes including rodent control and pesticide evaluation, warehouse storage, structures and facilities, and storage, and storage loss prevention for various food crops such as yams, Irish potatoes, sweet potatoes, cassava, legumes, rice, breadfruit, plantain and selected vegetables.

(12) University of the West Indies (Mona Campus)

Some agricultural research activities are carried out by the Department of Botany, Chemistry and Zoology. The Botany Department works with MOA in the areas of plant pathology, crop production, plant physiology, plant breeding and ecology. The Chemistry Department collaborates with SIRI in research on sugar and rum production, and with MOA in studies of pimento and yams. The Zoology Department collaborates with Fishery division of MOA in pelagic fish studies and oyster culture as well as in conducting environmental impact studies.

(13) Pioneer Hi-Breed International Inc.

This private company, whose parent company is based in the United States, and established in 1958, originally operated winter corn and sorghum breeding for the United States. In 1964, this company became a breeding station of tropical corn and sorghum, producing for both Jamaica and the United States. Since 1976, this company has concentrated on sorghum and small soybean testing programmes. The station has 120 acres as well as a seed processing plant, a research cold room and cold storage.

(14) Alcan Jamaica Ltd.

Research activities conducted by Alcan Jamaica Ltd. focus on reclamation, restoration and economic utilization of mined out lands bauxite. These activities include pasture and livestock development as well as crop production research.

(15) Other activities

Between 1977 to 1980 a Japanese team of rice researchers carried out rice experiments on mineral soils in BRUMDEC and identified some useful pointers. The results should provide very useful data for the agronomy of this Project.

2. PRESENT CONDITIONS IN THE PROJECT AREA

2.1 Land Tenure and Land Holding

The situation of land tenure in the parish of St. Catherine may be judged from the Census of Agriculture conducted in 1978/79. The percentages of farm land owned and operated by the legal categories are: 53% by single holders, 9% by partnerships, 15% by corporations and cooperatives, and 7% by government. However, 82% of the farms are owned by small farmers who own farms of less than 2 ha (5 acres), 60% of the farm land is owned by large farmers which represent only 0.6% of total number. The average size of farm is 3.3 ha (8.4 acres) excluding landless farmers, who only own livestock without farm land.

The land holdings in the parish of St. Catherine were estimated on the basis of the Provisional Farmers' Register, which was conducted by the Data Collection & Statistics Branch, the Data Bank & Evaluation division, MOA in 1982. The number of farm households and total farm land are 15,300 households and 51,200 ha (126,500 acres), respectively. The average farm size is 3.3 ha (8.3 acres). The number of the small farm households with less than 4 ha (10 acres) is 10,400 households, which represents 68% of the total household and with an average farm size of 1.34 ha (3.3 acres). The number of larger farm households with more than 4 ha is 4,900, which represents 32% of the total households and with an average farm size of 7.7 ha (19.1 acres). The number of farms and hectareage by holding type are shown on Table G-1.

Land holdings by farm size in and around the project area were estimated on the basis of the same Provisional Farmers' Register. The total number of farm households and total farm land are 2,140 household and 13,200 ha (32,700 acres), respectively. Of the total farm households, 278 (13% of the total) own or operate no farm land, and have only livestock or small stock. 17 farms are more than 40 ha (100 acres) such as the Bernard Lodge Estate, the Caymanas Estates and the Innswood Estate. These 17 large farms occupy 11,500 ha (28,400 acres), which is 87% of the total farm land. The average size of farm excluding landless farms and large farms more than 100 acres is 0.93 ha (2.3 acres). The land holding by farm size in the project area is shown in Table G-2 and summarized as follows:

Farm Size	Number of Farms		Total Acreage	
(ha)			(ha)	
Landless	278	(13.0%)	0	(0.0%)
0.0 to 0.4	1,284	(59.9%)	146	(1.1%)
0.4 to 2	391	(18.2%)	501	(3.8%)
2 to 4	90	(4.2%)	287	(2.2%)
4 to 8	53	(2.5%)	331	(2.5%)
8 to 20	24	(1.1%)	264	(2.0%)
20 to 40	6	(0.3%)	199	(1.5%)
40 or more	17	(0.8%)	11,502	(86.9%)
Total	2,143	(100%)	13,230	(100%)

2.2 Agricultural Extension Services

Agricultural extension services of MOA in the parish of St. Catherine are controlled by the Linstead Land Authority. The land Authority has 4 major Departments: the Land Department, Land Reform Department, Engineering Department and Extension Department under the Executive Agricultural Officer. The organization chart of the Linstead Land Authority is shown on Fig. G-4.

The Lands Department manages land administration, land tenure, collection of due, land settlement, conservation and maintenance of government land assets. The Land Reform Department has responsibility for leased land and Project Land Lease such as 5 acre lots to small farmers, collection of due for maintenance, allotment and reposition of tenant, and renewing and changing land lease contract. The Engineering Department provides engineering services for civil construction in the whole parish of St. Catherine. This Department has a staff of Soil Conservation Officers under the Works Manager.

The Extension Department of the Linstead Land Authority is headed by the Deputy Executive Agricultural Officer, and has a staff of five (5) Divisional Extension Officers, six (6) Area Extension Officers, two (2) Home Economic Officers and one (1) Crop Care Officer. The organization chart of the Extension Department is shown on Fig. G-5.

The Divisional Extensional Officer is responsible for all extension and agricultural development programmes and for supervising the work of the Area Extension Officers.

The main duties and responsibilities of the Area Extension Officers are as follows:

- (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 MOA as the need arises.

The parish of St. Catherine is divided into eight (8) Extension Divisions namely Old Harbour, Browns Hall, Spanish Town, Bog Walk, Watermount, Linstead, Glengoff and Guys Hill. Each extension division is subdivided into five (5) to six (6) Extension Areas, and total forty six (46) Extension Areas are in eight (8) Extension Divisions. The List of the Extension Division and Areas are shown on Table G-3.

The project area is covered by two (2) Extension Divisions, Old Harbour and Spanish Town division. These two (2) Extension Divisions have twelve (12) Extensions Areas, however, the project area is covered by seven(7) Extension Areas such as Old Harbour, Bushy Park, Nightingale Grove, Hartlands, Spring Gardens in the Old Harbour division, and Spanish Town East and South in the Spanish Town division. The Extension Divisions and Areas are managed by one (1) divisional extension officer and one (1) area extension officer. The divisional extension office is located in the Bodles Research Station near Old Harbour.

2.3 Marketing Channel

The Marketing system for agricultural products has various channels by types of crops. These channels are usually classified into central markets, higglers, exporters and others such as supermarkets and restaurants. Additionally, some corporations have their own market channels for export. Sugar cane is sold to the sugar mill factories after harvesting.

In the project area, Old Harbour and Spanish Town are the central markets. Grading, packing and transportation of products are provided by the farmers, and market fees are also paid by the farmers. In the markets, farmers sell their products to consumers directly based on the current market prices.

Higglers, who are usually women, visit the farmers for themselves and sort crop products while assisting the farmers in harvesting and providing their own packing materials. They purchase crops at farmgate prices and bring them to central markets or to consumers directly. Numerous higglers have established relationship with farmers over the years. Additionally, wives of the farmers participate as higglers in the marketing channel.

Exporters deal in large amounts of crops for export and offer prices based on export prices and marketing costs. Farm products are sorted and graded based on quality. In some cases, exporters provide packing material and transportation, but the farmers are charged their costs.

Others such as supermarkets and restaurants deal in some crops in small to medium amount. The prices are between farmgate and market prices. The farmers incur harvesting, packing and transportation costs.

2.4 Farmers' Organization

2.4.1 Jamaica Agricultural Societies

In the parish of St. Catherine, the Jamaica Agricultural Societies (JAS) has 111 branch societies and 11,316 members, which is the second largest parish in the Island.

JAS has 6 branch societies and 543 members in the project area in November, 1986. These branch societies and its membership are summarized as follows:

Branch Societies	Membership
1. Central Village	85
2. Hartland	50
3. Church Pen	175
4. Southern Spanish Town	55
5. Thompson Pen	75
6. Old Harbour	103
Total	543

Activities for April, 1985 to March 1986 of some branch societies in the project area are as follows:

(1) Church Pen

- Two deputations were led to the Ministry of Local Government for improvement to domestic water supply,
- Six deputations were led to MOA for the proposed land settlement and irrigation water supplies, and
- This branch operated a saving club with 60 members with total savings of J\$ 27,326.65. Members intend to use their savings as down-payment on the proposed Thetford Land Settlement.

(2) Old Harbour

This branch society negotiated for the purchase of Colbeck Property for its members. A delegation from this branch met with the Executive Committee of JAS and the resident part owner of the land. It was agreed that sale negotiations for the property should be done through JAS on behalf of the branch. The savings account operated by this branch stands at approximately J\$ 108,000.

2.4.2 St. Catherine Vegetable Producers Association

In the study area, the active farmers organization is the St. Catherine Vegetable Producers Association (SCVPA), which was established as a Producers Marketing organization in

1983. The association has its office in the town of Old Harbour, the farm store in Gutters and the grading station located in Church Pen.

SCVPA has received assistance under the Small Farmer Production and Marketing Project, which has evolved by the Marketing and Credit division of the Ministry of Agriculture and USAID.

In September 1986, 256 members participate in SCVPA. Most of the members are centred around Old Harbour, but some additional members are in Hartlands, Hill Run and Spanish Town. Total land holding of members is about 2,500 acres with the range between 0.25 acres and 400 acres held by each farmer. The median holding size is 5 acres.

SCVPA provides member farmers with technical services such as demonstration, trials, informations on farming, etc, and farm inputs supply services through the farm store. SCVPA also functions marketing organization and recorded J\$ 330,000 in 1984/1985 for both of domestic and export markets.

2.5 Agricultural Credit

There are 6 People's Cooperative Banks (PC Bank) in the parish of St. Catherine as listed below:

PC Bank	Location
1. Midland	Guys Hill
2. Upper St. John	Point Hill
3. N. W. St. Catherine	Marley Hill
4. Glengoffe	Glengoffe
5. St. Thomas-Ye-Vale	Bog Walk
6. St. Dorothy	Old Harbour

The farmers in the project area go to the PC Banks of St. Dorothy, St. Thomas-Ye-Vale, North West St. Catherine and Stony Hill.

Commercial Banks dealing with the agricultural credit in the project area are the National Commercial Bank Jamaica Ltd. (NCB) and the Bank of Nova Scotia Jamaica Ltd. The NCB has two (2) branches, one is in Spanish Town and the other is in Old Harbour. The Bank of Nova Scotia has three (3) branches, two are in Spanish Town and the other is in Old Harbour.

PC Banks provide farmers with loans of short term, medium term (up to 7 years) and long term (up to 12 years) with the interest rate of 12% per annum. While, commercial banks supply only medium term and long-term loan with the interest rate of 15% per annum.

According to the survey conducted by the St. Catherine Vegetable Producers Association, more than 80% of farmers want to receive loans for agricultural activities and about 50% of farmers got loan before. Their main source is PC Banks. Out of farmers who have borrowed before, 70% did not repay loan and feel hard to pay back. They have some problems with water supplies and failed crops. About 30% of farmers, who want loans, have never borrowed.

If the farmers are assured of irrigation water, technical assistance and market of products, more farmers will get loans and improve their production.

3. MARKETING PROSPECT

3.1 General

Future agricultural production in the project area needs to be viewed in terms of projections of domestic demand and export requirements for crops, livestock and fish. The marketable surplus of products in the project area after implementation of the project can then be classified as the following four categories:

(1) Crops for export

Winter vegetables, fruits and ornamental horticultural products will be mainly exported to the fresh markets in North America and Europe.

(2) Commodities for import substitution

Commodities such as rice, maize, soybean, beef, milk and fish, which are currently imported, will be supplied by domestic production.

(3) Crops for domestic consumption

Summer vegetables and some other crops like red pea will be marketed in the parishes of Kingston, St. Andrew, St. Catherine and Clarendon.

(4) Sugarcane

Sugarcane produced in the project area will be purchased by National Sugar Holding according to the Government policy.

3.2 Crops for Export

In the marketing studies carried out by Agro 21, it was found that the US market has large potential for importing winter vegetables, fruits and ornamental horticultural products.

The market size of the total flower industry in US has expanded from US\$ 2 billion annually in 1960's to 1970's to about US\$ 7 billion annually in 1980's, and is expected to reach to US\$ 9 billion in 1990's. The fresh cut flower industry alone increased from US\$ 3.1 billion in 1981 to US\$ 4.8 billion in 1985. It is estimated that per capita consumption on cut flowers is US\$ 14 to 16 and the average US household spends around US\$ 50 a year on cut flowers. At the same time, the number of firms producing fresh cut flower in the US has been declining due to changes in consumer preference to exotic cut flowers and to increasing import competition. Colombia and the Netherlands are the main exporters to the US, and Israel and Mexico follow them. Other Latin American countries such as Costa Rica and Guatemala export to US. It is considered that Jamaica has an opportunity to export fresh cut flowers to the US market because of

geographical position and price. Ornamental horticultural products proposed in this study are those proposed in the marketing studies carried by Agro 21.

Per capita consumption of vegetable in US has steadily increased at a rate of 5% per annum from 1970 to 1983, and reached 95 kg (209 lb) in 1984. US consumer's preference has been shifting towards fresh vegetables which contain high fibre and vitamins, even when the domestic supply is off season, because of their concerns for health. In addition to above changes in preferences, population growth contributes to increased demand for fresh vegetables. It is anticipated therefore that the import of fresh vegetables in US will continue to increase, and that Jamaica has the opportunity to export fresh vegetables to US markets in winter season. Indeed the export of fresh vegetables from Jamaica to North America and Europe has recently been increasing. More specifically cucumber, pumpkin and sweet pepper exports in 1985 reached 5,500 ton, which was 7.7 times of those in 1981. In this study, therefore, cucumber, pumpkin and sweet pepper have been selected for economic assessment.

In terms of US consumption trends in fruits, per capita consumption of fruits has been increasing and reached 42 kg (91.8 lb) for both of fresh and processed and 14 kg (30 lb) for tropical fruits in 1983. Consumer's preference is also changing to fresh fruit from processed fruit. The quality of fruit is becoming high even in the off season, and fresh fruit consumption is income elastic. For these reasons, demand and import of fresh fruits is steadily increasing. According to the marketing studies, Jamaica has an opportunity to export mango, papaya, pineapple, passion fruit, navel-orange and guava. As regards mango, the US and Europe imported 39,000 ton in 1983 and 51,000 ton in 1984. The prospective volume for export from Jamaica and expected production for export in the project area are as follows:

Prospective volume for export	:	17,250 ton
Production in the study area	:	5,600 ton

3.3 Commodities for Import Substitution

Rice, maize, soybean, beef, milk and fish will be produced in the project area after implementation of the project for the purpose of import substitution. Imports of these commodities from 1981 to 1985 are shown in Table G-4 and average self-sufficiency during the same period is summarized as below:

Commodity	Average Production	Average Import	Total	Self-Sufficiency
	(ton)	(ton)	(ton)	(%)
Rice	3,300	48,000	51,300	6.4
Maize	3,800	178,600	182,400	2.1
Soybean	700	59,200	59,900	1.2
Beef	13,000	1,200	14,300	91.6
Milk	49,100	10,500	59,600	82.4
Fish	8,300	14,700	23,100	36.4

On the basis of past trends of domestic production and imports of these commodities, per capita consumption in 1995 were forecast and are shown in Table G-5. Per capita consumption of rice, beef, milk and fish in 1995 are 38.3 kg, 7.6 kg, 26.2 kg and 23.9 kg, respectively. Using forecast per capita consumption in 1995, total demand was estimated for each commodity in Jamaica in 1995. The balance between total demand in 1995 and average domestic production in 1985 are shown in Table G-6 and summarized as below:

(Unit: ton)

Commodity	Total Demand in 1995 (A)	Average Production 1981-85 (B)	Balance (A)-(B)	Total Production in the Project Area in 1995
Rice	100,700	3,300	97,400	25,200
Maize	283,300	3,800	279,400	22,900
Soybean	76,500	700	75,800	3,200
Beef	20,000	13,100	6,900	820
Milk	68,900	49,100	19,800	15,800
Fish	62,900	8,300	54,600	3,400

The balance between total demand in 1995 and average production, which is the deficit in domestic production in 1995, will have to be supplied by imports and increase of domestic production. It is expected that production of these commodities in the project area will be one of the main sources of domestic production for reduction of the above deficit.

3.4 Crops for Domestic Consumption

Crops such as summer vegetables and some other crops, which will be harvested out of export season in the project area, will be marketed for domestic consumption, especially in the parishes of Kingston, St. Catherine, St. Andrew and Clarendon.

Future per capita consumption is estimated on the basis of past trends in per capita consumption for forecasting future demand in the market area. Estimated per capita consumption and the forecast demand in the market area for 18 vegetables and 6 other crops are shown in Table G-7 and G-8, respectively. Actual supplies in 1985 and estimated demand are summarized as below:

Crop	Per Capita		Market Area	
	Consumption		Supply	Demand
	in 1985	in 1995	in 1985	in 1995
	(kg/person)	(kg/person)	(ton)	(ton)
Calaloo	4.8	7.3	5,800	11,400
Cucumber	2.9	3.9	3,500	6,100
Onion	1.4	2.9	1,700	4,400
Pumpkin	12.5	15.5	15,500	24,000
Sweet pepper	0.9	4.5	1,000	6,900
Other vegetables	29.5	42.0	35,000	65,300
Vegetables total	52.0	76.1	62,500	118,100
Red pea	1.8	2.4	2,200	3,700

The balance between total supply in 1985 and total demand in 1995 will be supplemented from the area surrounding the market area of the parishes of Kingston, St. Andrew, St. Catherine and Clarendon, however, it is expected that the project area will be the main supply area for the market area after implementation of the project. The total production in the project area and the balance between total supply in 1985 total demand in 1995 are summarized as below:

	Balance between Total Supply in 1985 and Total Demand in 1995	Total Production in the Project area in 1995
Calaloo	5,600	7,500
Cucumber	2,600	3,000
Onion	2,700	3,800
Pumpkin	9,100	3,500
Sweet pepper	5,900	2,800
Other vegetables	29,700	-
Vegetables total	55,600	20,600
Red pea	1,600	250

3.5 Sugarcane

After implementation of the project, production of sugarcane will be raised to 222,800 ton in 1995. All the sugarcane produced in the project area will be transported to Monymusk sugar Mill Factory for milling.

4. IRRIGATION BENEFITS AND FARM BUDGET ANALYSIS

4.1 Irrigation Benefits

4.1.1 General

The irrigation benefits will primarily accrue from the increased agricultural production due to stable irrigation water supply, expansion of the irrigated area and changes in cropping. These benefits are defined as the difference in the annual net production values under future with and without the project conditions.

Crop production will gradually increase after commencement of the project operation. The buildup period needed to attain the anticipated yields for sugarcane, paddy, vegetables and orchard was estimated as follows:

Sugarcane and paddy	
1st year	40% of the anticipated yields
2nd year	60% of the anticipated yields
3rd year	80% of the anticipated yields
4th year	100% of the anticipated yields
Vegetables	
1st year	60% of the anticipated yields
2nd year	80% of the anticipated yields
3rd year	100% of the anticipated yields
Orchard	
1st to 3rd years	0% of the anticipated yields
4th year	20% of the anticipated yields
5th year	40% of the anticipated yields
6th year	60% of the anticipated yields
7th year	80% of the anticipated yields
8th year	100% of the anticipated yields

4.1.2 Change in land use

The present land use will be changed to the future land use under without and with project conditions as follows:

(Unit: ha)

Land Use	Without Project Condition		With Project Condition	
Sugarcane	4,190	(28.7%)	3,260	(22.3%)
Vegetable/crops	4,500	(30.7%)	4,200	(28.8%)
Grains	770	(5.3%)	0	(0.0%)
Ornamentals	170	(1.2%)	170	(1.2%)
Orchards	80	(0.5%)	780	(5.3%)
Paddy	710	(4.9%)	3,900	(26.7%)
Pasture	1,180	(8.1%)	1,330	(9.1%)
Aquaculture	430	(2.9%)	590	(4.0%)
Others	2,590	(17.7%)	390	(2.6%)
Total	14,620	(100.0%)	14,620	(100.0%)

Detail of gross and net area for each crop is shown on Table G-9 and G-10, respectively.

4.1.3 Production costs

The direct production costs per ha of proposed crops are estimated for without and with project conditions. It is assumed that the present farming system would not change significantly under without project condition because the major constraints for agricultural production would not have been overcome. Production costs under without project condition are estimated on the basis of those under present conditions. The unit prices of inputs are given in Annex-N. Economic production costs for without and with project conditions are shown in Table G-11.

4.1.4 Net production values

Net production values per ha of proposed crops were estimated using economic prices as forecast in Annex-N. Net production values are obtained by deducting direct production costs from the gross production value. For each cropping pattern net production values per ha were estimated using those of proposed crops. Net production values under with project conditions will increase about 27% from the values under without project condition. The net production values of each crop and cropping pattern are shown in Table G-12 to G-14 which may be summarized as follows:

(Unit: J\$/ha)

Cropping Pattern	Without Project Condition	With Project Condition
Sugarcane	960	3,560
Vegetable/crops	2,700	-
Vegetable/vegetable	-	50,600
Vegetable/grains	10,890	29,000
Grains	980	-
Paddy/paddy	2,380	3,600
Paddy/grains	-	2,820
Orchard	10,260	10,260
Ornamentals	282,300	282,300
Pasture	5,100	12,720
Aquaculture	7,400	7,400

4.1.5 Irrigation

The gross irrigation benefits at full development stage were estimated at about J\$ 118 million in total, J\$ 9,310/ha net or 8,290/ha gross (J\$ 3,750/acre net or J\$ 3,360/acre gross) per annum. Table G-15 shows the calculation of the annual irrigation benefits.

4.2 Farm Budget Analysis

After completion of construction, farmers will be supplied with irrigation water from the project facilities to cultivate their arable land, and will bear some charges or expenditure for supplied irrigation water.

Farm budget analysis was made for each farming type under with project condition on the basis of financial prices of products and farm inputs estimated in Annex-N. Typical farm sizes for each farming type were assumed from present conditions on large farms and a farm economic survey for small farmers. The calculation of farm budgets is shown in Table G-16 to G-19. The annual net reserve for each farming type may be summarized as follows:

Farming Type	Average Size	Net Reserve
	(ha)	(J\$/year)
Sugarcane	1,690	2,653,000
Dairy	70	463,600
Vegetables		
Large	170	3,468,000
Small	3.2	101,800
Paddy		
Large	710	3,379,600
Small	3.2	10,500
Orchard	170	419,000
Horticulture	2.0	516,000
Fish	6.0	31,400
Cattle	6.5	22,700

The increased net reserve would enable farmers to pay some charges for irrigation water and would offer them incentives for further development.

5. FARM INTERVIEW SURVEY

5.1 General

A farm interview survey was made during the field survey to collect data and information relating to the present situation of farmers in the study area. These data and information provided the present condition of farmers for formulating the development plan. Furthermore, for project benefit monitoring and evaluation, this survey will provide information on the present condition of farmers who will be beneficiaries of the project after completion of this project.

For these purposes, the farm interview survey was designed to collect information on (1) Demography, (2) Agricultural production, (3) Agricultural support services, and (4) Farmers' living conditions as follows:

(1) Demography

family size, sex composition, age structure, educational situation and occupation of family members,

(2) Agricultural production

farm size, land tenure, irrigation condition, crop acreage, crop yield, crop production and livestock production,

(3) Agricultural support services

extension services, agricultural credit and farmers' organizations, and

(4) Farmers' living conditions

on and off farm income, on and off farm expenditure, housing, utilities, properties, communities, etc.

5.2 Survey Design and Methodology

The questionnaire form for this survey was prepared taking account of the above items, and was matched with the social and agricultural situation of farmers in the study area.

Stratified random sampling was adopted in this survey. There are about 2,800 farm household in the study area and these were classified into 4 strata of farm size; (i) 0.04 ha to 0.4 ha, (ii) 0.4 ha to 2 ha, (iii) 2 ha to 8 ha, and (iv) over 8 ha.

The sample size was determined for each strata, and in all 110 farm households were selected for survey. Selected sample size were then allocated to agricultural extension divisions in the study area.

Six interviewers, who were provided by the Data Bank of MOA, conducted the interview survey over two weeks from 1st to 14th November, 1986. One hundred ten questionnaires were completed.

5.3 Survey Findings

The results of the farm interview survey and survey findings were follows:

The average farm size of the farms surveyed was about 3.2 ha (7.8 acres). By land tenure type, the average sizes were 5.7 ha (14 acres), 0.94 ha (2.3 acres) and 0.75 ha (1.85 acres) for own land, leased land and 'captured' land respectively. As for small farm with a size of less than 2 ha, only 15% of these farms cultivate land owned by themselves and the other 85% cultivate leased land or 'captured' land. On the other hand, 80% of large farms have their own land.

The average size of farm household served is 6.4, while the average household in the study area was estimated at 4.5. The farm household consists of 3.2 (male: 1.5, female: 1.7) over 16 years old and 3.2 under 15 years old.

With regard to the educational level of farmers and their families, 80% of them graduated from primary or secondary school, 4% achieved higher education such as college and university and 7% have never been educated. Those who achieved higher education are mostly on the larger farms of over 4 ha. Only 2 to 3% of farmers have received training or guidance in agriculture.

Except heads of farm households, almost 50% of family members are full time or part time farmers on their own farms. The other 50% have occupations other than farming such as manufacture, commerce, construction and public services. This is an important income source for supplementing farm income.

The main source of information or advice for farmers is other farmers, 40% of farmers see each other periodically i.e. weekly to exchange information. Only 22% of farmers have contact with officers of MOA, and these contacts are not as frequent as once or twice a month. Jamaica Agricultural Societies and St. Catherine Vegetable Producers Association are listed as addition information sources. Information received from these are farming plans, selection of crops, farm inputs, marketing, etc.

The main source of agricultural credit is the PC Bank. About 14% of farmers have loans ranging from J\$ 1,000 to J\$ 20,000. Other agencies such as commercial banks and credit unions are negligible. However another 86% of farmers have never had a loan. Their main reasons are (1) no interest in loans and lack of titles and collaterals.

About 30% of farmers participate in Jamaica Agricultural Society, 5% in Jamaica Livestock Association and 18% in St. Catherine Vegetable Producers Association. In all 34% of farmers participate in a farmer's organization, and 10% in two or more organizations.

About 41% of farmers have dwelling houses on their farms made of concrete with 2.75 rooms on average. 38% has wooden houses. Almost 50% of houses are supplied with domestic piped water. No house is equipped with a telephone.

The average size of farm household spent J\$ 12,350 on living in the previous year, and about half of the living expense is on food and drink. These expenses cannot be covered by farm income and are supplemented by family members' occupations.

Table G-1 NUMBER OF FARMS AND HECTARAGE BY LEGAL STATUS OF HOLDER

Farm Size	Single Holder	Partnership	Corporation	Co-operative	Government	Not Specified	Total
1. NUMBER OF FARMS							
Landless	273	0	0	0	0	0	273
0.0 to 0.4 ha	4,916	25	0	0	0	2	4,943
0.4 to 2.0 ha	9,598	76	0	0	2	2	9,678
2.0 to 4.0 ha	2,105	25	0	0	1	1	2,132
4.0 to 10.0 ha	950	17	1	0	1	2	971
10.0 to 20.0 ha	166	5	0	0	0	1	172
20.0 to 40.0 ha	69	4	0	1	0	0	74
40.0 ha or more	36	4	5	1	3	4	53
Total	18,113	156	6	2	7	12	18,296
2. HECTARAGE (ha)							
Landless	870	10	0	0	0	0	880
0.0 to 0.4	8,170	60	0	0	0	0	8,230
0.4 to 2.0	5,490	70	0	0	0	0	5,560
2.0 to 4.0	5,310	80	10	0	10	20	5,430
4.0 to 10.0	2,250	90	0	0	0	10	2,350
10.0 to 20.0	1,860	120	0	20	0	0	2,000
20.0 to 40.0	3,710	960	7,070	210	840	1,200	13,990
40.0 or more	0	0	0	0	0	0	0
Total	27,660	1,390	7,080	230	850	1,230	38,440

Table G-2 NUMBER OF FARMS BY FARM SIZE IN THE PROJECT AREA

Old Harbour Extension Division			
Farm Size (ha)	Number of Farmers	Total Acreage (ha)	Average Farm Size (ha/farm)
0	166 (15.4%)	0 (0.0%)	0.0
0.04 to 0.4	431 (40.0%)	77 (1.0%)	0.2
0.4 to 2	324 (30.1%)	422 (5.3%)	1.3
2 to 4	72 (6.7%)	231 (2.9%)	3.2
4 to 8	47 (4.4%)	284 (3.6%)	6.1
8 to 20	21 (1.9%)	235 (3.0%)	11.2
20 to 40	5 (0.5%)	159 (2.0%)	31.8
40 or more	11 (1.0%)	6,485 (82.2%)	589.5
Total	1,077 (100%)	7,893 (100%)	7.3

Spanish Town Extension Division			
Farm Size (ha)	Number of Farmers	Total Acreage (ha)	Average Farm Size (ha/farm)
0	112 (10.5%)	0 (0.0%)	0.0
0.04 to 0.4	853 (80.0%)	68 (1.3%)	0.1
0.4 to 2	67 (6.3%)	79 (1.5%)	1.2
2 to 4	18 (1.7%)	56 (1.0%)	3.1
4 to 8	6 (0.6%)	47 (0.9%)	7.8
8 to 20	3 (0.3%)	29 (0.6%)	9.8
20 to 40	1 (0.1%)	41 (0.8%)	40.5
40 or more	6 (0.6%)	5,018 (94.0%)	836.3
Total	1,066 (100%)	5,337 (100%)	5.0

Project Area			
Farm Size (ha)	Number of Farmers	Total Acreage (ha)	Average Farm Size (ha/farm)
0	278 (13.0%)	0 (0.0%)	0.0
0.04 to 0.4	1,284 (59.9%)	146 (1.1%)	0.1
0.4 to 2	391 (18.2%)	501 (3.8%)	1.3
2 to 4	90 (4.2%)	287 (2.2%)	3.2
4 to 8	53 (2.5%)	331 (2.5%)	6.2
8 to 20	24 (1.1%)	264 (2.0%)	11.0
20 to 40	6 (0.3%)	199 (1.5%)	33.2
40 or more	17 (0.8%)	11,502 (86.9%)	676.6
Total	2,143 (100%)	13,230 (100%)	6.2

Table G-3 LIST OF EXTENTION DIVISIONS AND AREAS
IN THE PARISH OF ST. CATHERINE

Division	Extension Area	Division	Extension Area
OLD HARBOUR	Old Harbour Red Ground Bushy Park Nightingale Grove Heart Land Spring Garden	WATERMOUNT	Watermount Gorden Hill Kentish Point Hill Lluidas Vale
BROWNS HALL	Bois Content Bartons Browns Hall Macca Tree Bellas Gate Connors	LINSTEAD	Wakefield Linstead Ewarton Charlemont Treadways or Backhire Hall Dover Castle
SPANISH TOWN	Bellvue Kitson Town Spanish Town East Spanish Town South Mt. Moreland Sligoville	GLENGOFFE	Waugh Hill Above Rocks St. Faiths Mt. Industry Aberden or Morris Hall Glengoffe
BOG WALK	Giblatore Harkers Hall Lucky Valley Bog Walk Riversdale	GUYS HILL	Benbow Guys Hill Seafield Pear Tree Grove Red Wood Troja

Table G-4 IMPORTS OF MAJOR FOOD COMMODITIES 1981 TO 1985

Commodity	(Unit : ton)					
	1981	1982	1983	1984	1985	Average
Rice	42,720	39,100	50,610	52,170	55,220	47,960
Maize	225,660	151,120	166,130	202,960	147,180	178,610
Soybean	53,010	54,790	94,080	50,860	43,050	59,160
Beef	1,900	1,730	1,160	860	330	1,200
Milk	11,410	10,980	8,690	10,900	10,540	10,500
Fish	16,570	17,170	13,020	14,840	11,860	14,690

Source; External Trade Year Book, Statistical Institute of Jamaica

Table G- 5(1/2)

ESTIMATION OF PER CAPITA CONSUMPTION OF IMPORT
COMMODITIES PER ANNUM

Year	Population	Domestic Production (ton)	Import (ton)	Supply for Domestic Consumption (ton)	Moving Average for 5 years (ton)	Per Capita Consumption (kg/capita)
RICE						
1977	2,072,000	2,400	28,700	31,100	31,100	15.01
1978	2,094,000	1,400	45,500	46,900	39,000	18.62
1979	2,137,000	1,200	27,900	29,100	35,700	16.71
1980	2,160,000	2,300	53,000	55,300	40,600	18.80
1981	2,182,000	1,900	42,700	44,600	41,400	18.97
1982	2,219,000	1,500	39,200	40,700	43,300	19.51
1983	2,263,000	3,400	50,700	54,100	44,800	19.80
1984	2,297,000	5,400	52,200	57,600	50,500	21.99
1985	2,326,000	4,300	55,200	59,500	51,300	22.06
Average in 1981-85		3,300	48,000	51,300	46,300	20.46
Increase Rate of Per Capita Consumption						5.36%
1995	(estimation of per capita consumption)					38.31
MAIZE						
1977	2,072,000	9,300	133,200	142,500	142,500	68.77
1978	2,094,000	7,900	207,100	215,000	178,750	85.36
1979	2,137,000	6,700	69,800	76,500	144,700	67.71
1980	2,160,000	4,400	210,600	215,000	162,300	75.14
1981	2,182,000	4,500	225,700	230,200	175,800	80.57
1982	2,219,000	3,100	151,100	154,200	178,200	80.31
1983	2,263,000	3,700	166,100	169,800	169,100	74.72
1984	2,297,000	3,700	202,000	205,700	195,000	84.89
1985	2,326,000	3,900	147,200	151,100	182,200	78.33
Average in 1981-85		3,800	178,400	182,200	180,100	79.76
Increase Rate of Per Capita Consumption						2.53%
1995	(estimation of per capita consumption)					107.70
SOYBEAN						
1977	2,072,000	0	34,500	34,500	34,500	16.65
1978	2,094,000	0	47,300	47,300	40,900	19.53
1979	2,137,000	0	71,600	71,600	51,100	23.91
1980	2,160,000	0	62,900	62,900	54,100	25.05
1981	2,182,000	0	53,000	53,000	53,900	24.70
1982	2,219,000	0	54,800	54,800	57,920	26.10
1983	2,263,000	0	94,100	94,100	67,280	29.73
1984	2,297,000	500	50,900	51,400	63,240	27.53
1985	2,326,000	800	43,000	43,800	59,420	25.55
Average in 1981-85		700	59,200	59,400	60,400	26.72
Increase Rate of Per Capita Consumption						0.72%
1995	(estimation of per capita consumption)					29.10

Table G- 5(2/2)

ESTIMATION OF PER CAPITA CONSUMPTION OF IMPORT
COMMODITIES PER ANNUM

Year	Population	Domestic Production (ton)	Import (ton)	Supply for Domestic Consumption (ton)	Moving Average for 5 years (ton)	Per Capita Consumption (kg/capita)
BEEF						
1975	2,030,000	14,200	10,200	24,400	24,400	12.02
1976	2,051,000	12,700	10,300	23,000	23,700	11.56
1977	2,072,000	12,400	7,400	19,800	22,400	10.81
1978	2,094,000	11,600	12,700	24,300	22,900	10.94
1979	2,137,000	11,400	4,300	15,700	21,400	10.01
1980	2,160,000	12,000	2,500	14,500	19,500	9.03
1981	2,182,000	11,800	4,100	15,900	18,000	8.25
1982	2,219,000	12,200	4,600	16,800	17,400	7.84
1983	2,263,000	14,100	3,600	17,700	16,100	7.11
1984	2,297,000	15,000	3,700	18,700	16,700	7.27
Average in 1981-85		13,000	3,700	16,700	17,500	7.90
Increase Rate of Per Capita Consumption						0.00%
1995	(estimation of per capita consumption)					7.62
MILK						
1982	2,219,000	48,400	11,000	59,400	59,400	26.77
1983	2,263,000	49,200	8,700	57,900	58,700	25.94
1984	2,297,000	49,600	10,900	60,500	59,300	25.82
Average in 1981-85		49,100	10,200	59,300	59,100	26.17
Increase Rate of Per Capita Consumption						0.00%
1995	(estimation of per capita consumption)					26.17
FISH						
1975	2,030,000	7,800	51,100	58,900	58,900	29.01
1976	2,051,000	7,800	52,700	60,500	59,700	29.11
1977	2,072,000	8,000	42,700	50,700	56,700	27.36
1978	2,094,000	8,100	53,400	61,500	57,900	27.65
1979	2,137,000	8,000	37,100	45,100	55,300	25.88
1980	2,160,000	7,900	40,400	48,300	53,200	24.63
1981	2,182,000	7,800	49,100	56,900	52,500	24.06
1982	2,219,000	8,100	55,700	63,800	55,100	24.83
1983	2,263,000	8,300	39,300	47,600	52,300	23.11
1984	2,297,000	9,600	44,000	53,600	54,000	23.51
Average in 1981-85		8,300	45,700	54,000	53,400	24.03
Increase Rate of Per Capita Consumption						0.00%
1995	(estimation of per capita consumption)					23.88

Table G-6 BALANCE BETWEEN TOTAL DEMAND IN 1995 AND AVERAGE DOMESTIC PRODUCTION DURING 1981 TO 1985

Commodity	(A)*	(B)	(C)*	(B)-(C)
	Per Capita Consumption in 1995 (kg/person)	Total Demand in 1995 (ton)	Average Domestic Production in 1981-1985 (ton)	Balance (ton)
Rice	38.3	100,700	3,300	97,400
Maize	107.7	283,300	3,800	279,500
Soyabean	29.1	76,500	700	75,800
Beef	7.6	20,000	13,100	6,900
Milk	26.2	68,900	49,100	19,800
Fish	23.9	62,900	8,300	54,600

Remark; see Table G-5

Note : (B)=(A) X population in 1995
(population in 1995 is estimated at 2,623,000)

Table G-7 (1/8) ESTIMATION OF PER CAPITA CONSUMPTION OF DOMESTIC CROPS PER ANNUM

Year	Population	Domestic Production (ton)	Import (ton)	Export (ton)	Supply for Domestic Consumption (ton)	Moving Average for 5 years (ton)	Per Capita Consumption (kg/capita)	
BETROOT								
1971	-	808	-	-	808	808	-	
1972	-	953	-	-	953	881	-	
1973	-	636	-	-	636	799	-	
1974	-	635.6	-	-	636	758	-	
1975	2,030,000	599.28	-	-	599	726	0.36	
1976	2,051,000	1,153	-	-	1,153	795	0.39	
1977	2,072,000	590	-	-	590	723	0.35	
1978	2,094,000	1,099	-	-	1,099	815	0.39	
1979	2,137,000	608	-	-	608	810	0.38	
1980	2,160,000	572	-	-	572	804	0.37	
1981	2,182,000	563	-	-	563	686	0.31	
1982	2,219,000	590	-	-	590	686	0.31	
1983	2,263,000	508	-	-	508	568	0.25	
1984	2,297,000	763	-	-	763	599	0.26	
1985	2,326,000	681	-	-	681	621	0.27	
		Increase Rate of Per Capita Consumption						-2.42%
1995	2,630,000						0.21	
CABBAGE								
1971	-	11,023	-	-	11,023	11,023	-	
1972	-	9,552	-	-	9,552	10,288	-	
1973	-	6,992	-	-	6,992	9,189	-	
1974	-	12,340	381	-	12,721	10,072	-	
1975	2,030,000	8,090	436	-	8,526	9,763	4.81	
1976	2,051,000	15,436	100	-	15,536	10,665	5.20	
1977	2,072,000	8,889	0	-	8,889	10,533	5.08	
1978	2,094,000	16,253	0	-	16,253	12,385	5.91	
1979	2,137,000	13,802	0	-	13,802	12,601	5.90	
1980	2,160,000	14,328	0	-	14,328	13,762	6.37	
1981	2,182,000	15,808	0	-	15,808	13,816	6.33	
1982	2,219,000	16,308	0	-	16,308	15,300	6.89	
1983	2,263,000	17,170	0	-	17,170	15,483	6.84	
1984	2,297,000	17,969	0	-	17,969	16,317	7.10	
1985	2,326,000	16,135	0	-	16,135	16,678	7.17	
		Increase Rate of Per Capita Consumption						2.45%
1995	2,630,000						9.19	
CALALOO								
1971	-	0	-	-	0	0	-	
1972	-	0	-	-	0	0	-	
1973	-	0	-	-	0	0	-	
1974	-	0	-	-	0	0	-	
1975	2,030,000	0	-	-	0	0	-	
1976	2,051,000	0	-	-	0	0	-	
1977	2,072,000	9,788	-	-	9,788	1,958	0.94	
1978	2,094,000	10,778	-	-	10,778	4,113	1.96	
1979	2,137,000	11,314	-	-	11,314	6,376	2.98	
1980	2,160,000	13,983	-	-	13,983	9,173	4.25	
1981	2,182,000	12,213	-	-	12,213	11,615	5.32	
1982	2,219,000	10,397	-	-	10,397	11,737	5.29	
1983	2,263,000	10,215	-	-	10,215	11,624	5.14	
1984	2,297,000	11,786	-	-	11,786	11,719	5.10	
1985	2,326,000	11,096	-	-	11,096	11,141	4.79	
		Increase Rate of Per Capita Consumption						3.01%
1995	2,630,000						7.32	

Source: Data Bank, Ministry of Agriculture

Table G-7 (2/8) ESTIMATION OF PER CAPITA CONSUMPTION OF DOMESTIC CROPS PER ANNUM

Year	Population	Domestic Production (ton)	Import (ton)	Export (ton)	Supply for Domestic Consumption (ton)	Moving Average for 5 years (ton)	Per Capita Consumption (kg/capita)	
CARROT								
1971	-	6,456	-	-	6,456	6,456	-	
1972	-	9,007	-	-	9,007	7,732	-	
1973	-	8,453	-	-	8,453	7,972	-	
1974	-	7,509	127	-	7,636	7,888	-	
1975	2,030,000	5,457	300	-	5,757	7,462	3.68	
1976	2,051,000	9,625	27	-	9,652	8,101	3.95	
1977	2,072,000	7,818	0	-	7,818	7,863	3.80	
1978	2,094,000	10,324	0	-	10,324	8,237	3.93	
1979	2,137,000	11,114	0	-	11,114	8,933	4.18	
1980	2,160,000	10,751	0	-	10,751	9,932	4.60	
1981	2,182,000	14,564	0	-	14,564	10,914	5.00	
1982	2,219,000	14,819	0	-	14,819	12,314	5.55	
1983	2,263,000	15,681	0	-	15,681	13,386	5.92	
1984	2,297,000	17,652	0	-	17,652	14,693	6.40	
1985	2,326,000	14,592	0	-	14,592	15,461	6.65	
		Increase Rate of Per Capita Consumption						6.04%
1995	2,630,000						11.93	
CHO-CHO								
1971	-	3,278	-	-	3,278	3,278	-	
1972	-	3,668	-	-	3,668	3,473	-	
1973	-	3,251	-	-	3,251	3,399	-	
1974	-	3,605	-	-	3,605	3,450	-	
1975	2,030,000	4,013	-	-	4,013	3,563	1.76	
1976	2,051,000	4,531	-	-	4,531	3,814	1.86	
1977	2,072,000	5,566	-	-	5,566	4,193	2.02	
1978	2,094,000	7,409	-	-	7,409	5,025	2.40	
1979	2,137,000	6,420	-	-	6,420	5,588	2.61	
1980	2,160,000	3,904	-	-	3,904	5,566	2.58	
1981	2,182,000	5,185	-	-	5,185	5,697	2.61	
1982	2,219,000	4,458	-	-	4,458	5,475	2.47	
1983	2,263,000	4,358	-	-	4,358	4,865	2.15	
1984	2,297,000	6,038	-	-	6,038	4,789	2.08	
1985	2,326,000	4,885	-	-	4,885	4,985	2.14	
		Increase Rate of Per Capita Consumption						1.10%
1995	2,630,000						2.61	
CUCUMBER								
1971	-	3,124	-	-	3,124	3,124	-	
1972	-	3,523	-	-	3,523	3,323	-	
1973	-	3,396	-	-	3,396	3,347	-	
1974	-	3,459	-	-	3,459	3,375	-	
1975	2,030,000	4,486	0	0	4,486	3,597	1.77	
1976	2,051,000	5,539	0	9.08	5,530	4,079	1.99	
1977	2,072,000	7,273	0	108.96	7,164	4,807	2.32	
1978	2,094,000	7,055	0	190.68	6,864	5,501	2.63	
1979	2,137,000	5,448	0	199.76	5,248	5,858	2.74	
1980	2,160,000	6,147	0	0	6,147	6,191	2.87	
1981	2,182,000	5,993	0	0	5,993	6,283	2.88	
1982	2,219,000	5,130	0	0	5,130	5,877	2.65	
1983	2,263,000	6,492	0	118.04	6,374	5,779	2.55	
1984	2,297,000	7,146	0	281.48	6,864	6,102	2.66	
1985	2,326,000	11,895	0	2533.3	9,361	6,745	2.90	
		Increase Rate of Per Capita Consumption						3.02%
1995	2,630,000						3.90	

Source: Data Bank, Ministry of Agriculture

Table G-7 (3/8) ESTIMATION OF PER CAPITA CONSUMPTION OF DOMESTIC CROPS PER ANNUM

Year	Population	Domestic Production (ton)	Import (ton)	Export (ton)	Supply for Domestic Consumption (ton)	Moving Average for 5 years (ton)	Per Capita Consumption (kg/capita)	
EGG PLANT								
1971	-	118	-	-	118	118	-	
1972	-	127	-	-	127	123	-	
1973	-	45	-	-	45	97	-	
1974	-	64	-	-	64	89	-	
1975	2,030,000	82	-	-	82	87	0.04	
1976	2,051,000	73	-	-	73	78	0.04	
1977	2,072,000	54	-	-	54	64	0.03	
1978	2,094,000	36	-	-	36	62	0.03	
1979	2,137,000	27	-	-	27	54	0.03	
1980	2,160,000	54	-	-	54	49	0.02	
1981	2,182,000	54	-	-	54	45	0.02	
1982	2,219,000	54	-	-	54	45	0.02	
1983	2,263,000	45	-	-	45	47	0.02	
1984	2,297,000	64	-	-	64	54	0.02	
1985	2,326,000	45	-	-	45	53	0.02	
		Increase Rate of Per Capita Consumption						0.22%
1995	2,630,000						0.02	
ESCALLION								
1971	-	1,071	-	-	1,071	1,071	-	
1972	-	1,286	-	-	1,286	1,179	-	
1973	-	1,023	-	-	1,023	1,127	-	
1974	-	1,033	-	-	1,033	1,103	-	
1975	2,030,000	854	-	-	854	1,053	0.52	
1976	2,051,000	1,416	-	-	1,416	1,122	0.55	
1977	2,072,000	2,478	-	-	2,478	1,361	0.66	
1978	2,094,000	3,578	-	-	3,578	1,872	0.89	
1979	2,137,000	3,803	-	-	3,803	2,426	1.14	
1980	2,160,000	3,489	-	-	3,489	2,953	1.37	
1981	2,182,000	5,711	-	-	5,711	3,812	1.75	
1982	2,219,000	2,402	-	-	2,402	3,797	1.71	
1983	2,263,000	3,975	-	-	3,975	3,876	1.71	
1984	2,297,000	4,525	-	-	4,525	4,021	1.75	
1985	2,326,000	3,462	-	-	3,462	4,015	1.73	
		Increase Rate of Per Capita Consumption						5.33%
1995	2,630,000						3.06	

Source: Data Bank, Ministry of Agriculture

Table G-7 (4/8) ESTIMATION OF PER CAPITA CONSUMPTION OF DOMESTIC CROPS PER ANNUM

Year	Population	Domestic Production (ton)	Import (ton)	Export (ton)	Supply for Domestic Consumption (ton)	Moving Average for 5 years (ton)	Per Capita Consumption (kg/capita)	
LETTUCE								
1971	-	4,576	-	-	4,576	4,576	-	
1972	-	3,923	-	-	3,923	4,249	-	
1973	-	3,532	-	-	3,532	4,010	-	
1974	-	2,343	-	-	2,343	3,593	-	
1975	2,030,000	2,778	-	-	2,778	3,430	1.69	
1976	2,051,000	3,832	-	-	3,832	3,282	1.60	
1977	2,072,000	1,062	-	-	1,062	2,709	1.31	
1978	2,094,000	1,308	-	-	1,308	2,265	1.08	
1979	2,137,000	1,362	-	-	1,362	2,068	0.97	
1980	2,160,000	1,071	-	-	1,071	1,727	0.80	
1981	2,182,000	1,189	-	-	1,189	1,199	0.55	
1982	2,219,000	1,489	-	-	1,489	1,284	0.58	
1983	2,263,000	2,088	-	-	2,088	1,440	0.64	
1984	2,297,000	2,079	-	-	2,079	1,584	0.69	
1985	2,326,000	2,034	-	-	2,034	1,776	0.76	
		Increase Rate of Per Capita Consumption						8.60%
1995	2,630,000						1.59	
OKRA								
1971	-	645	-	-	645	645	-	
1972	-	1,026	-	-	1,026	835	-	
1973	-	1,117	-	-	1,117	929	-	
1974	-	935	-	-	935	931	-	
1975	2,030,000	1,144	0	9.08	1,135	972	0.48	
1976	2,051,000	999	0	9.08	990	1,041	0.51	
1977	2,072,000	1,062	0	0	1,062	1,048	0.51	
1978	2,094,000	999	0	0	999	1,024	0.49	
1979	2,137,000	1,008	0	0	1,008	1,039	0.49	
1980	2,160,000	1,117	0	0	1,117	1,035	0.48	
1981	2,182,000	1,317	0	0	1,317	1,100	0.50	
1982	2,219,000	1,525	0	54.48	1,471	1,182	0.53	
1983	2,263,000	1,544	0	18.16	1,525	1,288	0.57	
1984	2,297,000	2,243	0	208.84	2,034	1,493	0.65	
1985	2,326,000	1,335	0	18.16	1,317	1,533	0.66	
		Increase Rate of Per Capita Consumption						3.37%
1995	2,630,000						0.84	
ONION								
1971	-	263	5,067	0	5,330	5,330	-	
1972	-	182	4,840	0	5,021	5,176	-	
1973	-	472	-	0	472	3,608	-	
1974	-	1,371	3,196	0	4,567	3,848	-	
1975	2,030,000	2,170	3,532	0	5,702	4,219	2.08	
1976	2,051,000	3,214	2,624	0	5,838	4,320	2.11	
1977	2,072,000	4,313	245	0	4,558	4,228	2.04	
1978	2,094,000	8,236	36	0	8,272	5,788	2.76	
1979	2,137,000	2,615	154	0	2,769	5,428	2.54	
1980	2,160,000	2,216	354	0	2,570	4,802	2.22	
1981	2,182,000	1,571	799	0	2,370	4,108	1.88	
1982	2,219,000	1,616	1,208	0	2,824	3,761	1.69	
1983	2,263,000	1,852	890	0	2,742	2,655	1.17	
1984	2,297,000	3,832	236	9.08	4,059	2,913	1.27	
1985	2,326,000	4,032	163	0	4,195	3,238	1.39	
		Increase Rate of Per Capita Consumption						6.12%
1995	2,630,000						2.85	

Source: Data Bank, Ministry of Agriculture

Table G-7 (5/8) ESTIMATION OF PER CAPITA CONSUMPTION OF DOMESTIC CROPS PER ANNUM

Year	Population	Domestic Production (ton)	Import (ton)	Export (ton)	Supply for Domestic Consumption (ton)	Moving Average for 5 years (ton)	Per Capita Consumption (kg/capita)	
PUMPKIN								
1971	-	20,130	-	-	20,130	20,130	-	
1972	-	10,887	-	-	10,887	15,509	-	
1973	-	18,596	-	-	18,596	16,538	-	
1974	-	19,613	-	-	19,613	17,306	-	
1975	2,030,000	23,662	0	962	22,700	18,385	9.06	
1976	2,051,000	21,329	0	436	20,893	18,538	9.04	
1977	2,072,000	27,095	0	263	26,831	21,727	10.49	
1978	2,094,000	33,986	0	327	33,660	24,739	11.81	
1979	2,137,000	22,900	0	200	22,700	25,357	11.87	
1980	2,160,000	25,224	0	400	24,825	25,782	11.94	
1981	2,182,000	27,640	0	590	27,049	27,013	12.38	
1982	2,219,000	23,336	0	1,308	22,028	26,052	11.74	
1983	2,263,000	32,506	0	1,725	30,781	25,477	11.26	
1984	2,297,000	39,044	0	2,143	36,901	28,317	12.33	
1985	2,326,000	30,382	0	2,152	28,230	28,998	12.47	
		Increase Rate of Per Capita Consumption						2.35%
1995	2,630,000						15.53	
STRING BEAN								
1971	-	599	-	-	599	599	-	
1972	-	636	-	-	636	617	-	
1973	-	581	-	-	581	605	-	
1974	-	463	-	-	463	570	-	
1975	2,030,000	781	9	-	790	614	0.30	
1976	2,051,000	881	9	-	890	672	0.33	
1977	2,072,000	790	9	-	799	705	0.34	
1978	2,094,000	808	0	-	808	750	0.36	
1979	2,137,000	572	0	-	572	772	0.36	
1980	2,160,000	672	0	-	672	748	0.35	
1981	2,182,000	817	0	0	817	734	0.34	
1982	2,219,000	763	0	0	763	726	0.33	
1983	2,263,000	1,108	27	0	1,135	792	0.35	
1984	2,297,000	1,371	0	54.48	1,317	941	0.41	
1985	2,326,000	1,580	0	281.48	1,298	1,066	0.46	
		Increase Rate of Per Capita Consumption						6.05%
1995	2,630,000						0.72	
SWEET PEPPER								
1971	-	191	-	-	191	191	-	
1972	-	300	-	-	300	245	-	
1973	-	218	-	-	218	236	-	
1974	-	218	-	-	218	232	-	
1975	2,030,000	345	-	-	345	254	0.13	
1976	2,051,000	418	-	-	418	300	0.15	
1977	2,072,000	381	-	-	381	316	0.15	
1978	2,094,000	436	-	-	436	360	0.17	
1979	2,137,000	545	-	-	545	425	0.20	
1980	2,160,000	962	-	-	962	548	0.25	
1981	2,182,000	1,253	0	118.04	1,135	692	0.32	
1982	2,219,000	962	0	81.72	881	792	0.36	
1983	2,263,000	1,289	0	145.28	1,144	933	0.41	
1984	2,297,000	3,133	0	435.84	2,697	1,364	0.59	
1985	2,326,000	4,912	0	789.96	4,122	1,996	0.86	
		Increase Rate of Per Capita Consumption						21.86%
1995	2,630,000						4.47	

Source: Data Bank, Ministry of Agriculture

Table G-7 (6/8) ESTIMATION OF PER CAPITA CONSUMPTION OF DOMESTIC CROPS PER ANNUM

Year	Population	Domestic Production (ton)	Import (ton)	Export (ton)	Supply for Domestic Consumption (ton)	Moving Average for 5 years (ton)	Per Capita Consumption (kg/capita)	
TOMATO								
1971	-	9,162	0	45	9,116	9,116	-	
1972	-	8,236	0	45	8,190	8,653	-	
1973	-	8,826	0	0	8,826	8,711	-	
1974	-	8,590	0	0	8,590	8,680	-	
1975	2,030,000	8,508	0	0	8,508	8,646	4.26	
1976	2,051,000	12,866	0	0	12,866	9,396	4.58	
1977	2,072,000	24,225	0	0	24,225	12,603	6.08	
1978	2,094,000	24,325	0	0	24,325	15,703	7.50	
1979	2,137,000	20,820	0	0	20,820	18,149	8.49	
1980	2,160,000	23,190	0	0	23,190	21,086	9.76	
1981	2,182,000	22,555	0	0	22,555	23,023	10.55	
1982	2,219,000	17,043	0	0	17,043	21,587	9.73	
1983	2,263,000	19,177	0	627	18,550	20,432	9.03	
1984	2,297,000	29,564	0	1,725	27,839	21,836	9.51	
1985	2,326,000	19,522	0	272	19,250	21,047	9.05	
		Increase Rate of Per Capita Consumption						1.42%
1995	2,630,000						11.18	
TURNIP								
1971	-	1,716	-	-	1,716	1,716	-	
1972	-	2,152	-	-	2,152	1,934	-	
1973	-	1,952	-	-	1,952	1,940	-	
1974	-	1,262	-	-	1,262	1,771	-	
1975	2,030,000	1,453	-	-	1,453	1,707	0.84	
1976	2,051,000	1,880	-	-	1,880	1,740	0.85	
1977	2,072,000	1,407	-	-	1,407	1,591	0.77	
1978	2,094,000	1,907	-	-	1,907	1,582	0.76	
1979	2,137,000	1,199	-	-	1,199	1,569	0.73	
1980	2,160,000	1,162	-	-	1,162	1,511	0.70	
1981	2,182,000	1,435	-	-	1,435	1,422	0.65	
1982	2,219,000	1,516	-	-	1,516	1,444	0.65	
1983	2,263,000	1,344	-	-	1,344	1,331	0.59	
1984	2,297,000	1,589	-	-	1,589	1,409	0.61	
1985	2,326,000	1,416	-	-	1,416	1,460	0.63	
		Increase Rate of Per Capita Consumption						0.00%
1995	2,630,000						0.63	
GROUND NUTS								
1971	-	1,153	-	-	1,153	1,153	-	
1972	-	981	-	-	981	1,067	-	
1973	-	1,081	-	-	1,081	1,071	-	
1974	-	1,153	454	-	1,607	1,205	-	
1975	2,030,000	1,062	636	-	1,698	1,304	0.64	
1976	2,051,000	1,362	554	-	1,916	1,456	0.71	
1977	2,072,000	1,843	91	-	1,934	1,647	0.79	
1978	2,094,000	2,806	191	-	2,996	2,030	0.97	
1979	2,137,000	2,515	100	-	2,615	2,232	1.04	
1980	2,160,000	2,279	0	-	2,279	2,348	1.09	
1981	2,182,000	2,088	45	-	2,134	2,392	1.10	
1982	2,219,000	2,270	0	-	2,270	2,459	1.11	
1983	2,263,000	2,597	0	-	2,597	2,379	1.05	
1984	2,297,000	2,533	9	-	2,542	2,364	1.03	
1985	2,326,000	3,223	-	-	3,223	2,553	1.10	
		Increase Rate of Per Capita Consumption						0.13%
1995	2,630,000						1.09	

Source: Data Bank, Ministry of Agriculture

Table G-7 (7/8) ESTIMATION OF PER CAPITA CONSUMPTION OF DOMESTIC CROPS PER ANNUM

Year	Population	Domestic Production (ton)	Import (ton)	Export (ton)	Supply for Domestic Consumption (ton)	Moving Average for 5 years (ton)	Per Capita Consumption (kg/capita)	
RED PEA								
1971	-	2,570	-	-	2,570	2,570	-	
1972	-	2,706	-	-	2,706	2,638	-	
1973	-	1,843	-	-	1,843	2,373	-	
1974	-	2,152	1,535	-	3,686	2,701	-	
1975	2,030,000	2,052	1,989	-	4,041	2,969	1.46	
1976	2,051,000	2,097	1,344	-	3,441	3,143	1.53	
1977	2,072,000	2,461	209	-	2,670	3,136	1.51	
1978	2,094,000	5,167	54	-	5,221	3,812	1.82	
1979	2,137,000	4,259	0	-	4,259	3,926	1.84	
1980	2,160,000	3,895	36	-	3,932	3,904	1.81	
1981	2,182,000	4,286	109	0	4,395	4,095	1.88	
1982	2,219,000	3,378	336	0	3,714	4,304	1.94	
1983	2,263,000	3,623	263	0	3,886	4,037	1.78	
1984	2,297,000	4,295	9	0	4,304	4,046	1.76	
1985	2,326,000	4,204	73	0	4,277	4,115	1.77	
		Increase Rate of Per Capita Consumption						2.24%
1995	2,630,000						2.38	
LEGUME								
1971	-	6,401	-	-	6,401	6,401	-	
1972	-	7,527	-	-	7,527	6,964	-	
1973	-	5,403	-	-	5,403	6,444	-	
1974	-	5,938	2,542	-	8,481	6,953	-	
1975	2,030,000	6,256	3,187	-	9,443	7,451	3.67	
1976	2,051,000	5,593	2,297	-	7,891	7,749	3.78	
1977	2,072,000	7,355	1,071	-	8,426	7,929	3.83	
1978	2,094,000	11,931	1,253	-	13,184	9,485	4.53	
1979	2,137,000	10,587	281	-	10,869	9,963	4.66	
1980	2,160,000	9,688	427	-	10,115	10,097	4.67	
1981	2,182,000	10,052	527	-	10,578	10,634	4.87	
1982	2,219,000	8,880	617	-	9,498	10,849	4.89	
1983	2,263,000	9,588	554	-	10,142	10,240	4.53	
1984	2,297,000	10,406	472	-	10,878	10,242	4.46	
1985	2,326,000	10,596	263	-	10,860	10,391	4.47	
		Increase Rate of Per Capita Consumption						-0.14%
1995	2,630,000						4.57	
GINGER								
1971	-	418	-	-	418	418	-	
1972	-	599	-	-	599	508	-	
1973	-	681	-	-	681	566	-	
1974	-	781	0	-	781	620	-	
1975	2,030,000	863	0	-	863	668	0.33	
1976	2,051,000	908	0	-	908	766	0.37	
1977	2,072,000	381	0	-	381	723	0.35	
1978	2,094,000	627	0	-	627	712	0.34	
1979	2,137,000	617	0	-	617	679	0.32	
1980	2,160,000	400	0	-	400	587	0.27	
1981	2,182,000	445	0	-	445	494	0.23	
1982	2,219,000	536	0	-	536	525	0.24	
1983	2,263,000	400	0	-	400	479	0.21	
1984	2,297,000	554	0	-	554	467	0.20	
1985	2,326,000	617	0	-	617	510	0.22	
		Increase Rate of Per Capita Consumption						0.00%
1995	2,630,000						0.22	

Source: Data Bank, Ministry of Agriculture

Table G-7 (8/8) ESTIMATION OF PER CAPITA CONSUMPTION OF DOMESTIC CROPS PER ANNUM

Year	Population	Domestic Production (ton)	Import (ton)	Export (ton)	Supply for Domestic Consumption (ton)	Moving Average for 5 years (ton)	Per Capita Consumption (kg/capita)	
HOT PEPPER								
1971	-	981	-	-	981	981	-	
1972	-	772	-	-	772	876	-	
1973	-	826	-	-	826	860	-	
1974	-	917	-	-	917	874	-	
1975	2,030,000	926	-	-	926	884	0.44	
1976	2,051,000	899	-	-	899	868	0.42	
1977	2,072,000	1,298	-	-	1,298	973	0.47	
1978	2,094,000	1,244	-	-	1,244	1,057	0.50	
1979	2,137,000	1,081	-	-	1,081	1,090	0.51	
1980	2,160,000	899	-	-	899	1,084	0.50	
1981	2,182,000	1,235	-	-	1,235	1,151	0.53	
1982	2,219,000	999	-	56.296	943	1,080	0.49	
1983	2,263,000	1,979	-	160.72	1,819	1,195	0.53	
1984	2,297,000	2,915	-	188.86	2,726	1,524	0.66	
1985	2,326,000	2,197	-	275.12	1,922	1,729	0.74	
		Increase Rate of Per Capita Consumption						0.00%
1995	2,630,000						0.59	
WATER MELON								
1971	-	3,087	-	-	3,087	3,087	-	
1972	-	2,179	-	-	2,179	2,633	-	
1973	-	2,225	-	-	2,225	2,497	-	
1974	-	2,624	-	-	2,624	2,529	-	
1975	2,030,000	2,043	-	-	2,043	2,432	1.20	
1976	2,051,000	3,405	-	-	3,405	2,495	1.22	
1977	2,072,000	7,346	-	-	7,346	3,528	1.70	
1978	2,094,000	4,821	-	-	4,821	4,048	1.93	
1979	2,137,000	3,469	-	-	3,469	4,217	1.97	
1980	2,160,000	2,996	-	-	2,996	4,407	2.04	
1981	2,182,000	4,867	0	0	4,867	4,700	2.15	
1982	2,219,000	2,906	0	0	2,906	3,812	1.72	
1983	2,263,000	3,496	0	148	3,348	3,517	1.55	
1984	2,297,000	5,521	0	333.24	5,187	3,861	1.68	
1985	2,326,000	2,479	0	188.86	2,290	3,720	1.60	
		Increase Rate of Per Capita Consumption						0.00%
1995	2,630,000						1.74	

Source: Data Bank, Ministry of Agriculture

Table G-8 ESTIMATION OF TOTAL DEMAND IN THE PROJECT AREA
IN 1985 AND 1995

Commodity	(A)*	(B)*	(C) Total Demand in the Market Area		(D)-(C) Balance of Demand
	Per Capita Consumption		in 1985*	in 1995**	(ton)
	in 1985 (kg/person)	in 1995 (kg/person)	(ton)	(ton)	
Vegetable total	52.0	76.1	62,500	118,100	55,600
Beetroot	0.27	0.21	300	300	0
Cabbage	7.17	9.19	8,600	14,300	5,700
Calaloo	4.79	7.32	5,800	11,400	5,600
Carrot	6.65	11.93	8,000	18,500	10,500
Cho-cho	2.14	2.61	2,600	4,100	1,500
Cucumber	2.90	3.90	3,500	6,100	2,600
Egg Plant	0.02	0.02	0	0	0
Escallion	1.73	3.06	2,100	4,800	2,700
Lettuce	0.76	1.59	900	2,500	1,600
Okra	0.66	0.84	800	1,300	500
Onion	1.39	2.85	1,700	4,400	2,700
Pumpkin	12.47	15.53	15,000	24,100	9,100
String Bean	0.46	0.72	600	1,100	500
Sweet Pepper	0.86	4.47	1,000	6,900	5,900
Tomato	9.05	11.18	10,900	17,400	6,500
Turnip	0.63	0.63	800	1,000	200
Legume total	4.47	4.57	5,400	7,100	1,700
Ground nuts	1.10	1.09	1,300	1,700	400
Red Pea	1.77	2.38	2,100	3,700	1,600
Ginger	0.22	0.22	300	300	0
Hot Pepper	0.74	0.59	900	900	0
Water Melon	1.60	1.74	1,900	2,700	800

Note : Population in the Market area in 1985 and 1995 is estimated at 1,203,000 and 1,553,000, respectively.

Remarks: *; see Table G-7
 **; (C) = (A) X (Population in the Market area in 1985)
 ***; (D) = (B) X (Population in the Market area in 1995)

Table G-9 FUTURE LAND USE IN GROSS AREA

(Unit: ha)

Without Project Condition		With Project Condition	
SUGARCANE	4,190	SUGARCANE	3,260
VEGETABLE	4,500	VEGETABLE	4,200
vege./crops	450	vege./crops	0
vege./vege.	0	vege./vege.	750
vege./grains	4,050	vege./grains	3,450
GRAINS	770	GRAINS	0
RICE	710	RICE	3,900
rice/rice	710	rice/rice	1,720
rice/grain	0	rice/grain	2,180
SUB-TOTAL	10,170	SUB-TOTAL	11,360
ORCHARD	80	ORCHARD	780
ORNAMENTAL	170	ORNAMENTAL	170
PASTURE	1,180	PASTURE	1,330
AQUACULTURE	430	AQUACULTURE	590
SUB-TOTAL	1,860	SUB-TOTAL	2,870
ARABLE LAND TOTAL	12,030	ARABLE LAND TOTAL	14,230
OTHERS	2,590	OTHERS	390
glassland	460	glassland	0
bush/grass	670	bush/grass	0
bush	1,110	bush	0
woodland	80	woodland	0
swamp	160	swamp	0
reservoir	110	reservoir	390
TOTAL	14,620	TOTAL	14,620

Table G-10 FUTURE LAND USE IN NET AREA

(Unit: ha)

Without Project Condition		With Project Condition	
SUGARCANE	3,770	SUGARCANE	2,930
VEGETABLE	4,050	VEGETABLE	3,800
vege./crops	400	vege./crops	0
vege./vege.	0	vege./vege.	680
vege./grains	3,650	vege./grains	3,120
GRAINS	690	GRAINS	0
RICE	640	RICE	3,490
rice/rice	640	rice/rice	1,540
rice/grain	0	rice/grain	1,950
SUB-TOTAL	9,150	SUB-TOTAL	10,220
ORCHARD	70	ORCHARD	700
ORNAMENTAL	150	ORNAMENTAL	150
PASTURE	1,070	PASTURE	1,200
AQUACULTURE	300	AQUACULTURE	410
SUB-TOTAL	1,590	SUB-TOTAL	2,460
ARABLE LAND TOTAL	10,740	ARABLE LAND TOTAL	12,680
OTHERS	3,880	OTHERS	1,940
glassland	460	glassland	0
bush/grass	670	bush/grass	0
bush	1,110	bush	0
woodland	80	woodland	0
swamp	160	swamp	0
reservoir	110	reservoir	390
others	1,290	OTHERS	1,550
TOTAL	14,620	TOTAL	14,620

Table G-11 (1/12) ECONOMIC PRODUCTION COST PER HA
(AQUACULTURE UNDER WITH AND WITHOUT PROJECT CONDITIONS)

	Unit	Requirement	Unit Price	Total
(Unit: JS)				
Cost per crop				
Pond maintenance	time	1	370	370
Fingering	no	11,600	0.41	4,760
Feed	kg	5,300	1.43	7,580
Fertilizer	kg	400	0.87	350
Fuel & utilities	L.S.	1	1,200	1,200
Labour	man-day	100	15.0	1,500
Miscellaneous		5%	15,760	790
Total cost per crop				16,600
Income per crop				
production per crop inof production pond (ton/ha)			2.80	
farmgate price (\$/kg)				8.71
production value per ha				24,400
income per crop(not include initial cost)				7,800
Net income per year				
number of crops per year				2.5
income per year				19,500
recovery of initial cost				12,100
net income per year				7,400

Initial capital cost				(Unit: JS)
Item	Unit	Reaurement	Unit Price	Total
Land clearing	time	1	1,500	1,500
Pond construction	time	1	18,500	18,500
Pond drain/piping	time	1	14,800	14,800
Pump (portable)	time	7%	98,900	6,600
Fencing	chain	31	125	3,900
Seines	ft.	500	33	16,500
Scales/balance	no.	2	1,000	2,000
Dipnets	no.	5	100	500
Cage	no.	7	100	700
Miscellaneous		5%		3,300
Total				68,300
Amortizing cost	10	years	12%	12,100

Table G-11 (2/12) ECONOMIC PRODUCTION COST PER HA
(MAIZE UNDER WITH PROJECT CONDITION)

				(Unit: J\$)
Item of Cost	Unit	Require- ment	Price	Total (per ha)
LARGE FARM				
1. LABOUR OPERATION				
-Harrowing	machine hr	0.8	85	70
-Rotavating	machine hr	0.6	85	50
-Land levelling	machine hr	2.5	85	210
-Furrowing & bedding	machine hr	1.2	65	80
-Planting	machine hr	0.6	65	40
-Spray	machine hr	0.6	49	30
-Weeding	man-day	2.5	15.0	40
-Fertilizing	man-day	1.2	15.0	20
-Spray	machine hr	3.6	65	230
-Harvesting	machine hr	2.5	65	160
-Transportation		1	370.0	370
-Irrigation	man-day	1	15.0	20
Subtotal				1,320
2. MATERIAL				
-Seed	kg	17	39.10	660
-Fertilizer	kg	1,500	0.87	1,310
-Chemicals	lit	16	120.91	1,930
Subtotal				3,900
3. MISCELLANEOUS	10%			520
4. TOTAL COST				5,740
SMALL FARMER				
1. LABOUR OPERATION				
-Ploughing, Harrowing & Ridging	time	1	494	490
-Apply herbicide	time	2	49	100
-Plant (manual)	man-day	7	15.0	110
-Apply fertilizer	man-day	2	15.0	30
-Weed & mould	man-day	12	15.0	180
-Apply pesticide	time	6	49	290
-HARVESTING	man-day	25	15.0	380
Subtotal				1,580
2. MATERIAL				
-Seed	kg	22.4	39.10	880
-Fertilizer	kg	627	0.87	550
-Chemicals	lit	16	120.91	1,930
Subtotal				3,360
3. MISCELLANEOUS	10%			490
4. TOTAL COST				5,430

Table G-11 (3/12) ECONOMIC PRODUCTION COST PER HA
(INITIAL COST OF ORNAMENTAL HORTICULTURE UNDER WITH AND WITHOUT PROJECT CONDITIONS)

Cost of Item	(Unit: JS)										Average
	Leather- leaf Fern	Dracaena Massangeane (Canes)	Dracaena Massangeane (Tops)	Croton Codiaeum Variëgaum	Golden Pothos	Aglaonema (Silver Queen)	Yucca (Tips)	Dracaena Janet Craig (Tips)	Philoden- dron		
fencing	19,800	19,800	8,000	185,200	19,800	19,800	19,800	19,800	19,800	19,800	36,900
shade house	168,600	148,100			168,600	168,600		168,600	168,600	168,600	165,200
packing shade	61,700	61,700	61,700	61,700	61,700	61,700	61,700	61,700	61,700	61,700	61,700
pick-up truck	404,900	155,600	155,600	155,600	155,600	155,600	155,600	155,600	155,600	155,600	183,300
cold room	259,300										259,300
office and storeroom	133,300		148,100	148,100	148,100	148,100	148,100	148,100	148,100	148,100	146,000
caretakers' quarters	29,600										29,600
construction cost	33,100										33,100
spray equipment	9,900										9,900
office equipment	8,600	9,900	9,900	9,900	9,900	9,900	9,900	9,900	9,900	9,900	9,800
irrigation pump	49,400	61,700	61,700	61,700	61,700	61,700	61,700	61,700	61,700	61,700	122,100
irrigation pipes											
& sprinkler	24,700	24,700	24,700	24,700	24,700	24,700	24,700	24,700	24,700	24,700	24,700
installation cost	8,600										8,600
agricultural tools				29,600							29,600
planting material	192,000	100,700	125,900	51,100	88,900	138,500	67,900	125,900	106,700	106,700	110,800
land preparation											
& planting	2,500	12,300	12,300	12,300	18,500	12,300	7,800	12,300	11,100	11,100	11,300
Total	1,406,000	594,500	607,900	739,900	757,500	800,900	557,200	1,343,900	619,800	619,800	1,241,900
										15 years	90,900
										Average Annual Recovery Cost per ha	

Table G-11 (4/12) ECONOMIC PRODUCTION COST PER HA
(ORNAMENTAL HORTICULTURE UNDER WITH AND
WITHOUT PROJECT CONDITIONS)

Cost of Item	(Unit: J\$)				
	1st Year	2nd Year	3rd Year	4th Year	5th Year
1. OPERATION AND LABOUR					
-weed control	1,000	1,000	1,000	1,000	1,000
-disease control	1,100	1,100	1,100	1,100	1,100
-fertilizing	600	600	600	600	600
-maintenance	700	700	700	700	700
-harvesting, grading and packing	600	2,700	4,200	4,400	4,400
-unskilled labour	3,400	3,400	3,400	3,400	3,400
-transportation	5,400	5,400	5,900	7,100	7,100
subtotal	12,800	14,900	16,900	18,300	18,300
2. MATERIAL					
-fertilizer	21,600	21,600	21,600	21,600	21,600
-agricultural chemicals	6,000	6,000	6,000	6,000	6,000
-soil, saw dust and poultry manure	4,000	3,400	3,400	3,400	3,400
-fuel & oil	19,600	19,600	19,600	19,600	19,600
-electricity	2,400	2,400	2,400	2,400	2,400
-packing material	4,800	20,200	26,900	29,700	29,700
subtotal	58,400	73,200	79,900	82,700	82,700
3. OTHERS					
-Miscellaneous	7,100	8,800	9,700	10,100	10,100
-supervision	33,600	33,600	33,600	33,600	33,600
subtotal	40,700	42,400	43,300	43,700	43,700
4. INITIAL COST RECOVERY					
	90,900	90,900	90,900	90,900	90,900
5. GRAND TOTAL					
	202,800	221,400	231,000	235,600	235,600
6. INCOME					
(1) Leatherleaf	0	26,200	43,700	43,700	43,700
(2) Dracaena(cane)	0	0	0	25,700	25,700
(3) Dracaena(tips)	12,000	21,100	27,100	30,100	30,100
(4) Croton	29,500	32,000	58,900	58,900	58,900
(5) Golden Pothos	73,500	73,500	73,500	73,500	73,500
(6) Aglaonema	33,500	68,500	67,100	67,100	67,100
(7) Yucca	1,900	17,400	23,200	23,200	23,200
(8) Janet Craig	19,500	34,200	43,900	48,800	48,800
(9) Philodendron	146,900	146,900	146,900	146,900	146,900
Total Revenue	316,800	419,800	484,300	517,900	517,900
7. NET INCOME					
	114,000	198,400	253,300	282,300	282,300

Table G-11 (5/12)

ECONOMIC PRODUCTION COST PER HA
(PADDY FOR LARGE FARMER)

(Unit:J\$)

Item of Cost	Unit	Require- ment	Price	Total
WITHOUT PROJECT CONDITION				
1. LABOUR OPERATION				
-Ploughing	machine hr	1	346	350
-Harrowing & leveling	machine hr	0.4	370	150
-Irrigation & drainage	man-day	18	15.0	270
-Pre-germinate & sow seed	time	1	141	140
-Herbicide application	time	2	62	120
-Fertilizer application	time	3	141	420
-Pest control	time	2	62	120
-Harvesting	machine hr	1	370	370
-Transportation to Farmgate	per 45kg	87	2	170
Subtotal				2,110
2. MATERIAL				
-Rice seeds	kg	112	1.51	170
-Chemicals	lit	7	120.91	850
-Urea	kg	378	0.87	330
Subtotal				1,350
3. MISCELLANEOUS		10%		350
4. GRAND TOTAL				3,810
WITH PROJECT CONDITION				
1. LABOUR OPERATION				
-Ploughing	machine hr	1	346	350
-Harrowing & leveling	machine hr	1.2	370	440
-Irrigation & drainage	man-day	18	15.0	270
-Pre-germinate & sow seed	time	1	141	140
-Herbicide application	time	2	62	120
-Fertilizer application	time	3	141	420
-Pest control	time	2	62	120
-Supplemental planting	man-day	2	15.0	30
-Harvesting (combine hrs)	machine hr	1	370	370
-Transportation to Farmgate	per 45 kg	112	2	220
Subtotal				2,480
2. MATERIAL				
-Rice seeds	kg	112	1.51	170
-Chemicals	lit	10	120.91	1,210
-Fertilizer	kg	365	0.87	320
Subtotal				1,700
3. MISCELLANEOUS		10%		420
4. GRAND TOTAL				4,600