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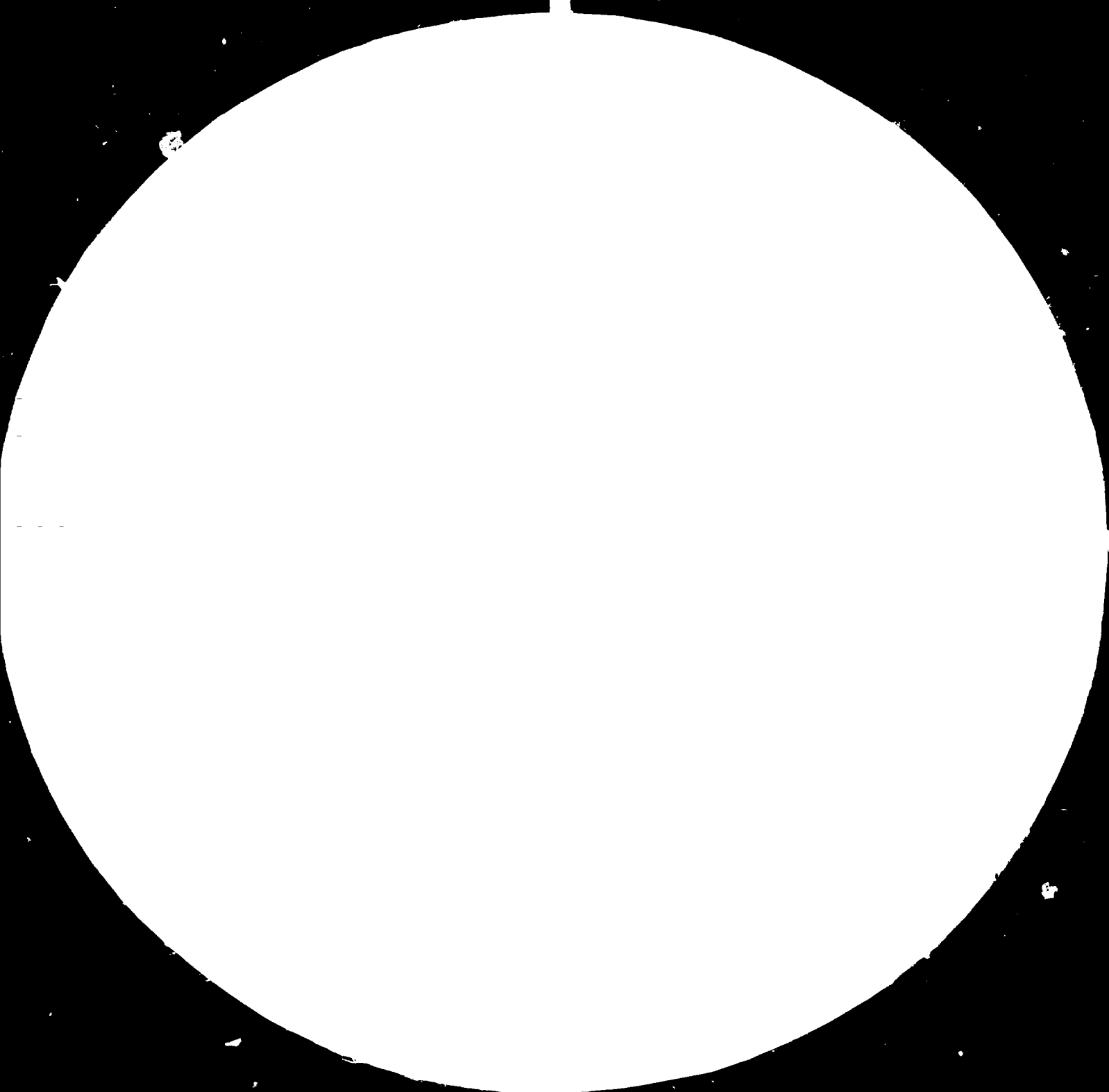

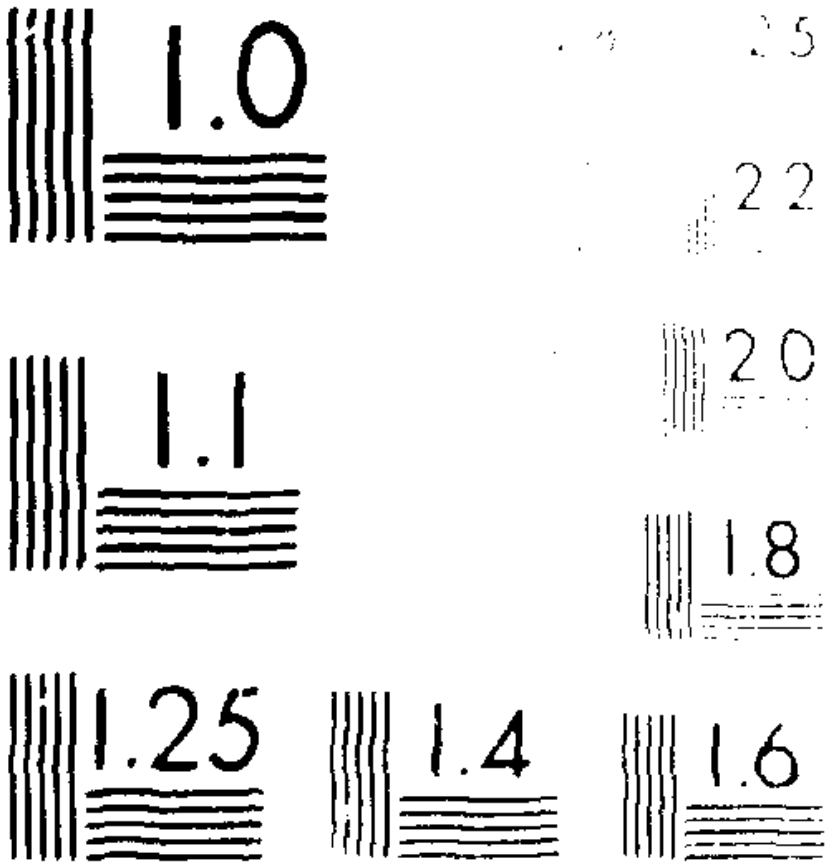
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9 March 1983
English

Grenada.

IDENTIFICATION, PREPARATION AND DEVELOPMENT OF INDUSTRIAL PROJECTS IN GRENADA

DP/CAR/73/001

GRENADA

Terminal report *

Prepared for the Government of Grenada
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of Rudolf Eder,
Industrial Adviser

United Nations Industrial Development Organization

Vienna

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V.83-53204

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1. SUMMARY AND RECOMMENDATIONS

1.1 Summary

(1) Title, number and purpose of the project:

Title: Industrial Adviser

Number: DP/CAR/73/001/11-05/H/31.6.A

Purpose: To assist the Grenada Government in identification and preparation of industrial projects

Duration: first phase: 27.1. - 9.3.1982

second phase: 29.6. - 13.10.1982

The duration of the mission was reduced from 6 to 5 months.

(2) Conclusions:

a) The original objectives of the project were revised at the beginning of the mission to read as follows:
- prepare, submit and implement an ex-post feasibility study on agro-industries (nutmeg, jam and jelly, sauces and nectar);
- prepare a feasibility study on a combined slaughterhouse and meat processing plant;
- advise on other items of the job description, if there is enough time left;

b) The revised objectives were attained.

1.2 Recommendations

(1) Recommendations to the Government:

a) It is recommended to observe and monitor the implementation of the programme proposed in the study on the Development of the Grenada Agro-Industries;

b) It is recommended to follow up the report on a "Combined Slaughterhouse and Meat Processing Plant".

c) It is recommended to make use of project evaluation in future project development.

(2) Recommendations to UNIDO:

d) It is recommended to concentrate any assistance on implementing items (1), (2), and (3) above, to make sure that the joint efforts will lead to an effective result.

1.3 Problems of the Industries of Grenada

(1) The traditional industries (sugar and coconuts) are facing structural changes.

(2) New industries like garment industries (labour oriented) have a very low national value added (about 3,000 ECS per capita or less).

(3) Capital intensive industries (flour mill) are based on imported raw material (market oriented) and have a low national value added too (about 10%) though the value added per capita is much higher (10,000 - 13,000 ECS).

(4) Industries, transforming local raw materials are in very bad shape or do not exist.

(5) Public capital resources for investment in industries are very limited. No funds are available for industrial development (UNDP funds are spent elsewhere).

2. INTRODUCTION

2.1 Project Background

The seven island states which comprise the Eastern Caribbean Common Market have a population of about 300,000. The islands are also members of a wider regional economic group, CARICOM, which has a population of over 5 million.

At a meeting in 1975 of the Industrial Development Co-ordinating Committee (composed of representatives of the Caribbean Community Secretariat, the Caribbean Development Bank, the Caribbean Investment Corporation, the Caribbean Regional Integration and Advisory Team , the Eastern Caribbean Common Market Secretariat and other regional institutions), the participants agreed on a definition of responsibilities of its constituent institutions. The ECCM inter alia was entrusted with the identification of industries and the preparation of pre-feasibility studies, together with providing assistance to investors in the region up to the stage at which the industrial projects of these investors could be evaluated by financial institutions.

Within the framework of UNIDO assistance to ECCM request was received from the Grenada Government to provide an industrial adviser for a period of six months.

2.2 Objectives of the Project

In the job description the objectives were formulated as the following duties:

1. Advise on the organisation and staffing of the Ministry of Industrial Development and Fisheries with regard to the industrial sector;
2. Assist in identifying major national objectives for industrial development;

3. Identify and assess physical and institutional resources and infrastructure relevant to industrial development;
4. Examine existing industrial enterprises with a view to expanding their production;
5. Identify new potential industrial projects and indicate relative priorities based on national objectives and ranking criteria (e.g. employment creation, utilization of indigenous raw materials, foreign exchange, national value added);
6. Prepare and submit project opportunity reports for each of the high priority projects and to collaborate with ECCM/UNIDO project CAR/73/001, in preparing pre-feasibility studies for further action by Government, entrepreneurs and financial institutions;
7. Due consideration is to be given to the use of appropriate technologies and project designs well adapted to local resources and capabilities;
8. Advise on methods for evaluating projects in terms of their national economic profitability;
9. Collaborate and take account of the work undertaken by ECC/UNIDO project CAR/73/001 - Industrial Production;
10. Assess the need for further technical assistance required by the industrial sector;
11. Prepare a final report, setting out the findings of the mission and the recommendations to the Government on further action.

The duties formulated in the job description were revised at the beginning of the first mission after discussions with:

Cde. Bernard Coard, Deputy Prime Minister and Minister of Planning, Finance and Trade;
Cde. Kenrick Radix, Minister of Industrial Development and Fisheries;
Ms. Gloria Payne-Banfield, Permanent Secretary of Planning and
Cde. Aaron Moses, Development Officer in the Ministry of Industrial Development and Fisheries.

All previously formulated objectives and duties have been recognised as important. However, there was full understanding that the present situation and constraints would require concentration on the following activities:

1. Analysis of existing industrial enterprises with a view to expanding their production.
2. Analysis of physical and institutional resources and infrastructure relevant to industrial development and of new potential industrial projects.
3. Feasibility studies of selected projects.
4. Activities which may be required to come to a rapid result in industrial development.

At the beginning of the second mission, duties were revised again during several discussions with the Minister of Industrial Development and Fisheries. It was agreed upon the following priorities:

1st priority:
(a) Analyse actual operations of Grenada Agro-Industries;
(b) elaborate a programme to improve operations;
(c) discuss findings and re-organisation programme with the board of directors of Grenada Agro-Industries;
(d) assist in implementing the re-organisation programme;
(e) advise on further development of agro-industries.

2nd priority: If, after completion of duties of first priority (a-e), there is some time left, the following feasibility studies should be started and advanced as far as possible:

(a) Slaughterhouse and meat processing;
(b) Milk reconstitution;
(c) Packaging materials for agro-industries (jam, jelly, sauces, nectar, milk, yoghourt).

3rd priority: other activities included in the job description.

2.3 Official arrangements

The project was shortened from 6 to 5 months by UNDP and split into two phases:

First phase : 27.1. 1982 - 8.3. 1982
Second phase: 29.6. 1982 - 13.10.1982

The Industrial Adviser was assigned to the Ministry of Industrial Development and Fisheries.

2.4 Training

Informal on-the-job training took place in discussions and mainly during the implementation of the re-organisation programme, formulated as feasibility study. Positive results of the training experience may be seen in the fact that two complete feasibility studies were made, one of which was to a large extent applied and implemented and both were discussed in all details including issues of project evaluation and financing.

There was good opportunity to deal with problems of project development in two practical cases.

3. THE MAIN DUTIES OF THE JOB DESCRIPTION AND THEIR ACHIEVEMENT

Owing to the changed priorities only little time could be allocated to most of the duties formulated in the job description. Nevertheless, some results could be obtained. Findings and recommendations are compiled briefly according to the tasks of the original job description.

3.1 Industrial Administration

a) The situation:

Industrial administration comes mainly under the portfolio of the Ministry of Industrial Development and Fisheries. This Ministry has been created in 1981 by Cabinet decision as an attempt at centralizing the industrial development effort.

The Ministry comprises four divisions:

(1) Industrial Development (Private Sector);

(2) Agro-Industries (Public Sector);

(3) Fisheries;

(4) Administration

Two divisions are directly dealing with industrial administration:

(1) The Industrial Development Division is sub-divided into:

a) an industrial research and planning unit;

b) a project identification, evaluation and monitoring unit, and

c) an investment promotion unit.

(2) The Agro-Industry Division is monitoring all public sector sponsored industrial projects. It is a kind of operations division and is monitoring the following projects or operating companies:

a) True-Blue multiple fruit-vegetable processing plant (Grenada Agro-Industries);

b) Telescope Coffee Processing Plant;

c) Produce Chemist Laboratory;

d) Grenada Bureau of Standard (Quality Control Unit);

e) Spice Grinding;

f) M+Hartmann Livestock Project;

g) Bestlait Industry, and

h) Restaurant Operations.

The division is supposed to assume the following functions: assist in carrying out feasibility studies, assist in preparing company plans, identify new public sector investment opportunities, co-ordination and liaison with the Ministry, assist in compiling statistics;

b) Conclusions:

The actual organization of the industrial administration could work satisfactorily, if the staff requirements were met. Both Divisions are understaffed (one officer per division).

3.2 National Objectives for Industrial Development (see also 3.7)

a) The situation:

The Government has set the following national objectives for industrial development:

1) to create employment;
2) to increase the national value added;
3) to make better use of natural resources;

The industrial survey has shown that objectives (2) and (3) had been somehow neglected in projects realized in the past. Most industries have a national value added below 10% and are based mainly on imported raw materials or other imported material inputs.

b) Conclusions :

Investment decisions have not been based on project evaluation taking into account national objectives, but rather on purely commercial criteria. Consequent project evaluation could certainly help in the future to take into account national objectives in industrial development.

3.3. Resources and Infrastructure Relevant to Industrial Development

The most important physical resources are a great variety of fruit, vegetable, other crops and fish. At present, the catch of fish is very small, but a great potential. Figures on the various raw materials are shown in annex 4.4.

It is quite evident that agro-industries have the greatest development potential.

Institutional resources are very weak. A reasonable evaluation of the infrastructure can be made for specific cases only. Generally speaking, the following groups of infrastructure may be considered as good or fair:

Roads: Grenada possesses an excellent network of over 600 miles of roads to all parts of the country, including one running right around the country. Most of the roads are paved and motorable under all weather conditions.

Airport: A new International Airport is currently under construction at Point Salines, on the island's Southern coast. The first phase (construction of 5,200 feet of runway) is already complete. When fully completed in 1983, the Airport will be equipped with all modern facilities, including those for night landing. The 9,000 feet runway will be capable of accommodating wide-bodied aircraft on direct flight from all parts of the world.

The island is currently serviced by a small airport (5,000 feet) located about 17 miles from the capital city. The air strip can accommodate only relatively small aircrafts and has no night landing facilities.

There is also an airstrip at Laureston in Carriacou. Air service is operated by L.I.A.T. with international flight connections at Barbados, Trinidad and Antigua.

Sea Ports: The main port is at St. George's. It is a well sheltered deep water harbour, and has reasonable berthing and docking facilities. Other ports of entry are at Grenville on the east coast and Hillsborough in Carriacou.

Telecommunications: There is an island-wide automatic telephone network with seven fully automatic linking exchange. Radio telephone communication with all countries of the world is available on a 24-hour daily basis.

Telex and telegrams communications services are also available on a daily basis.

Electricity: is provided on an island wide basis. Current output is enough to satisfy existing commercial, domestic and industrial needs. However, a new expansion phase will be implemented soon. Rating is 220/240 volts. 50 cycles AC.

Water: Pipe borne water is also supplied on an island wide basis in sufficient quantity to meet existing demands. A comprehensive expansion programme is currently under way in order to meet future demands generated by an expanding tourism and industrial sectors.

Others must be checked in each individual case. Electricity may cause some problems.

3.4 Expansion of Existing Industries

With the assistance of the UNDP Office an industrial survey was done.

The survey comprises the whole manufacturing industry as defined in the International Standard Industrial Classification (ISIC) under the major division 3.

In spite of certain short-comings due to the lack of accounting in some factories, the results of the survey provide a good picture of the manufacturing industries, their structure, employment and contribution to the GDP. Furthermore, the survey shows which products are manufactured on the island. The technical report on the development of the Grenada Agro-Industries shows possibilities of expansion of one industry. The garment factories show further opportunities.

3.5 New Project Ideas and Priorities

In the past, project ideas were mainly based on cheap local raw material - like the jam and jelly project -, on cheap woman labour - like garment projects - or on local demand - like the flour mill project or the brewery. The orientation of projects did not change since then, but some projects meet several criteria. The following project ideas were preselected:

a) Slaughterhouse and meat processing:

There is a considerable local demand and livestock may be supplied locally in sufficient quantities.

b) Pulp of nutmeg pods:

It is shown in the Technical Report on the Development of the Grenada Agro-Industries that production of nutmeg pods is such that the total quantity available cannot be exploited locally within the next decade to make finished products like jam and jelly. It may be assumed that pulp of nutmeg pods could be exported for further processing. The value added and the content of local raw materials would be much higher than for jam and jelly.

c) Packaging material:

All packaging material has to be imported at high prices. Local production could help to save at least the very high transport cost for bulky bottles, jars and other containers. Suitability of packaging material could and should be tested as soon as possible. Such a project would be linked with the following industries:

- agro-industries: jam, jelly, sauces;
- beverage industry: soft drinks, mineral water;
- dairy: milk, cream, yoghourt, cheese, ice-cream;
- meat processing: various products.

d) Dairy products:

Dairy products are imported. But dairy farming could easily be developed and supply enough milk to substitute imports to a large extent (50-80%). It may be recommended to start the project as a re-combination plant with imported milk powder.

Other projects are of low priority and omitted here.

3.6 Project Studies

The Caribbean Community Secretariat has studied about 30 opportunities, but some is of real interest for Grenada. The Government wished now to concentrate on few, but promising projects of the highest priority, for which complete feasibility studies should be made. The idea of having opportunity studies made is not abandoned, but deferred as long as resources are as limited as now.

Two studies have been made, one on the development of the Grenada Agro-Industries, an other on a combined slaughterhouse and meat processing plant (Annex 4.1 and 4.2).

The study on the Agro-Industries is conceived as a post-investment study concerning an existing and operating factory producing jam and jelly of nutmeg pods, spicy sauces, nectars and other products. The post-investment study is combined with a programme of reorganisation to overcome heavy short-comings and proposals for further development of the industry. The result of the study shows that operations of the existing factory could be improved. This is the first target for the development of the agro-industy. Only after achieving this target, further steps should be undertaken. There is no reason to implement a new jam and jelly project as long as the existing production unit is not run properly and its capacity is used only at a range of 30%. The feasibility study on a combined slaughterhouse and meat processing plant indicates that this would be a very promising investment opportunity with a more or less guaranteed market, based on local raw materials, a very high position balance of payments effect and a considerable contribution to GDP. This project could be implemented within a very short time.

3.7 Project Evaluation

The People's Revolutionary Government of Grenada has expressed strong committments towards the principle of industrial development where feasible and compatible with the national interest. The PRG is prepared to actively support the development of new projects provided that such projects are compatible and identifiable with the overall economic policy of the nation. The PRG has stated that it welcomes especially projects that are oriented towards growth of GDP, the creation of employment, a positive foreign exchange effect and the preservation of the quality of the environment. Rational project development is the most efficient instrument for carrying out the established development policy of the Government with its multiple objectives. An important phase of rational project development is project evaluation. If there is a set of national development objectives, the projects may be evaluated by their contribution to the fulfilment of each of the objectives using special evaluation methods.

At present, Grenada cannot make use of such possibilities, because projects are generally implemented without feasibility studies, and a complete feasibility study is required for project evaluation.

The feasibility study should contain all technical and economic data that are essential for the overall economic and social evaluation project.

This was shown in the feasibility study on a combined slaughterhouse and meat processing plant (Annex 4.4). Besides an analysis of the commercial profitability the study includes an estimate of

- the value added effect,
- the employment effect and,
- the net foreign exchange effect.

The three criteria reflect the contribution of the project towards achieving the main objectives of the PRG. They are easy to be obtained and could be applied immediately.

3.8 Collaboration with ECCM/UNIDO Project CAR/73/001

There was just no opportunity to collaborate.

3.9 Need for Further Technical Assistance

This issue was discussed very thoroughly and several times with the Deputy Prime Minister and Minister of Planning, Finance and Trade, Mr. Bernard Coard, the Minister of Industrial Development and Fisheries, Mr. Henrick Radix, the Permanent Secretary for Planning, Mrs. Gloria Payne-Banfield, and the various officials in charge of industries.

The necessity of a systematic approach to industrial development has been recognised by all participants. But the present economic situation requires a more appropriate approach. The Government wants and needs rapid results. Accordingly, projects which may be realised rapidly and lead quickly to the expected income and employment effect have priority. Furthermore, the extremely limited resources do not allow the systematic development procedure at the moment. 220 000 $ only will be available for ... industries during the forthcoming country programme and this amount ... be used only in 1984 or 1985. Under the above conditions, it is very difficult to establish a realistic programme of technical assistance.

Irrespective of available funds, the following list of technical assistance required by the industrial sector has been established.

The projects are ranked by priorities reflecting the preferences of the Government and its objectives.

(1) Short-term consultant: The Ministry of Industrial Development and Fisheries may wish to get assistance to solve problems in the following fields:

a) Marketing of the products of the Grenada Agro-Industries (nutmeg jam and jelly, nectars, sauces).
In fact, it is very probable that marketing problems arise (see annex 4.2)

b) Management of the Grenada Agro-Industries (see annex 4.2)

c) Feasibility study of a milk-recombination plant

d) Feasibility study of packaging material (plastics) for jam, jelly, sauces, milk, yoghourt.

e) Implementation of the slaughterhouse project.

(2) Long-term assistance: Taking into account the shortage of development officers in the Ministry for Industrial Development and Fisheries, medium term assistance (f-3 years) may be considered as desirable. But this was not discussed with the Minister.

Annex 4.1. Technical Report on a Combined Slaughterhouse and Meat Processing Plant

1. Summary and recommendations

1.1 The present report shows that a combined slaughterhouse and meat processing plant would be a good investment opportunity.

1.2 The slaughterhouses operating at present do by far not meet an international standard.

1.3 The market analysis comes to a positive result.

1.3.1 Demand from import substitution is considerable and may be taken for granted. Additional demand may be expected from the traditional sector, from increasing tourism and a general increase in per capita consumption.

1.3.2 Prices vary between 4 and 22 ECS per kg.

1.3.3 The sales plan is based on an increase of sales from 500 to 1 000 t/per year within two years.

1.3.4 The finished products should comprise a variety of high quality goods in hygienic and appealing packaging.

1.4 There is some evidence that raw material will be available at desired quantities and qualities.

1.5 A good site may be found near the Mt. Hartmann project.

1.6 Design and engineering are oriented towards a high standard of production and based on the technology provided by a leading supplier of equipment.

1.7 The organization is relatively simple and should not be a problem.

1.8 Manpower is certainly a problem. A training programme is proposed during implementation.

1.9 Implementation; An optimistic implementation plant shows that the project would take a minimum of 18 months of implementation time.

1.10 The economic analysis shows a good result throughout.

1.10.1 Total investment amounts to 2,835,600 EC$

1.10.2 Cash inflows are supposed to increase to 1,726.000 EC$ from the third year of operation onward.

1.10.3 The internal rate of return is 31%.

1.10.4 The value added is high. The internal rate of return of net value added is 35%. The project is highly efficient from the national point of view and generates a social surplus of 2,573,000 EC$ based on a social discount rate of 15%.

1.10.5 The employment effect is appropriate to the kind of project.

1.10.6 The net foreign exchange effect based only on import substitution amounts to over 3,700,000 EC$ in a normal year, which corresponds to a high capacity to repay credits in foreign exchange.

1.2 Taking into account the result of the present study it is recommended:

1.2.1 To check raw material supply;

1.2.2 To check design, engineering and prices of equipment with a potential supplier;

1.2.3 To check implementation;

1.2.4 If the results do not change considerably, the implementation is recommended.

2. Background Information

Supply of meat and meat products is mainly concentrated at St. George's though there is private slaughtering all over the country.

Supermarkets offer imported goods in their ice box, or canned products.

There is an abattoir too. It was built probably before 1900. Several butchers slaughter normally on Friday evening about 5-10 heads of cattle and about 15 pigs per week. The meat is sold the next day at an average price of 4.5 EC$ per pound for beef and 3 EC$ per pound of pork. The customer has no choice of quality. He purchases a certain quantity and will get a certain mixture of quality including bones.

Hotes and restaurants depend on imported products, which are considerable (See Chapter 3). The consumption of meat and meat products per capita is small.

The People's Revolutionary Government - fully aware of the situation - has decided to improve the conditions. The Mount Hartmann Livestock Project is now under construction. Its production will start by 1983/84. It will supply pigs, sheep, goats, ducks, turkeys, rabbits and sweet water fish. In an extension of this project, cattle will be raised.

The Minister of Industrial Development and Fisheries has expressed his wish to have a feasibility study done as soon as possible on the best utilization of the livestock. Accordingly, the present study has been undertaken.

A potential supplier of machinery and equipment for meat processing, Messrs. Laska, Austria has been contacted. The present study is based on Laska - know how and prices.

3. The market for meat and meat products:

3.1 Estimates of demand:

Demand estimates will be based on the following assumptions:

a) Imports may be substituted entirely;
b) The present abattoir will be closed for sanitary reasons and its turn over taken over;
c) Tourism will expand again and surpass the level of the past;
d) Consumption of meat and meat products per capita will increase. Assumptions a) and b) are very realistic even in the very short run. Assumptions c) and d) are sound and reasonable, but depend on the general economic development.

a) Demand from import substitution:

Table 1 shows import figures on meat and meat products for the period 1976-81 by main items (qualities). In order to show better the structure of imports and their development, graph 1 has been worked out. Various assumptions may be made to explain the structure and structural changes in connection with tourism, but also with the quality and prices of certain products. Fresh pork is the cheapest item, followed by pickled pork and pickled beef. They are mainly of low quality and used in local consumption. Fresh beef, mutton, bacon and ham are the most expensive products. Their imports are certainly correlated with tourism.

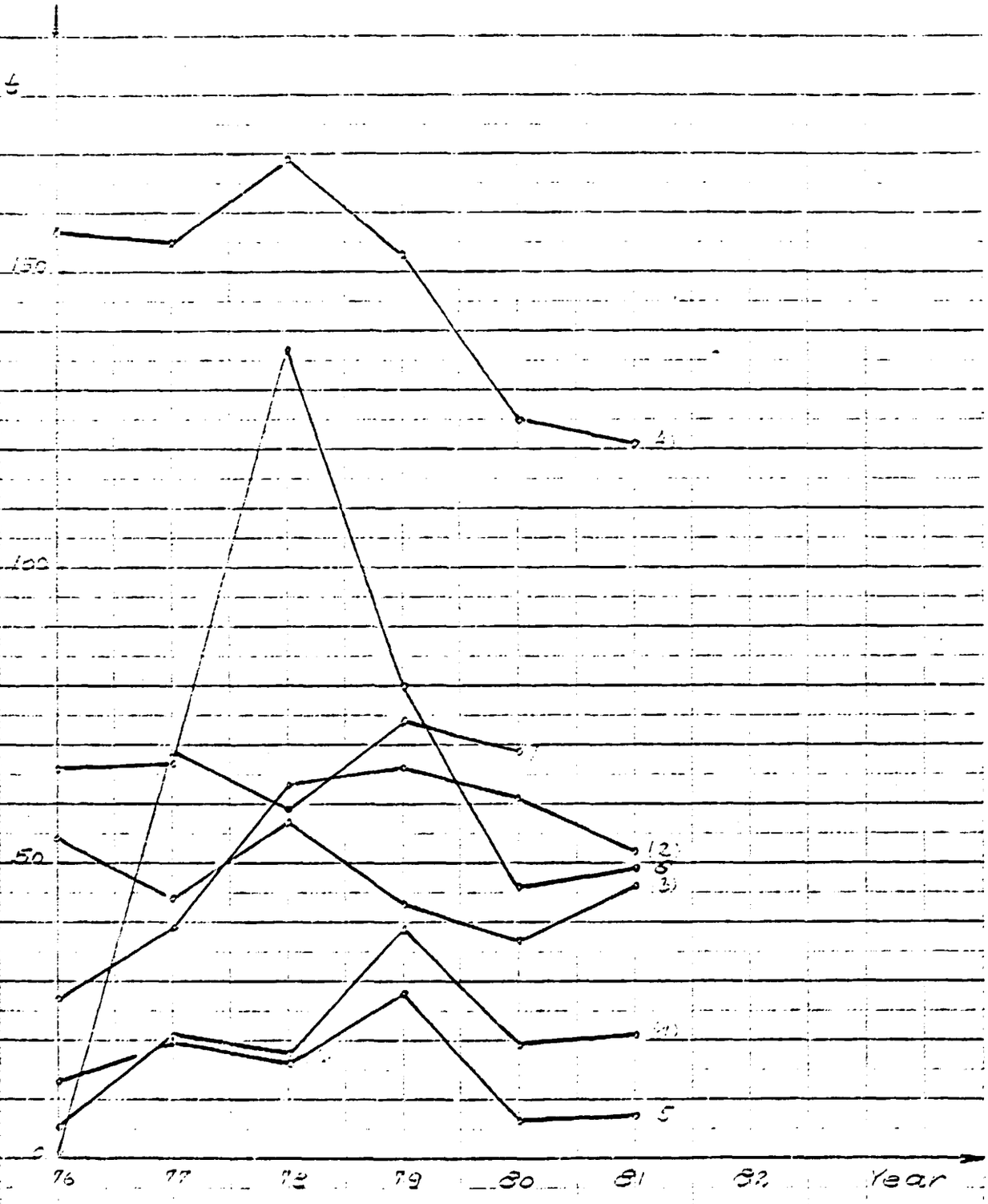
- TABLE N 1 -

Animal Products Import In Grenada

		1976		1977		1978		1979		1980		1981	
		Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value
POULTRY MEAT	(0)	1 078 278.	1 584 173.	1 451 967.	2 201 080.	1 465 727.	2 624 964.	1 559 143.	3 355 331.	1 679 391.	3 449 109.	1 846 726.	3 979 700.
BACON	(1)	5 312.	24 296.	21 758.	121 543.	18 896.	116 980.	39 827.	231 449.	19 494.	146 935.	21 136.	150 084.
HAM	(2)	27 238.	174 376.	39 795.	261 987.	63 236.	457 624.	66 935.	506 240.	61 079.	520 342.	52 070.	407 300.
FRESH PORK	(3)	54 150.	102 432.	44 639.	85 194.	57 230.	125 654.	43 570.	115 689.	37 955.	114 834.	46 114.	155 366.
PICKLED PORK	(4)	157 939.	380 572.	155 948.	376 214.	169 091.	466 661.	153 241.	496 223.	125 373.	403 262.	121 369.	469 046.
MUTTON	(5)	13 368.	52 046.	20 210.	77 313.	16 513.	91 952.	28 034.	163 143.	6 694	62 676.	7 039.	69 835.
FRESH BEEF	(6)	66 190.	268 719.	67 312.	316 853.	137 173.	672 444.	80 347.	684 222.	46 449.	514 032.	49 364.	522 723.
PICKLED BEEF	(7)	935.	900.	58 797.	205 722.	59 706.	239 847.	74 551.	354 491.	69 741.	358 535.	-	-
MEAT TOTAL	(1-7)	325 132.	-	418 459.	-	521 845.	-	486 505.	-	366 785.	2 120 616.	297 000.	-
MEAT & MEAT PRODUCT	(8)	1 563 690.	3 196 504.	2 056 896.	4 590 812.	2 202 076.	6 018 384.	2 238 311.	7 091 471.	2 286 618.	7 318 311.	-	-
MEAT PRODUCTS	(9)	160 280.	-	186 470.	-	214 504.	-	192 663.	-	240 442.	1 748 586.	-	-
FISH & FISH PRODUCT	(10)	463 023.	1 441 632.	525 327.	1 956 508.	480 350.	2 103 485.	488 212.	2 249 435.	507 853.	2 571 194.	550 750.	2 933 806.
MEAT & POULTRY	(11=8+0)	-	-	-	-	-	-	-	-	-	5 569 725.	-	-

Quantity Unit : kilograms
Value Unit : EC Dollars

Source: Central Statistic Office



Graph 1 : Imports of meat

We conclude:

- The amounts corresponding to actual imports could probably be captured by the project;
- The maximum import figures could probably be achieved after recovery of tourism and probably be surpassed;
- The structure of consumption by meat quality would certainly differ from the actual import structure in the sense that higher quality would be accepted; qualities like ham and bacon could probably not be substituted by another quality.

Therefore, minimum demand captured through import substitution may be estimated as follows (quantities in t):

Pork	Bacon	21	-	40 t
	Ham	52	-	66 t
	Fresh Pork	46	-	57 t
	Pickled Pork	121	-	169 t
	Total Pork	240	-	332 t
Beef	Fresh Beef	50	-	140 t
	Pickled Beef	60	-	74 t
	Total Beef	110	-	214 t
Mutton		7	-	28 t
Meat Products		180	-	200 t
Total meat and meat products		537	-	774 t

b) Demand from substitution of traditional slaughtering

It is assumed that:

i) In case of operating a new high standard slaughterhouse and meat processing plant, most of the customers of the traditional abattoir would become customers of the new slaughterhouse;

ii) In case of distributing well packed, fresh meat and meat products of high quality by refrigerated van all over the country, most of the customers of traditional butchers would like to purchase the products of the new slaughterhouse.

Such a development is in the interest of everybody. The traditional butchers and distributors could probably be integrated in the distribution system of the new project.

The economic impact of such a change would be very considerable. The impact from the sanitary point of view would be even more spectacular.

The existing demand, which would be diverted, may be estimated as follows: Table 2, shows the number of cattle, sheep, goats and pigs slaughtered from 1961 to 1979.

The figures are in a certain sense insignificant, especially the figures for sheep and goats. Nevertheless, we may assume that potential demand of local consumers will not be less than 1000 cattle and 1500 pigs, corresponding to about 200 t of beef and 100 t of pork. Sheep may be around 15 t, goat around 6 t or more.

c) Additional demand from increasing tourism:

Grenada has the potential of increasing tourism considerably. The opening of the new International Airport will have a large impact on such a development. Consequently the higher figures estimated under a) may become relevant.

d) Increase in demand owing to an increase in per capita consumption:

The total meat consumption estimated under a) through c) amounts to:

a)	537 - 774	t
b)	300 - 320	t
Total	837 - 1094	t

The average annual consumption per capita would consequently amount to about 8 kg, corresponding to 155 g per week. The figures have to be reduced by the consumption of tourists. It may be concluded that there is by far no saturation in consumption of meat and meant products.

3.2 Prices:

Import prices may be computed from table 1. They read as follows:

Bacon	7,10	EC$ per kg
Ham	7.82	"
Fresh pork	3,37	"
Pickled pork	3,86	"
Mutton	9.92	"
Fresh beef	10,59	"
Pickled beef	5,20	"

Retail prices at the abattoir are for mixed quality including bones:

Pork	6,10	ECS per kg
Beef	9,0	"

Supermarkets sell at the following prices:

Bacon	10,30	ECS per kg
Beef	22,00	"

3.3 Sales plan

Based on the findings of chapters 3.1 and 4. The following tentative sales plan is proposed. It may be considered as conservative, with little risk of not achieving it.

TABLE 3

SALES PLAN

Kind of meat	rgin per kg	1 year of operation t	1 year of operation Gross Margin in ECS '000	2nd and following operation t	2nd and following operation Gross Margin in ECS '000
Beef	1,5	192	288	384	576
Pork	1	168	168	336	336
Sheep	1,5	19	28	38	57
Calves	1,5	24	36	48	72
Goats	1,5	23	34	43	65
Meat prod.	2,4	80	160	160	320
Total		506	714	1,009	1,426

Taking into account the services offered to the customers by a modern slaughterhouse and meat processing plant, the proposed margins represent minimum margins, which could be increased, if the market position were fully taken advantage of. Sales of by-products are not taken into account, but not excluded (hides, bones, tallow, etc.).

3.4 The finished products

The purpose and objective of the project is, to provide Grenada with a rich assortment of fresh meat and meat products. The assortment should comprise cheap, but good and tasty products as well as more expensive products of selected quality. The combined slaughterhouse and meat processing plant should allow a very considerable improvement of supplies to the population, which can only be achieved through industrial production in a modern plant.

The assortment of finished products should comprise:

- all kinds of fresh meat (assorted);
- ham and bacon;
- fresh sausages;
- cooked sausages;
- emulsion type and smoked sausages;
- semi-dry and dry sausages and
- other meat products according to taste.

It is intended to achieve high quality at reasonable prices.

3.5 Packaging of finished products

Packaging of finished goods is an important aspect of quality. It should meet:

- Hygienic requirements
- be efficient and
- appealing.

The proposed vacuum method offers decisive advantages for packaging of perishable food. It increases shelf-life, avoids loss of weight, protects the goods, is hygenic and efficient. Costs are reasonable.

4. Raw Material

The project will to a large extent depend on and be connected with the Mt. Hartmann Livestock Project. The sales plan in chapter 3.3 is based on the projected supply of various kinds of animals by the Mt. Hartmann Livestock Project and requires the following quantities of animals:

TABLE 4

REQUIREMENT OF ANIMALS

	FIRST YEAR	SECOND AND FOLLOWING YEARS
Pigs	2,400	4,800
Cattle	960	1,920
Calves	480	960
Goats	720	1,440

The quantities projected for the first year should not cause any problem. Similar figures were achieved in the past and even surpassed without the Mt. Hartmann Livestock Project. Most spices may be bought locally. Chemicals like nitrite, nitrate, salt have to be imported, but their share in total cost is very small. This applies to packaging material as well.

5. Location and Site

5.1 General Requirements

The location of the slaughterhouse and meat processing plant must be studied carefully. The optimal location for a slaughterhouse will not always be the optimal location for a meat processing plant. But in many cases the advantages of combining both outmatch the advantages of individual optimum location.

Factors to be taken into account are:

- Supply of livestock: transport should be avoided, if possible; animals should be kept at a pleasant place;
- The location should be free from odeurs, smoke, flying ash, dust;
- The plant should be completely separated from other plants or buildings;
- Ample water supply;
- Adequate infrastructure;
- Possibility of future expansion;
- Sewage disposal.

5.2 Location

The Mt. Hartmann area fulfills all requirements and may be proposed with first priority. The site has still to be fixed-

6. Design and Engineering

6.1 Introduction

The share of beef of total production will amount to about 50%. It deserves special attention in order to keep quality as high as possible and to take into account the influence of tropical conditions on the quality of the meat.

The main indirect effect of climate, resulting from the interaction of rainfall, dry season and temperature, is on the vegetation available which, largely influences cattle nutrition and therefore quality and yields of meat. In other words, the sunlight, evaporation of water from respiratory passages, general depression, voluntary restruction of good and other influences effect essentially not only meat yields, but they have in general a marked importance for the quality of the meat itself. And, finally, conditions of pre-slaughter treatment of cattle in warm climatic regions and particularly stress-producing factors such as rough handling, exhausting exercise, emotional excitement, etc., cause a more marked depletion of muscle glycogen and potassium in the tropics. Careless and faulty handling of the material under unsanitary conditions, lack of refrigeration, and the indifference of butchers may give rise to accelerated development of post mortem changes in meat. In general, it is necessary to take into account that beef in the tropics, being less rich in fat, contains relatively high amounts of proteins and water and therefore has higher water binding and emulsifying properties. This fact suggests that such meat is not primarily and only table meat, but, first of all, processing, i.e. sausage meat, which is equally appropriate for emulsion type, cooked, and dry sausages. The small quantity of intramuscular fat facilitates the trimming process, while sufficient grinding and chopping of the meat itself is a pre-requisite for obtaining the desired texture in the finished sausage product.

But all other sorts of meat need similar attention. As far as slaughtering is concerned, similar conditions should be created for all animals.

Meat processing is probably most important for beef, but again, meat of pork and to a lesser extent of sheep and goat will have to be processed too, in order to realize the highest possible value added and to make the best of the raw material.

6.2 The production process

The project comprises two self-contained units, a slaughterhouse and a meat processing plant, which could be developed independently, but which offer great advantages, if they are integrated into one plant. The advantages are mainly of economic nature and the plant will be conceived in a way to fully bring the advantages of integration to bear.

6.2.1 Slaughtering

The slaughtering process is very much the same for cattle, pigs, sheep and goats. The living animals are kept in a compound before slaughtering. This is important to obtain good qualities of meat. From here they are driven to stable A, weighed on a scale for live animals, and then to the stunning box. Cattle is stunned by means of a captive bolt pistol, pigs, sheep and goats by means of electric stunning tongs. Cattle is suspended on the bleeding and dressing hoist, bled and dehided. Pigs are hoisted on a looped chain fastened around one of their hind legs and bled in a suspended position on the bleeding tube track. Hoisting is done by elevator in all cases. The blood is collected in a trough. Sheep and goats are dehided (like cattle), pigs are scalded in a scalding trough, dehaired with a pig dehairing machine. On the cleaning table their claws are removed and the remaining hairs scratched off.

The hind legs are fastened with a hook and hoisted on to a double suspension slaughtering stand. In this straddled position the rib cage can be opened and innards and organs removed.

The carcase is split in half, the cattle halves have to be quartered to ensure that they can be transported on the tub treck system easily.

The carcase is washed in a shower. Carcase and innards are inspected by a Veterinary Surgeon. After cooling the carcase is sent to the cold store.

The innards and organs are processed in the tripery, sorted according to size and preserved with salt. They are stored in keeping with their intended use. The casings can be processed further for use in sausage production.

6.2.2 Meat processing

Meat processing comprises the production of the various desired finished products, ham, bacon, sausages, beefburgers, pastes etc. The production process is similar within the various categories of the finished products.

The production of ham

Ham pieces are separated from other cuts, injected with brine in a continuous brine injector. The brine can be compiled according to local requirements and taste. The meat peices are then placed by hand into a 250 l massaging unit. This unit is sealed hermetically and vacuum drawn. It can be swung into a horizontal position, the working position. All processing times can be pre-programmed. The meat is massaged gently by a massaging system. The unit is emptied on completion of the massaging process.

The pieces of ham can then be processed in various ways. They can be tied with strings and taken for thermal treatment. Various products, such as cooked ham, smoked ham or smoked meat can be produced, or the ham can be put into nets or casings. For this, further processing will have to be undertaken in the smoking and cooking unit.

Thermal processing

The smoking and cooking unit is equipped with fully automatic controls, with which all the smoking and cooking processes can be programmed. It is also fitted with an automatic smoke generator for saw dust, and can be used for smoking only, or for both smoking and cooking. Finished goods are cooled with water and stored in the cold store.

Production of sausages

More ample information is given in the annex by Laska on Beef Processing. The general production process of sausages only is outlined here. Sausage meat is selected and trimmed. In a mincer it is minced to a certain coarseness or fineness.

The emulsifying process, i.e. the emulsion is produced in the cutter. During this process seasonings, salt and other ingredients are added. The content of the bowl is emptied into mixing basins using an unloader. The stuffing machine is loaded by hand. Stuffing is controlled by an electronic-hydraulic system. The stuffing machine is equipped with a portioning and linking system, which ensures the sausages to be portioned efficiently and exactly. Long sausages are fastened by hand using strings. The sausages are hung on smoke sticks and taken to the smoke carriages.

Storage

The products are stored in the cold store.

Packing

The sausages and smoked products are vacuum packed, without exception due to the climate. Additional packing in cardboard boxes may be necessary for longer transportation periods.

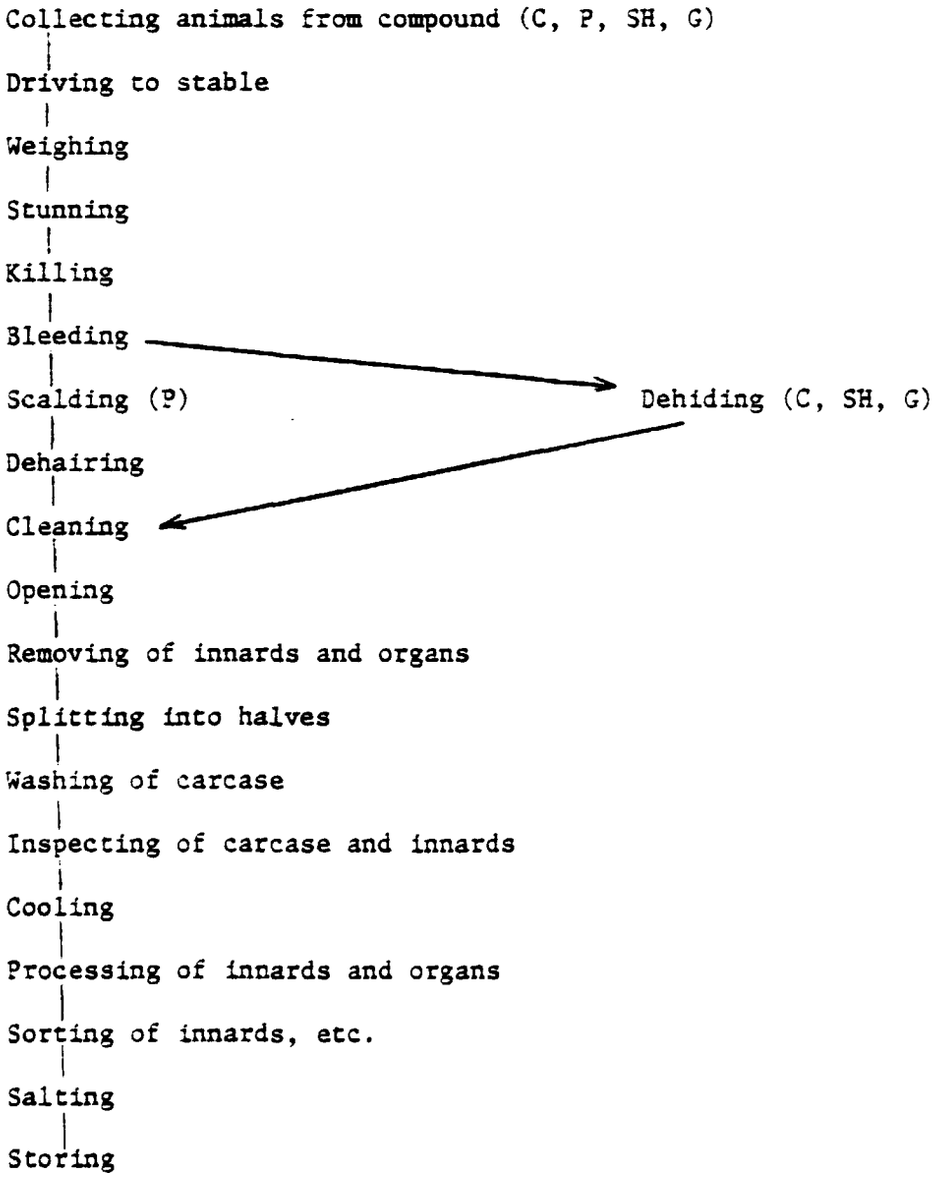
Sausages will also be cut into slices and vacuum packed.

6.2.3 Process flow diagrams

a) Slaughtering

The slaughtering process flow is very much the same for cattle, pigs, sheep and goats. Deviations are: Cattle is stunned differently and bled on another place; pigs are not dehided, while other animals are. The main processing steps are shown in the following process flow diagram:

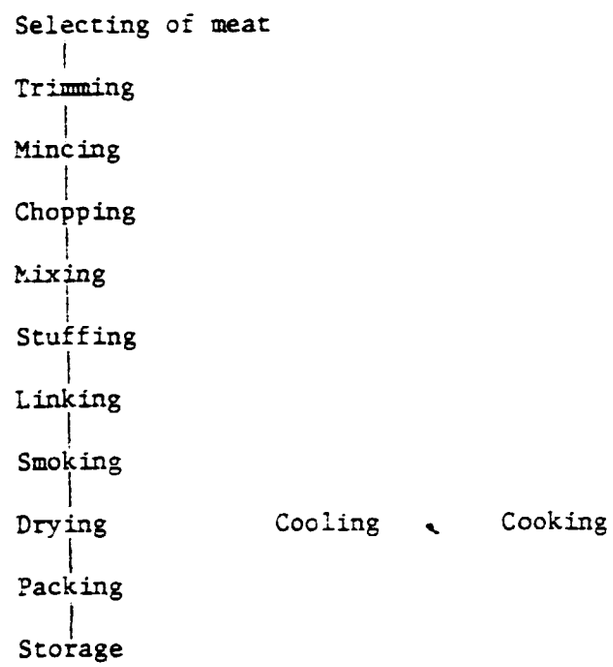
PROCESS FLOW DIAGRAM 1: SLAUGHTERING



b) Preparing of sausages

For preparing of sausages a general scheme may be drawn up. Such a scheme is shown in process flow diagram 2.

PROCESS FLOW DIAGRAM 2: SAUSAGES



6.3 Equipment and machinery

Equipment and machinery needed for the plant were chosen from the production programme of a leading manufacturer taking into account all determinant factors:

It comprises:

1. Slaughtering equipment and machinery

1.1 Scale for live animals (up to 2000 kg);

1.2 Stunning tongs;

1.3 Killing box, elevator, bleeding tube track including supporting structure, bleeding device, track for return hooks;

1.4 Scalding and singing machine

1.5 Cleaning table

1.6 Tube track system in slaughtery room, supporting structure - U and I profiles, clamping plates, tube track holding supports, transfer track, loading arms, flaps, suspension slaughtery stand, cattle bleeding and dressing hoists.

1.7 Truck for innards

1.8 Desinfaction basins

1.9 Tube track scales

1.10 Economy showers

1.11 Work table for tripery

1.12 Transport truck for innards etc.

1.13 Casings washing machine

2. Processing machinery and equipment

2.1 Brand, saw, type 4.206

2.2 Mincer, type E 130

2.3 Automatic cutter, type KR 100-2

2.4 Ice flaker, type SA 160

2.5 Stuffer, type FA 40

2.6 Universal smoking and cooking chamber with accessories

2.7 Shower

2.8 Boiler

2.9 Slicing machine

2.10 Vacuum packing machine

2.11 Brine injector, type B1 13

2.12 Massaging unit, type H5-6

2.13 Sets of knives

2.14 High pressure cleaner

2.15 Belt sharpener

2.16 Stuffing table

2.17 Browning table

Total price, fob, Hamburg Aus.S 4,650,000 = ECS 774,860

3.	Auxiliary equipment	
3.1	Air compressor	2,000
3.2	Two cold rooms with 2 compressors	190,000
3.3	Diesel-generating set 100 KVA	70,000
3.4	Refrigerating van (two)	120,000
3.5	Truck	60,000
3.6	Car	30,000
	Total auxiliary equipment	472,000
4.	Electrical supply and installation	120,000
	Total equipment, machinery	1,366,860
	Freight, insurance	260,140
	Total equipment on site	1,627,000

6.4 Plant layout and required land

The enclosed plant layout shows the listed machinery and equipment at the right place. Office space of 40 to 60 m^2 is not taken into account for various reasons. The plant requires about 500 m^2 of surface in an independent building. In addition, a compound of 500 to 2000 m^2 would be an asset. Total land requirement would be 2000 to 3000 m^2.

6.5 Building

A building of about 500 m^2 is required. The structural framework is either of reinforced concrete or steel.

A non slip floor may be constructed of dense concrete with embedded abrassive hard particles in the surface, or of vitrificed bricks lad on a concrete base, or of any other material which will not absorb moisture and can easily be cleaned.

Exterior walls are usually built of brick. The wall surfaces of rooms, where wet operations are conducted, must be smooth, that is made of glazed tiles, smooth portland cement or other non absorbent material. Walls should be tiled at least to a height of 1.8m or must be covered or coated with lead free paint.

The ceiling surface should be smooth and flat. Good ventilation should be planned. Water for any purpose must be potable. Direct natural light is preferable. The glass area should be at least one seventh of the floor area of any working room. The number and the location of lights must be carefully determined. Floor drainage should be given adequate attention. The slope must enable rapid disposal of all waters (1.8 - 2% slope min.). The lines within the workroom may be of cast iron or galvanized metal. The fat trap must be incorporated in the drainage system.

Drainage lines from toilets must not be connected with any other factory drainage line. Sewage and water offas can be discharged into a river if its flow is sufficient at all seasons, or into the sea. The factory must be provided with suitable facilities for the disposal of bones, ligaments, etc.

Every possible precaution should be taken to keep the factory free from flies, rats, mice etc. Screens must be placed everywhere. Lavatories must be supplied with hot and cold water and maintained in clean conditions.

Strict sanitary measures must be employed throughout the factory. The building is estimated to cost about EC$ 500,000.

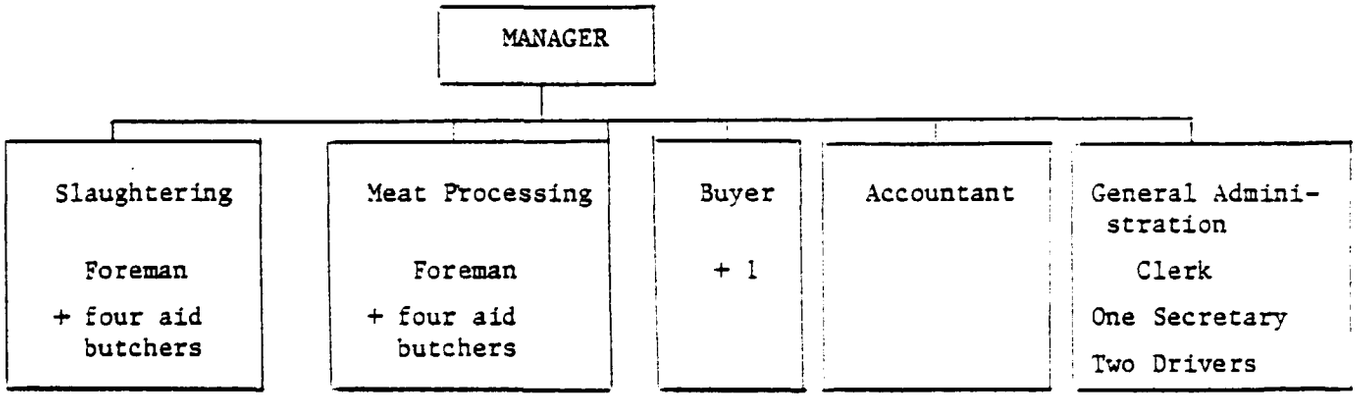
7. Organization

7.1 The structure

The combined slaughterhouse and meat processing plant requires the following organization to be efficient: Production is divided into slaughtering and meat processing, each headed by a foreman.

In addition to production it is necessary to fulfil a number of administrative and service functions. They are general administration, marketing, accounting, wage and salary administration, product research, purchasing, quality and production control, maintenance, receiving and shipping, store-keeping, external transport. In the present case the listed functions will be assumed by a small number of personnel. The manager himself will have to assume most of the control functions.

If a considerable part of livestock has to be purchased from all over the country, a buyer with one or two drivers will have to assume this function. One accountant will assume all the financial functions, one clerk will be in charge of store keeping, receiving, shipping and assist the manager in all marketing functions and some other function. The organizational set up will therefore be as follows:



7.2 Office equipment

The following equipment is required:

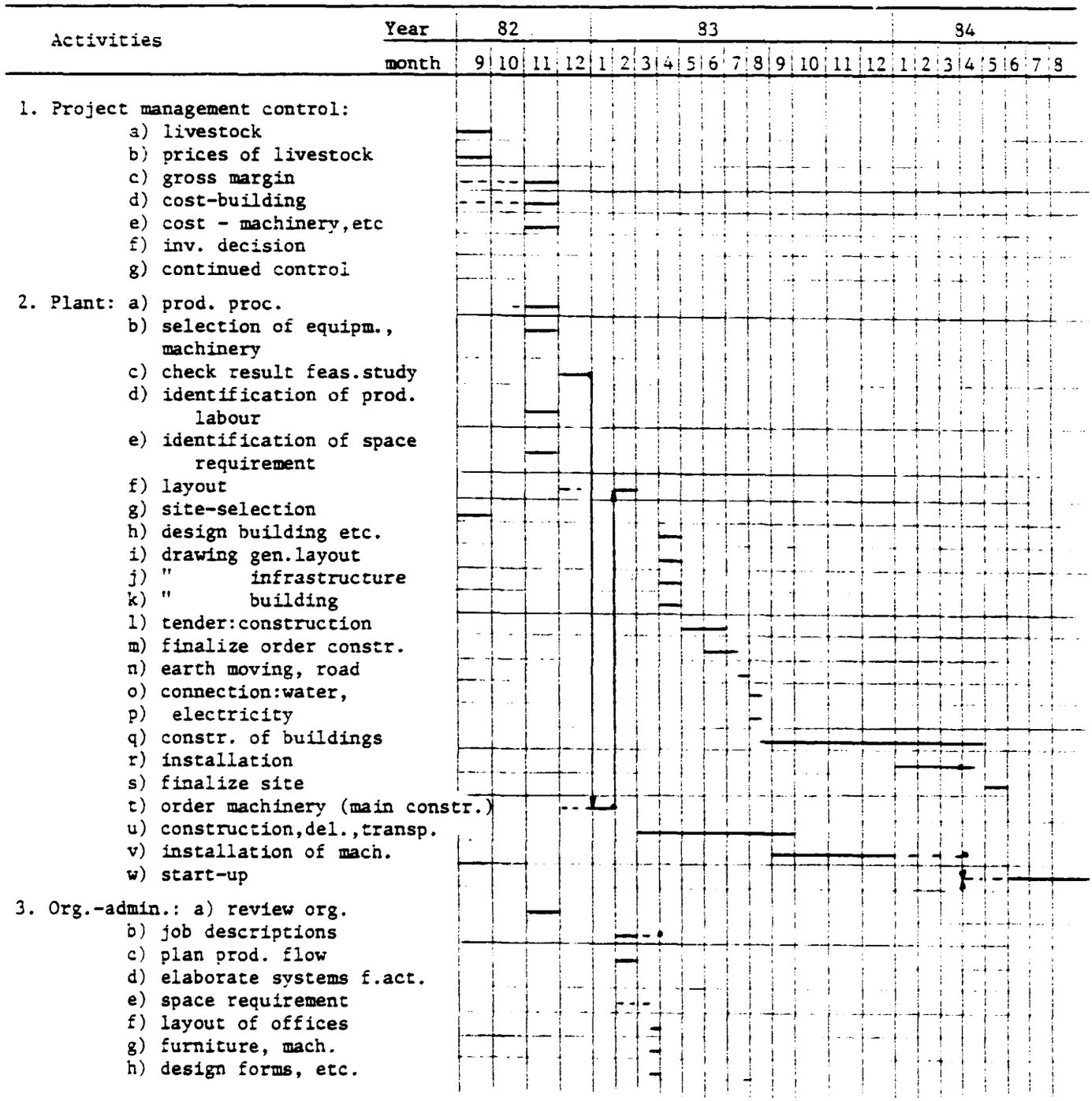
1.	Typewriter	3,000
2.	Calculating machine	600
3.	Book keeping machine	10,000
4.	Furniture, etc.	20,000
	Total	33,600

8. Manpower

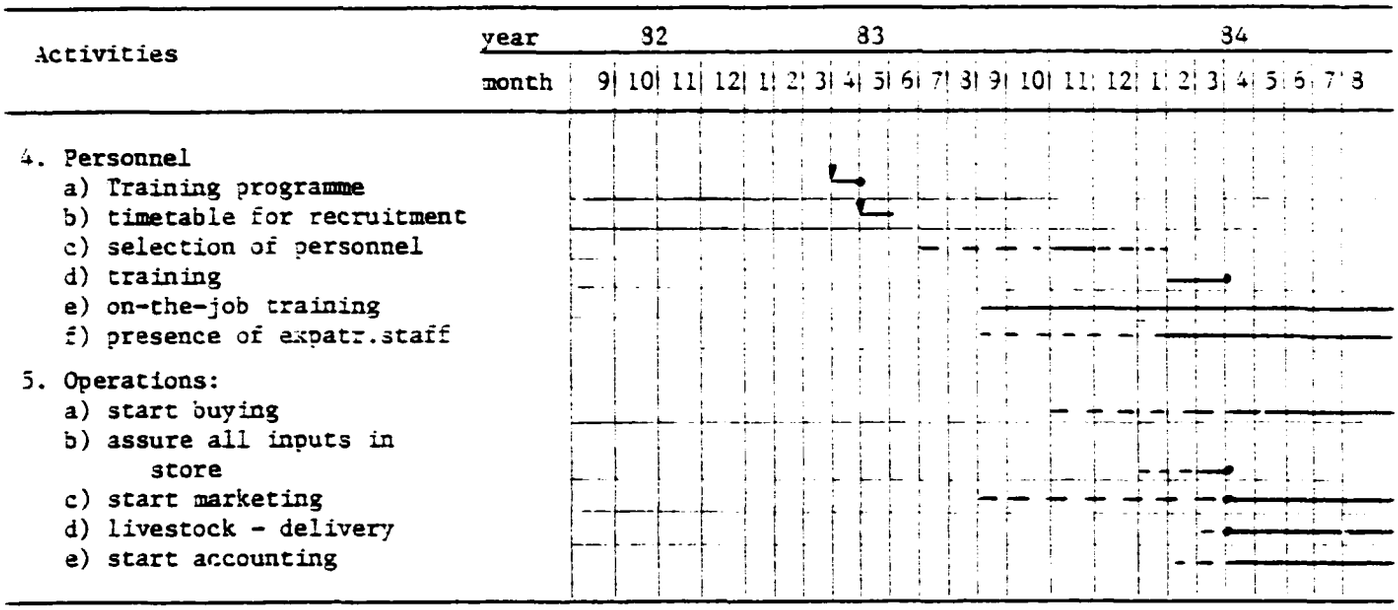
The manpower requirement may vary according to the degree of integrating marketing functions. If marketing is limited to selling to retailers, the manpower requirement will be as follows:

1	Manager		1,500
1	Accountant		800
1	Buyer		800
1	Clerk		800
1	Secretary		600
2	Foremen each 600		1,200
8	Aid butchers à 400		3,200
3	Drivers à 500		1,500
18		ECS P.M.	10,400
	or ECS per year		124,800

Graph 9.5: Implementation Plan



Graph 9.5 continued



9. Implementation

The activities necessary for further development of the project may be subdivided into groups:

a) Project management control;
b) Plant;
c) Organization and administration;
d) Personnel.

9.1 Project management control

The present feasibility study was not done under optimum conditions, thus it has some weak points which must be remedied before going ahead with investment. It is suggested that the main elements of the study (assumptions, information) on which is based the economic analysis on which depends the investment decision will be checked again. This can be connected with activities, which are anyway part of project development.

The main points are:

i) Availability of livestock according to production programme;
ii) Price of livestock or/and;
iii) Margin per product unit;
iv) Requirement and cost of building;
v) Requirement and cost of machinery and equipment, especially, cold store, trucks, generating set;
vi) A final investment decision should be taken only after receiving satisfactory information on the various points raised above.

The preparation of an investment decision could be done without causing expenditure. But it might be desirable to the Government to send one or two persons abroad to visit similar installations and to negotiate with potential suppliers. The cost would amount to about EC$ 7,000 per person. Arrangements for financing and the appointment of a project manager will be urgent and important measures to start implementation.

9.2 Plant

a) Designing of the plant will be initiated by describing and choosing the production methods step by step. In doing so local conditions have to be considered. Deviations from the production process proposed in the present study must be explained and their consequences be shown. It may be possible to get the exact production process free of charge.

b) Next comes production equipment and tooling selection, which will depend on the potential supplier. A thorough discussion of alternatives offered by the potential supplier is necessary. Other activities are:

c) A comparison of prices with the feasibility study is desirable. Consequences have to be shown.

d) The supplier has to give normal figures on the needs of production labour corresponding to the selected equipment.

e) Production space requirements have to be confirmed by the supplier.

f) The layout of physical facilities has to be detailed and discussed.

g) Selection of site could be done now;

h) Design building, infrastructure, etc.;

i) Make drawings of general layout;

j) Make drawings of infrastructure;

k) Make drawings of building (production and administration);

l) Tender; construction;

m) Finalize order for construction;

n) Earth moving, road;

o) Water connection;

p) Electricity connection;

q) Erect building and finish;

r) Install electricity, water, steam pipes, compressed air, air conditioning, cold store, telephone, sanitary installations, light;

s) Finalize: fence, parking, etc.;

t) Order machinery and equipment;

u) Time for construction and delivery, transport of machinery, and equipment;

v) Installation of machinery and equipment;

w) Start up.

9.3 Organization and administration

a) The organization proposed in chapter 7 should be discussed and compared with similar operating plant.

b) Job descriptions should be written for all posts.

c) A plan for the production flow is to be elaborated.

d) A system is to be proposed for the following activities:
- Control of production;
- Store keeping;
- Financial accounting;
- Cost accounting;
- Statistics for the management;
- Other relevant activities.

e) An estimate of the space requirement has to be made according to the organization and staffing of the plant.

f) Then the office layout has to be made.

g) Furniture and office equipment has to be selected.

h) Forms and all kinds of organizational devices have to be conceived.

9.4 Personnel

a) Based on the job descriptions, a training programme has to be proposed, which would also show the duration of training.

b) A time table for recruitment of personnel has to be established and confirmed.

c) The personnel has to be selected and recruited.

d) Training will take place according to the programme and start sometime before the start up of the plant.

e) Continued on the job-training.

f) It will be necessary that qualified expatriate personnel assumes certain tasks during the running in and training period.

The success of the project will certainly depend to a large extent on the successful training of personnel. Training may be done locally, abroad or on both places at least for some posts. In similar projects the expenditure for training amounted to about ECS 100,000. This amount may be cut down in negotiations, or for other reasons, but is should be provided for.

9.5 Implementation plan

The following tentative implementation plan is a first trial to show when activities of implementation have to take place in order to implement the project. The total implementation time may in fact be longer but hardly be shorter than 18 months from the day of signature of contract with the main supplier of machinery, equipment, know-how and training.

10. Economic analysis

10.1 Cash outflow

The cash flow will be based on the assumption of a project life of 10 years. The potential supplier will have to comment on the durability of the various parts of machinery and equipment so that necessary corrections can be made, if variations are considerable.

Cash outflows will be dealt with by groups of costs and chronologically as far as possible. Certain items may be mentioned even if they are void of payments.

a) Project study: void

b) Know-how: The price of know-how is - if at all asked for included in the price for the main equipment and to a lesser extent in the cost of training.

c) Equipment, machinery, auxiliary equipment, electrical supply and installation, tools and minimum of spare parts, including freight and insurance: EC$ 1,627,000
(Organ.) + 33,600

Payment: 50% with order
30% on delivery (6 months later)
20% after start up (12 months later)

d) Land: 3,000 m^2 at a price of 10 EC$ per m^2 will cost 30,000 EC$. The price is due at the beginning of earth moving.

e) Building: EC$ 500,000

f) Implementations: EC$ 600,000
Project management EC$ 100,000
Erection, installation EC$ 400,000
Training EC$ 100,000

g) Start up cost:
Start up cost include expenses for salaries and wages before start up, overhead cost, material inputs, marketing cost, buying cost, legal fees.

h) Manufacturing costs:
Manufacturing costs comprise current expenses for normal operations and are divided into the following groups:
Manpower 124,800
Direct material (live stocks etc.) excluded, because calculation is based on a gross margin and not on turn over.

Depreciation: must not be taken into account!		
Maintenance cost:		20,000
Utilities:		36,000
Post, telephone insurance etc.		48,000
Post, telephone	6,000	
Insurance	15,000	
Travel	10,000	
Stationery	2,000	
Advertising	10,000	
Others	5,000	
Total	48,000	
Total manufacturing costs:		228,800

i) Replacement investment:

After five years vehicles will have to be replaced.

210,000

Other necessary replacement are included in maintenance.

10.2 Cash inflow

The price of meat and meat products are directly related to the price of livestock, which may be subject to fluctuations. Therefore, the concept of margin between the two is applied here. The margin may be considered as fairly constant.

In our sales plan, chapter 3.3, we propose minimum margins of between 1 and 2 EC$ per kg. of finished product. An increase of the margin is possible, if necessary. According to the sales plan, cash inflows will develop as follows:

1st year of operation	714,000
2nd year of operation about	1,000,000
From 3rd year of operation onward	1,426,000

The figures will have to be checked with the potential supplier, but seem to be reasonable as far as the production capacity is concerned.

At the end of ten years of operation the salvage value may be considerable. It comprises at least the price of the land, part of the building, part of equipment, the good will and other assets. In spite of this, we will rather under state and assume it to amount to 1.5 minimum ECS.

10.3 Cash flow and IRR

The first cash flow table is shown in table 10.3. It is based on the assumptions, that payments for initial investment have to be made during the first year, full manufacturing cost have to be paid from the second through the 11th year, the margin increases from 50% (referring to capacity utilization) during the second year, the 75% during the third, 100% during the fourth through the eleventh year. The balance shows that investment could be paid back in 3 to 4 years. In case, the margin would not increase after the second year, manufacturing cost remaining the same, the IRR would still be 14%.

10.4 Value added effect

The overall effects of the project on the economy will be shown in the first instance by means of the value added of the project. Instead of the value of output the margin is used and for the value of current material inputs and services purchased from outside the project stands. This value minus main inputs (which are covered by the value of output). Our formula therefore reads:

Value added + Margin minus remaining inputs.

The value added flow may be established using the figures of the cash flow. During the first year the value of material inputs and services corresponds with the investment figure. In year 6 the value of material inputs amounts to 210,000 EC$.

The remaining inputs are:

Maintenance cost	20,000
Utilities	36,000
Others	35,000
Total	89,000

TABLE 10.3 : CASH-FLOW AND IRR (in 1 000 Birr)

	1	2	3	4	5	6	7	8	9	10	11	
Cash-outflow :												
Investment :												
Equipment, mach.	1 627					210						
Office equipment	33,60											
Land	30											
Building	500											
Implementation	600											
Start-up cost	45											
Operating cost												
Manufacturing cost		228 80	228 80	228 80	228 80	228 80	228 80	228 80	228 80	228 80	228 80	
Cash-inflow :												
Margin		714	1 000	1 426	1 426	1 426	1 426	1 426	1 426	1 426	1 426	
Salvage value											1 500	
Balance	- 2 835 60	485 20	771 20	1 197 20	1 197 20	987 20	1 197 20	1 197 20	1 197 20	1 197 20	2 697 20	IRR : 31,23
Accum. balance	- 2 835 60	-2 350 40	-1 579 20	-382	815 20	1 802 40	2 999 60	4 196 80	5 394	6 591 20	9 288 40	

TABLE 10. 4 : VALUE ADDED FLOW

Value of output (margin-dir. r. m.)		714	1 000	1 426	1 426	1 426	1 426	1 426	1 426	1 426	2 926	
Value of mat. inputs :						210						
Investment	2 835											
Manufacturing.		89	89	89	89	89	89	89	89	89	89	
Net value added	-2 835.6	625	911	1 337	1 337	1 127	1 337	1 337	1 337	1 337	2 837	VA-IRR : 35,[illegible]

They are supposed to be constant over the whole life span. The salvage value is considered as increasing the value of output in year 11. Discounting of value added leads to a IRR of net value added of 35,72%.

For the present project the net value added may be considered as net national value added, because no payments out of the value added will be transferred abroad. If we assume that the social rate of discount is 15%, the present value of the national value added for the entire life of the project is 3,199,600 EC$. The discounted wages amount to 626,340 EC$. The comparison of the present value of the net national value added for the whole life span of the project with the project is highly efficient from the national point of view. It generates a social surplus of 2,573,000 EC$.

10.5 Employment effort

The number of workers employed directly in the project is 18 or more. But it must be taken into account that a considerable number of additional jobs will be created in backward and forward linkage projects (or firms). Distributors, livestock projects, animal feed project etc.

10.6 Net foreign exchange effect

The assessment of the effects of the implementation of the project on the foreign exchange position of Grenada is certainly an essential part of the economic evaluation.

The outflows comprise payments for the equipment (total amount), office equipment (33,000 EC$), 50% of the cost of the buildings, implementation (450,000 EC$) and start up cost (30,000 EC$) made during the first year;

from the second year to the eleventh year we suppose that 65,000 ECS have to be paid in foreign exchange for manufacturing costs. In year 6 an additional investment of 210,000 EC$ will be necessary. The foreign exchange inflows are mainly due to import substitution and will develop as follows:

1st year:	Meat	2,120,000
	Meat products	600,000
	Total	2,720,000
2nd year:	Meat (at least)	2,600,000
	Meat products	1,200,000
	Total	3,800,000

Possible exports are not taken into account. The net foreign exchange flow is the difference between outflows and inflows as shown in table 10.6.

The foreign exchange outflow of the first year due to investment expenditures abroad will be more than compensated in year 2, which is the first year of production.

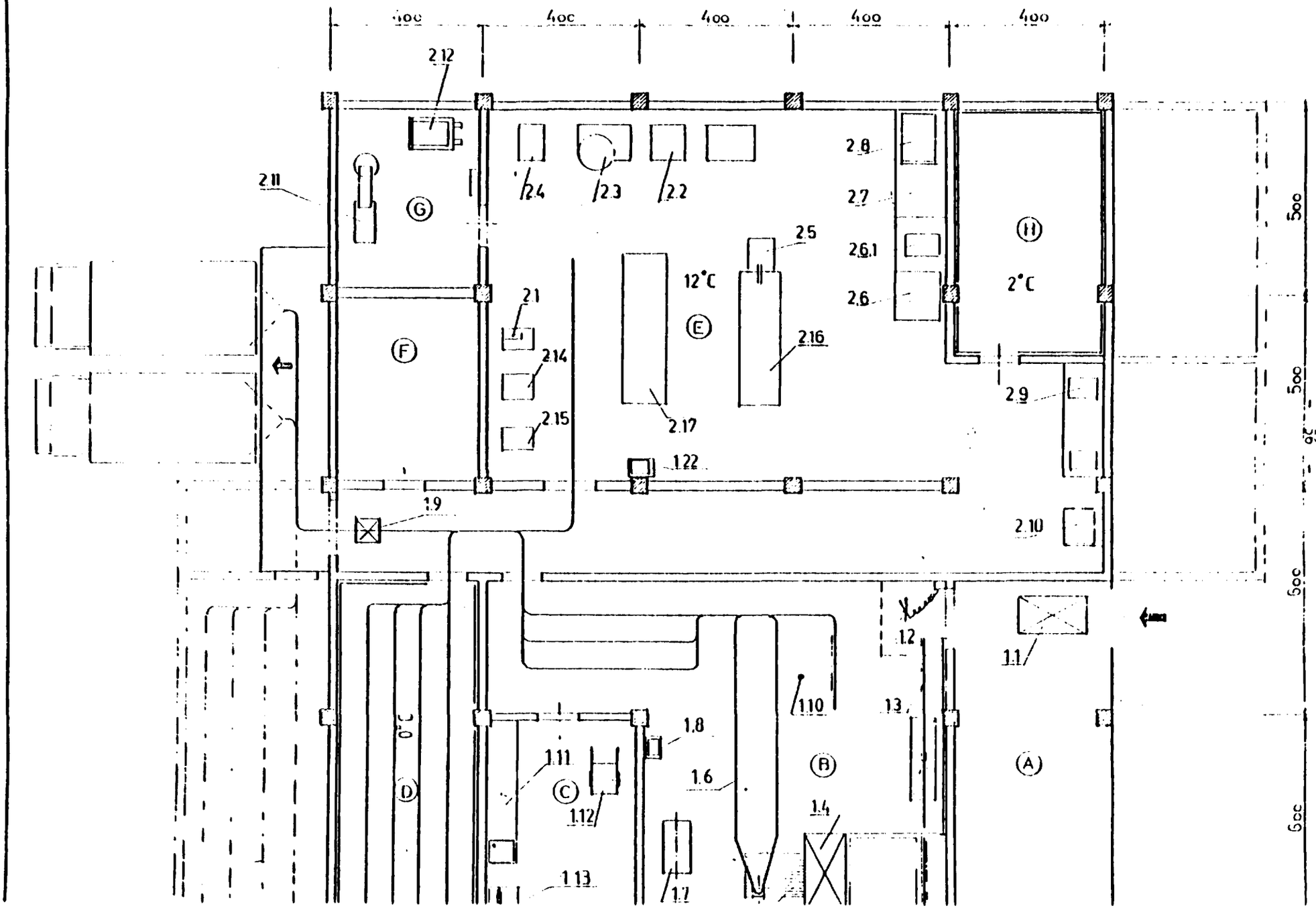
The net foreign exchange effect increases to 3,735,000 ECS in year 3 through year 11 with the only exception of year 6, when it decreases to 3,525,000 ECS.

The discount rate at which the present value of the foreign exchange flow becomes zero shows the capacity of the project to repay credits in foreign exchange. It is very high in the present case, i.e. 130%.

TABLE 10.6 : FOREIGN EXCHANGE FLOWS AND REPAYMENT POTENTIAL IN FOREIGN EXCHANGE

	1	2	3	4	5	6	7	8	9	10	11
Outflows :											
Equipment	1 627					210					
Office equipment	33										
Building 50 %	250										
Implementation	450										
Start-up cost	30										
Manufacturing :											
Maintenance		15				15					
Utilities		25				25					
Others		25				25					
	-2 390	-65	-65	-65	65	275	65	65	65	65	65
Inflows :											
Import substitution	-	2 720	3 800	3 800	3 800	3 800	3 800	3 800	3 800	3 800	3 800
Net foreign exchange flow	-2 390	+2 655	+3 735	3 735	3 735	3 525	3 735	3 735	3 735	3 735	3 735

IRR OF REPAYMENT : 130


400
400
400
400
400
500
500
500
500
2.12
2.11
2.4
2.3
2.2
2.8
2.7
2.6.1
2.6
2.5
2.16
2.9
2.1
2.14
2.15
2.17
12°C
2°C
1.22
1.9
2.10
1.2
1.1
1.10
1.8
1.11
1.6
1.12
1.4
1.13
1.7
1.3
A
B
C
D
E
F
G
H

Annex 4.2. Technical Report on the Development of the Granada Agro-Industries

1. Summary and Recommendations

1.A Summary of the analysis of the present situation

a) Marketing

At present no major marketing problem is reported. Stocks at the Marketing Board vary within the range of half a day's (mango nectar) and about twenty days' (jam) production. But it cannot be said if stocks are so small because production is so small. And here we can identify the major marketing problem, which may be described as follows:

- there is no sales plan, neither for the local nor for the foreign market;
- information, necessary to establish a marketing strategy, sales plan and production plan, is not available.

Taking into account the high prices of jars and bottles - they cost as much as eight pounds (resp. 6 pounds) of nutmeg pods - it is difficult to understand, why there is no deposit on them.

b) Raw material and other material inputs

The share of local raw materials in total material inputs is very low; about 3% for jam and jelly, about 4% for mango nectar. At present there is no storebook and consequently heavy wastage of expensive imported goods, uneconomic purchasing of materials and other shortcomings. The space available to store materials and finished products is inadequate from the hygienic point of view and too small.

c) Production

The performance of production is considerable in many respects. Nevertheless, there are shortcomings, which may explain the economic failure of the factory:

- Insufficient planning and organization of production;
- Inappropriate outlay;
- Inappropriate maintenance, leading to interruptions of production;
- Inappropriate control, leading to varying qualities of products; varying boiling time, varying taste, increased consumption of fuel and other inputs, etc.

d) Organization and personnel

There are about thirty people who report directly to one, two or three superiors without having clearly specified duties and responsibilities.

e) Economic impact of the present operation

The Agro-Industries project has created directly about 35 employment opportunities. For this purpose, an investment of about 1,300,000 EC$ (see 10.A) had to be spent, corresponding roughly to 40,000 EC$ per new employment; compared with a daily wage of 10 EC$, the per capita investment corresponds to 16 years of work.

Available figures indicate a net loss of EC$ 202,524 for 1981 and further losses for the first 6 months of 1982. The foreign exchange effect has been negative so far. The structure of direct material cost indicates a very small national value added in case the factory is breaking even.

f) Conclusions

At present, the Grenada Agro Industries are not viable and a heavy burden to the Central Government with a very small or no positive effect on national goals.

But the analysis has shown that there are reasons to consider Grenada Agro Industries as a kind of pilot venture which could be transformed by and by into a profitable enterprise.

Section B through this report suggests an action programme, which will allow to improve operations and the economic result.

1.B. Recommendations concerning the existing plant

a) General recommendation

It is recommended to implement the reorganization programme as proposed under B of each chapter of the report.

b) Security in boiler operations

It is strongly recommended to contact the manufacturer of the boiler and to ask him, when and if he would recommend to have the boiler inspected by one of his representatives. This issue should be sorted out soon for the security of the staff.

c) The present outlay is inappropriate for any kind of production

It is recommended to re-arrange some of the equipment to get a better production flow.

d) There is enough equipment to set up a separate line to produce sauces simultaneously to jam and jelly or nectars, but there is not enough space. Such a line could compromise the improvements achieved in jam - jelly production for reasons of organization and space.

e) It is strongly recommended not to make changes any more without drawings and a proper plan.

f) Planning of production

It is recommended not to change the production from one product to another every one or two days. It is recommended to plan continuous production of the same product for at least one week. This will simplify planning and organization as well as store keeping and increase return to scale.

g) Cold store

It is recommended to plan the inventory of the cold store according to the production plan. The purpose of the cold store is to permit a buffer stock but not to store goods for more than one month (more or less). Example: jam - jelly production:

The purpose of the cold store consists in allowing to build up a stock of extract and pulp to secure full production during the whole phase of jam and jelly production taking into account the bottle neck in preparation of cleaned pods, pulp and extract. But only the quantities which cannot be provided from normal production have to be built up whenever possible in the cold store. At the end of the production cycle of jam and jelly the total stock of pods, pulp and extract should be consumed. If small quantities are left over, it must be made sure that the first in first out principle will be applied.

h) Repair and maintenance

It is recommended to apply the following principles:

- repair and maintenance must be done in a way to disturb production as little as possible, if feasible and necessary after working hours on Saturday and Sunday. This is particularly important as far as the boiler is concerned.
- The planning of invetory in the cold store should allow regular maintenance of the cold store equipment. The cold store must be emptied and cleaned regularly.
- Regular maintenance should help to avoid breakdowns and repairs.
- The maintenance programme must be observed and controlled by the management, which is responsible for bad maintenance.
- Major repairs should be done if it seems to be advisable by competent firms.
- The insect screens should be repaired or renewed regularly.
- Stores must be protected against rain, insects and rats.

i) Quality control

It is recommended to change the present regulation according to which goods have to be retained at the factory until the OK comes from the laboratory.

1) At present the regulation makes full production impossible. The plant would require additional 25 m^3 of store room for jam and jelly above. The requirement of space for nectars would go beyond 100 m^3.

2) It is a very expensive regulation, because it increases the requirement of working capital at least by 60 - 180,000 EC$ and because operations are slowed down.

j) It is recommended that the present report is updated every year and during the year in order to develop it as an up-to-date management instrument.

2. Background Information

2.A. Concerning the actual plant

The Agro-Industries Plant has been implemented in 1980 without feasibility study and began operations in early 1981.

Mainly second hand equipment has been used (and purchased!!).

The products to be produced have been identified by the Produce Chemist Laboratory and with the assistance of a food technologist of the FAO, who wrote formulations for the products and a first version of production processes.

The year 1981 is considered as primarily a year of learning by doing for the plant's workers. The lack of familiarity and experience in that type of operation is said to be responsible for the initial problems encountered during 1981.

The management identified early 1982 the following major problems:

1. Inexperience of factory staff;
2. Severe handicap of no organized working capital so that packaging, preservatives and chemicals could be ordered in advance;
3. The unreliability of packaging supplies;
4. Unreliable electrical power supply;
5. Severe breakdown of major equipment operations;
6. Low volume of some raw materials during the period.

To overcome those problems the management asked for the following:

1. Sufficient funds to obtain packaging containers etc. for at least three (3) months.
2. Spare parts for the equipment used in production.
3. A stand-by generator (60,000 ECS).

The Government has in the meantime accorded the requested funds. Some time in May or June new machinery had arrived at the Factory:

A generating set, a filling machine, a semi-automatic sealer and others.

There is no plan how to install the production equipment. The generating set is being installed just now.

In a post-investment appraisal of the Agro-Industry Plant, elaborated by the Ministry of Industrial Development and Fisheries, a number of recommendations were spelled out. Most of them have not yet been implemented. Some of them are:

1. To clearly outline the functions and responsibilities of the plant's management.
2. To outline job descriptions and issue letters of employment to workers.
3. To implement acceptable accounting procedures.

In March 1982, the Minister for Industrial Development and Fisheries, Comrade Kenrick Radix, expressed his interest to have a study done by the UNIDO Expert under project DP/CAR/73/001/11-05/H. Unfortunately no decision was taken before the expert's return mission so that no preparatory work could be done in Vienna. But the study was decided immediately after the expert's arrival in July 1982.

The terms of reference read as follows:

a) Analysis of the present situation and operations

b) Proposal on improvements of the present operations and the utilization of equipment.

The two tasks will be dealt with in the same study and according to the same plan, but separated within the main chapters of the study.

2.B. Alternatives to improve and reorganize operations of Grenada Agro-Industries

The analysis of the present situation and operations for GAI has shown that there are many opportunities to make smaller changes and improvements of operations and different approaches to reorganise the whole enterprise. In section B, changes of minor importance are suggested. Major changes will be proposed in Section

The target of section B is, to make the existing factory viable, limiting changes to the necessary minimum, and concentrating on "making better use" of the existing potential, machinery, equipment, premises.

The proposals will mainly concern - in logical order:

- the production programme and - connected with it - the optimization of the production process;
- the production organization;
- economies in inputs;
- maintenance;
- management functions.

2.C. Further development of agro-industries in Grenada

2.C.1 Resources and opportunities

Our study of raw material supply in connection with the Grenada Agro-Industries has shown that available resources are used partly only. In addition, the country has the possibilities to extend production of certain fruits and vegetables considerably within a short time, if there is an outlet at a reasonable price for these products.

Based on natural resources, the following opportunities may be considered as very interesting.

- Nutmeg extract, nutmeg pulp and jam and jelly.
- Various nectars.

Other products like sauces and chutney are of less interest, taking into account the actual production of these products.

Products based on nutmeg-pods

Nutmeg pods are available in quantities to produce 120,000,000 jars of jam and jelly, i.e. 60,000 tons of jam and jelly per year. The existing factory has a capacity of about 900,000 jars or 450 tons per year. In fact, the production will not go beyond 150 tons per year because only a third of capacity is supposed to be used for jam and jelly production. This corresponds to 0.25% of the potential 99% of the available amount of pods are not utilized and rot.

Netars

The quantities of fruits available for the production of nectars are not as spectacular as for nutmeg pods, but still considerable (see chapter 4).

2.C.2 Problems

Further development of agro-industries is facing several problems.

Production of jam and jelly can be increased easily from the point of view of production, but hardly to a degree of full utilization of the resources. Apart from capital requirement, organization and management problems, the marketing risk would become very important. As far as nectars are concerned, the more sophisticated production process may cause certain problems. Nectar production would require more modern equipment and probably a higher standard of packaging.

2.C.3 Strategies to develop the nutmeg pods industry and nectar production

Nutmeg pods are a valuable resource, idle so far at 99%. It can be used among other purposes to make jam and jelly, pectin and other semi-finished products, like pulp and extract.

At present, Grenada has some experience to make jam and jelly. But the experience is limited to a very small market; total sales amount to 57,000 jars of jam and jelly for the period from the beginning of production in 1981 to June 1982. Sales during the first six months of 1982 amount to 2,600 jars on the local market and to 1,570 jars overseas. These quantities correspond to one day's production (!!) which could actually amount to 4,600 jars per day in one shift.

It is evident that marketing becomes the paramount problem. Immediate measures will be necessary.

The present situation, opportunities and problems inspire to the following strategy

A) Strategy in respect of jam and jelly production:

1st step: Increase production and sales of the Grenada Agro-Industries to at least 50% of capacity.

2nd step: Evaluate the experience made after having sold at least 500,000 jars.

3rd step: Decide upon the implementation of an additional plant, which should be more efficient than the present one.

4th step: According to the development of sales, capacity may be increased.

B) Strategy in respect of better utilization of nutmeg pods

The main constraint for the development of the production of jam and jelly is the market. To penetrate the market will take some time and there will still remain an important element of uncertainty.

A possibility to come quicker to a higher degree of utilization of nutmeg pods consists in selling pulp to either established manufacturers of jam mainly in industrialised countries or to establish a nutmeg jam factory in some industrialised country offering an interesting market or to establish such a factory as a joint venture and to supply the necessary pulp.

The various solutions have to be studied, but this cannot be done at St. George's. The market study has to be done in the countries considered as potential market. The technical aspects have to be studied in cooperation with the various potential suppliers of equipment. This would not mean that the equipment must be purchased from such a preselected partner, but it is necessary to obtain from them the technical characteristics of equipment, realistic prices of equipment and other information.

C) Strategy in respect of nectar production

Production of nectars is a much more sophisticated and delicate matter. The acutal applied process does not make the best of the opportunity.

The product should in all respects meet high standards, if the market is to be enlarged beyond the CARICOM.

It is therefore recommended to produce nectars in a modern factory, which takes into account the progress made during the last twenty years. The production would be automatic in a closed circuit process flow so that the high quality standard could be reached. All other activities might be manual.

The proposed strategy for the development of agro-industries could be visualised as a development from the relatively simple multi-purpose plant to specialised plants of high quality standard and efficiency, competitive on the international market.

The erection of a new plant would roughly take 18 months or more (from feasibility study, training of labour and staff, erection, start up and running-in-period to normal production).

It could be considered as realistic to develop the agro-industries according to graph 2.1, which shows clearly that the installed capacities should be used to a certain percentage before implementing a new project. The ordinate shows the number of jars in 1000 per day or its equivalent in other units. The graph illustrates that production capacity has to be increased considerably. Referring to the utilization of nutmeg pods, the hypothetic development shows that, though the development is spectacular, it l-ads to the utilization of about 600 t of pods per year only corresponding to certainly less than 5%.

Therefore the export of pulp should be envisaged and possibilities studied.

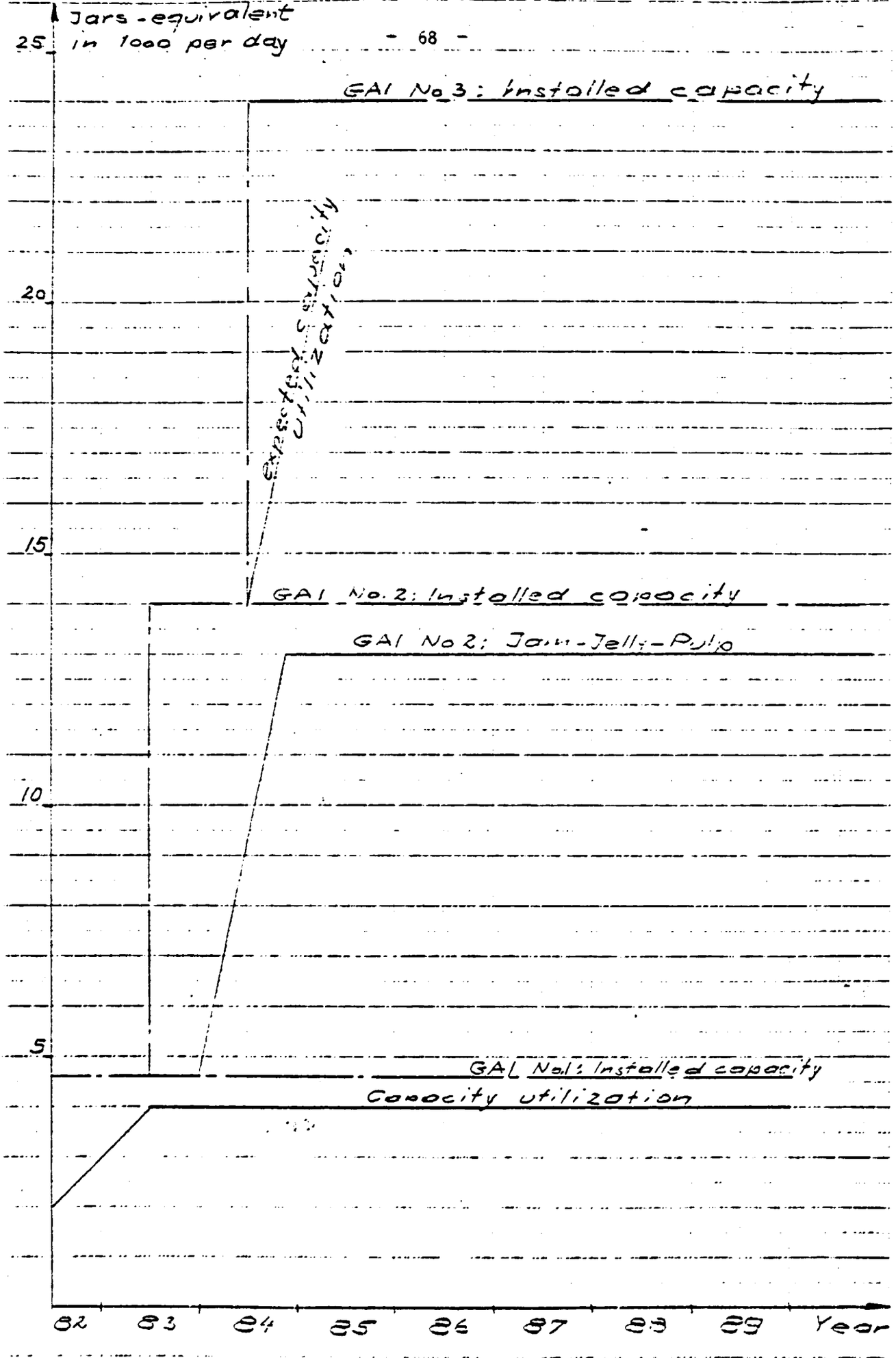


Table 2.1: Development of agro-industries

3. Products, Markets and Marketing Concept

A. The actual situation

3.1 The Products

The production programme comprises the following products and product groups:

a) Nectars N

1)	Guava-Banana Nectar	GBN
2)	Mango Nectar	MN
3)	Paw-Paw Nectar	PPN
4)	Sour-Sop Nectar	SSN
5)	Tamarind Nectar	TN

b) Jam and Jelly: J

6)	Nutmeg Jelly	NJY
7)	Nutmeg Jam	NJM

c) Sauces: S

8)	Hot Sauce	HS
9)	Spicy Sauce	SS
10)	Mango chutney	NCH

3.2 The market and marketing

Actually, the products are mainly sold on the local market Small exports have been realised to the following countries: Trinidad and Tobago, Barbados, St. Lucia, Martinique, (St. Kitts, St. Vincent, Mexico, U.S.A.), Canada and UK.

The products are marketed by Grenada Agro-Industries Marketing Division presently attached to the Marketing Board. The distribution is effectuated through two channels. The first channel goes from the factory to the depot of the Marketing Board, from there to wholesalers

and then to retailers. The second channel follows the following line; factory-depot of Marketing Board - Van salesman, visiting retailers, hotels, institutions. Very little is sold ex-factory.

The products are sold under the brand name of "Spice Isle". It is the intention of the Marketing Board to fix prices on export markets too, to do own advertising, and to pay selected sole-agents (for each country) a certain (unknown) margin.

The ex-factory prices are the following:

Nectars (283 ml)	1.60 EC$
Nutmeg-Jam and Jelly (454 g)	3.24 EC$
Spicy Sauce (300 ml)	2.75 EC$
Hot-Sauce (300 ml)	2.17 EC$
Mango Chutney (454 g)	3.29 EC$

Table 3.2: Sales of agro-products (January - June 1982)

Item	Local		Overseas		Total	
	EC$	1000	EC$	1000	EC$	1000
Nectars	26,924		9,772		36,696	
Jam, Jelly	8,348		5,022		13,370	
Mango Chutney	1,668		2,131		3,799	
Hot Sauce	14,576		2,112		16,688	
Spicy Sauce	5,488		6,354		11,842	

The conditions for the Marketing Board are:

Delivery free depot of Marketing Board and 12,5% discount (margin).

The Marketing Bard intends to extend a margin of 7,5% to wholesalers. Retailers, hotels, etc. have to pay the ex-factory price.

There is no deposit on bottles and jars though they have to be imported at high prices (0.64 and 0.85 respectively).

Compared with the lowest wages paid to workers of the factory, the prices must be considered as high. But they are lower, than the ones of imported substitutes.

Packaging is of international standard as far as bottles and jars are concerned. Cans show rust very soon and substitutes are probably packed in a more appealing way. Labels are of acceptable quality.

3.B Marketing measures to improve operations

3.B.1 General measures

After 18 months of operation little can be said and little is known about the market. Who knows how much of each product can be sold at which price on which market?

This gap must be filled as soon as possible. The potential market should be divided into 5 zones:

a) Local market
b) CARICOM
c) USA, Canada and other American countries
d) Europe
e) Other regions

Marketing activities should be started in the first 4 zones immediately.

The activities should include:

a) Market studies on each region
b) Market tests
c) Establishing of contacts with relevant institutions (Chamber of Commerce, periodicals, associations, etc.)

3.B.2 Specific measures to be taken on the local market

Owing to the lack of information we depend on some assumptions which, however, will help us to improve marketing.

According to information obtained from the Marketing Board, out of total sales of jam and jelly of about 180,000 EC$, local sales amount to about 140,000 EC$ corresponding to roughly 43,200 jars or thirteen days' production.

We conclude from the small quantities sold and the price that jam and jelly are too expensive for the majority of people. This seems to become evident, if one compares the price of one jar with the daily wage of labour: three jars for 1 day's work.

There must be something wrong. It is the price. Apparently it is cheaper to make jelly at home than to purchase it (could somebody imagine that it is cheaper to make a car at home, than to buy it?). But the task of industries is to supply goods at a lower price than one could achieve in making it at home.

Two reasons may be identified to explain the high prices:

- Packaging
- Productivity

There are solutions to both problems. Productivity will increase through implementation of the present programme. Returns to scale will become effective.

Packaging can be made cheaper in two ways:

a) Through a deposit on jars (and bottles) and re-cycling. (The deposit could be about 50 to 80 cents and reduce the price by the same amount).

b) Through utilization of other packaging materials. (The product could be offered in different containers at different prices and thereby appeal to different income groups).

Finally, this would lead to differentiated prices:

- A luxurious presentation in glass jars (actual packaging), but the price including a deposit;
- An economy presentation in nice but cheap plastic containers for low income customers.

Such a price policy would satisfy everybody and in particular contribute to increase the standard of living of everybody including the poor people.

It is probably the only way to enlarge the local market.

Nota bene

Import duty will only be advantageous for the industry, private and public enterprises, at the expense of the consumers, the mass of the population.

The GAI needs a larger market to go into mass production, the purpose of industries.

The factory could produce easily about 600,000 jars of jam and jelly in one year. And this should be the first target of the management. On the other hand 600,000 jars per year means only about six jars per year per capita of the local population.

3.B.3 Marketing strategy and sales target

It is planned to sell during the coming six months 320,000 jars of jam and jelly.

Marketing should make full use of the following instruments:

- Price differentiation, deposit, even price changes;
- Packaging (proposal: one shipment of plastic containers should be imported to test the market);
- Quality

Other instruments should be used according to expected results from market studies.

3.B.4 Packaging in cartons

It is recommended to use again the cartons of 12 jars - though they are printed for the local market at least. This will allow to save about 400 EC$ every day of jam-jelly production !! This will have no negative effects on sales.

4. Raw Materials and Other Material Inputs

A. The present situation

4.A.1 Synopsis of materials used:

		Abbr.	Price
	Fruits		ECS/kg
1)	Banana	B	0.22
2)	Guava	G	0.44
3)	Mango - Green	gM	0.22
	Ripe	rM	0.22
4)	Nutmeg - pods	N	0.22
5)	Paw-Paw - Green	gP	0.33
	Ripe	rP	0.44
6)	Tamarind	T	0.44
	Spices		
7)	Cinnamon	Ci	24.00
8)	Condiciou	Co	0.44
9)	Ginger	Gi	30.00
10)	Onion	On	1.90
11)	Pepper (strong)	Pe	1.00
12)	Tumeric	Tu	24.00
	Chemicals		
13)	Acetic acid	AA	3.60
14)	Browning (1 bottle = 5 ECS)	BR	12.32
15)	Citric acid	CA	6.70
16)	Pectin	PE	26.48
17)	Salt	SA	0.58
18)	Sodium Benzoate	SB	5.92
19)	Starch	ST	4.00
20)	Sugar - White	wSU	1.62
	Brown	bSU	1.40

Packaging materials	Abbr.	Price
21) Yars		0.85
22) Caps		0.22
23) Labels		0.08
24) Cartons with portions		0.07
25) Cans with ends		0.66
26) Labels		0.15
27) Cartons of 48		2.40
28) Bottles		0.64
29) Caps		0.10
30) Labels		0.06
31) Cartons and port		
32) Canisters of 51		

Utilities

33) Electricity
34) Water
35) Fuel
36) Gas

4.A.2 More details on materials

The fruits are collected from agents all over the country and from individual farmers.

1. Bananas are available during the whole year in sufficient quantities and qualities.

Exports and local sales of bananas

quantities in t.

Year	Exported	Locally sold	
		ripe	green
1961	13		
1962	14		
1963	16,3		
1964	15,4		
1965	23,1		
1966	23,4		
1967	28,6		
1968	30		
1969	25,2		
1970	21,1		
1971	15,6		
1972	14,6		
1973	11,3		
1974	9,8	4,7	278,9
1975	14,5	131	1,316
1976		242	631
1977		140	834
1978		108,6	615
1979		72,2	260

During the first six months of 1982, the factory purchased 1.13 tons of bananas.

2. Guava

The production of guava has developed as follows:

Year	1973	1974	1975	1976	1977	1978
Tons	157	153	150	146	[illegible]	130

The factory has purchased 1.56 tons in six months.

3. Mango

Mangoes are supplied seasonally only. The available quantities are large as is shown in the following table.

Year	1973	1974	1975	1976	1977	1978	1979
Tons	2,216	1,750	1,237	1,380	1,600	1,590	1,672

The factory has purchased 16.13 tons in six months.

4. Nutmeg pods

Nutmeg pods are available more or less the whole year. The production of pods may be estimated roughly as amounting to two or three times the quantity of nutmeg, when they are green. If we take an average of 4,000 tons of green nutmegs, the quantity of pods may be of 8,000 to 12,000 tons.

At present, only a very small quantity is used to make jelly. The factory has purchased 13.1 tons in six months. This corresponds to about 0.08 to 0.15% of the available and unutilized quantity.

5. Paw-Paw

Supply of paw-paw is reported to have been irregular and insufficient. The estimates of production and sales show that there is no abundance.

Year	1974	1975	1976	1977	1978	1979
Production (t)					84	60.6
Sales (t)	5.2	29.5	19	18.5	20.8	20.2

These figures compare with 6 tons of purchases of the factory in six months. The supply is particularly difficult as far as ripe fruit is concerned.

6. Tamarind

The production of tamarind is shown in the following estimates:

Year	1973	1974	1975	1976	1977	1978	1979
Tons	280	260	250	237	230	183	22

The factory has purchased 6.9 tons in six months.

7. Cinnamon

The country produced in the past years considerable quantities.

Year	1973	1974	1975	1976	1977	1978
Tons	8	13.8	8.4	16.9	18	-

Only small quantities are required.

8. Condicion

No estimates on production are available. Two tons have been purchased in six months.

9. Ginger

No estimates on production are available. The requirement is small (0,7 tons in six months) and may be met easily.

10. Onion

About 3.7 tons of onion have been sold on the market (local production). The quantities required for the factory have been imported! No figures are available. There is great evidence that local production could be developed to cover all requirements.

11. Pepper

The following quantities of hot pepper are produced.

Year	1974	1975	1976	1977	1978	1979
Tons	3.5	19.7	11.5	11.9	18.3	13.6

Factory purchases amount to 0.79 tons in six months.

12. Tumeric

0.259 tons have been purchased by the factory in six months. Figures on production are not available.

Chemicals

All chemicals are directly or indirectly imported.

13. Acetic Acid

AA is imported as GLACIAL ACETIC ACID BPS, packed in drums of 25 litres. One supplier is:

B. Terfloth + Company (UK) Limited,
Eagle House,
112 Parkshot
Richmond - Surrey.

One order will be of a net weight of 4.576 kg. The price cif St. George's is US$ 1,328 per kg or EC$ 3.60 per kg.

14. Browning

15. Citric Acid

Monohydrate, granular form BP USP, packed in packs of 50 kg. One supplier is:

B. Terfloth (see 13)

The size of a normal shipment is of 300 kg. The price cif St. George's is US$ 2,48 per kg or EC$ 6,70 per kg.
Invoice dated 29th April 1982.

16. Pectin

Purchased as Medium Gel Strength Paktin Type 612 from B. Terfloth (see 13). Packed in bags of 50 kg. Price cif St. George's: US$ 9,75 per kg or EC$ 26,23 per kg. 1 shipment of 600 kg cost per 13 March 1982, US$ 5,850 or EC$ 15,893.87.

17. Salt

It is purchased locally, but imported.

18. Sodium Benzoate

Imported from: Southern Commodity Corporation
3550 N.W. 112th Street
Miami, Florida 33167.

Price cif St. George's in bags of 45,33 kg. US$ 2,19 per kg or 5,92 per kg.

19. Starch

20. White Sugar

Sugar is imported from different sources. Prices vary little. Example of a shipment dated 20th March 1982:

Supplier:	Everglades Sugar Refinery, P.O. Box 339 SAVANNAK GA 31 402 USA
Quantity:	100 bags à 45.36 kg net
Price:	à US$ 27 = 2.700 US$
Freight:	Freight = 448,21 Insurance = 27,25 Ex-factory = price 2224,21 US$ Free St. George's 7.335 ECS or 1,62 ECS per kg.

Packaging Materials

21 Jars

22 Caps

Jars of 454 g or 16 ounces are used for jam, jelly and chutney. They are presently imported from:

Costa in Musson
Bos 103 - Bridgetown
Barbados

One shipment dated 10 February 1982 reads as follows:

30,000 jars in 2,500 cases at 12 x 12 oz (!!) weigh 6,083 kg and cost 6,65 Bd. $/case = 16.625 BdS (the price increased to 8.27 Bd$ as per 5.5.1982). 29,700 caps in 27 cases (Twist white plastical) at 1100 caps per case weigh 216 kg and cost 138,04 per 1000 (145,15 Bd$ as per 10 June 1982) = 4.099,78 Bd.S.

Freight:	2,006.96
Export charges:	154
Insurance:	720,58 Bd$
Bd$	23.606.32
CIF EC$	31,967.00

EC$ = 0.85 per jar
0.22 per cap
1.07 per unit in cases of 12
12,80 per case

23 Labels for Jars (Jam, jelly and chutney)
Labels are adhesive (see sample)
They are purchased from:
Caribbean Flexographic and Foil Printers,
Kelly Village
Caroni
Trinidad, W.I.

They must be paid in advance. The prices differ slightly according to an invoice dated 30 April 1982 and 1st July 1982.

20,000 pieces "Nutmeg Jam" cost 68 per 1000
= 1360 TT$

20,000 pieces "Nutmeg Jelly" cost 73.5 TT$ per 1000
= 1470 TT$

Plus handling = 60 TT$
Plus insurance = 100 TT$
1 TT$ = 1.128,5 EC$ + 5% Foreign Exchange tax.

It is supposed that the price for the chutney label is the same.

Price Cif: EC$ 0,08

24 Cartons with partitions

Empty jars are delivered in cases of 12. Because the Marketing Board shows some preference for cases of 24, the management decided to use cases of 24, which have to be purchased at a price of EC$ 1,70 including the partition. The cost per jar is therefore EC$ 0,07.
Size (24 jars): 31.47.14,3 cm

25 Packaging of nectars

Nectars are filled in cans. PPN and TN are packed in coated cans, the other nectars are packed in plain cans. There is almost no difference in prices.
The content of one can is 283 ml or 10 fl.oz.
One unit consists of the can and the end.
Price: EC$ o,66
Cans are purchased from:
Metal Box Trinidad Limited,
Macoya Road,
Tuna Puna.

One shipment comprises:

71,512 cans)	Weight: 3007 kg.	Price	435 TT$
72,000 ends)			52 TT$
	+ Haulage:		872 TT$
	+ Handling:		138 TT$
	FOB		35.862 TT$
	CIF	EC$	47.423

26 Labels for nectars

Supplier is the same firm (see 23)

The price of one label is in the average: EC$ 0.15

27 Cartons of 48

They are used for nectars (cans) and are said to cost about EC$ 2,40.

28 Bottles

Bottles are used for the hot sauce and the spicy table sauce. The content is of 300 ml.

Price: EC$ 0,64 (if)

Weight: 600 cases of 24 of 11 ozs. = 14,000 bottles:
3,742 kg.

Supplier: Alstons Marketing Company
69 Independent Square
Port-of-Spain
Trinidad

29 Caps for bottles

30 mm (Ketchup)

Price: 0,10 EC$/cap cif

30 Labels for Hot Sauce and Spicy Sauce

Price: 0,06 EC$ cif

31 Cartons and partitions for 24 bottles

Price: 2,00 ECS

32 Canisters of 5 litres

They are used for sauces sold to restaurants.

4.A.3 Material Balances by Products

4.3.1 The data

We may work out two different material balances for each product;

a) the effective balance or ex-post balance,

b) the target balance

Available data are not always consistent and reliable, but will give at least a first picture. They could be improved easily. Tables 4.3.1 a, b,c,d,e show the number of batches, the main inputs, the output and the output/input ratio as percentage by day of production. Irregularities of measuring must be accepted within a certain margin.

Output/input ratios in weight vary between 42 and 88% for jam, with a net improvement in June (68 and 77%), and between 37 and 82% for jelly !!

It is proposed to use the average ratio for further computations. Accordingly, the output/input ratio is

for jam 71%

for jelly 62%

Similar figures for other products have not yet been worked out.

Table 4.3.1.a

PRODUCTION ON NUTMEG JAM

Period : Jan - May and June 1982

Date Month	Day	Nº. of Batches	Inputs in Lbs. Pulp	Petin	Sugar	Output Nº. of Jars	Output/Input % 100
01	06	5	600	8,44	600	769	64
	8	1	120	1,7	120	161	67
	11	3	360	5	360	427	59
	12	4	480	6,75	480	646	67
	13	2	240	3,4	240	328	68
	14	4	480	6,75	480	658	69
	15	3	360	5	360	562	78
	18	1	120	1,7	120	119	50
	19	2	240	3,375	240	330	69
	20	3	360	5	360	526	73
	22	2	240	3,4	240	322	67
	25	1	120	1,7	120	147	61
	29	2	240	3,4	240	388	81
		33	3,960	55,54	3,960	5,383	68

Table 4.3.1.b

Month	Day	Nº. of Batches	Pulp	Sugar	Pectin	Jars	%
02	10	2	240	240	3.7	340	71
	11	4	480	480	6.7	715	74
	17	3	360	375	5	310	42
		9	1080	1080	14.4	1365	63
03				NIL			
04	2	3	360	360	5	460	64
	5	4	480	480	7	671	70
	6	3	360	360	4.8	528	73
	7	6	720	720	9.75	1065	74
	8	4	654	654	7.8	979	75
	13	3	360	360	5.25	520	72
	14	6	720	720	10.5	1070	74
	15	3	360	360	5.25	1091	-
	19	2	480	480	7	771	80
	20	3	360	-	5.25	800	-
	21	4	720	720	10.5	1110	78
	26		1080	1080	15.7	1641	76
	28	1	240	240	3.5	489	
	29	3	600	600	8.8	758	63
	30	3	600	600	8.8	934	78
			8094	7734	115.9	11886	877

Table 4.3.1.c

Month	Day	Nº. of Batch	Inputs in Pounds			Output Jars	%
			Pulp	Sugar	Pect		
05	3	2	240	240	3.5	365	76
	4	11	1320	1320	19.25	1796	68
	5	12	1440	1440	21	1705	59
	6	5	6000	600	10.5	1020	85
	7	2	360	360	5.25	510	71
	19	12	1440	1440	21	2208	77
	20	8	960	960	14	1452	76
	24	9	1080	1080	15.75	1686	78
	25	7	840	840	12.25	1352	80
	26	1	240	240	3.5	424	88
	26	4	480	480	7	723	75
	27	8	960	960	14.0	1499	78
	28	4	480	480	8.75	732	76
			10880	10880	155.75	15472	74
			24014	24014	286	34106	71

Table 4.3.1.d

JAM PRODUCTION - JUNE 1982

Month	Day	Size of Patch	Nº. of Batches	Sugar	Pectin	Pulp	Nº. of Jars	Output / Input 100
6	1	240	7	840	12,25	840	1255	75
	3	"	1	120	2,75	120	172	72
	4	"	9	1080	15,75	1080	1583	73
	7	"	6	720	10,50	720	1050	73
	9	"	8	960	14,00	960	1434	75
	23	"	7	840	12,25	840	1134	68
	24	"	9	1080	14,00	1080	1445	67
	28	"	5	600	8,75	600	866	72
	29	"	4	480	7,00	480	740	77
		240	56	6720	96,25	6720	9679	72

Table 4.3.1.e

PRODUCTION OF NUTMEG-JELLY In
Period Jan to May 1982

01	04	1	120	120	1.9	111	46
	5	4	480	480	7.5	552	58
	6	2	306	306	4.6	314	51
	8	3	440	440	6.6	490	56
	11	1	120	120	1.9	132	55
	12	5	680	680	10.3	633	47
	13	3	600	600	7.5	617	51
	14	3	475	475	6.5	454	48
	15	1	240	240	2.1	327	68
	22	1	240	240	2.8	266	55
	29	1	120	120	1.87	151	63
			3,821		53.57	4047	53
02	5	3	500	500	7.3	611	61
	10	1	269	269	3.8	332	61
	15	2	360	360	5.6	496	69
	16	2	394	394	6	563	71
			1,523		22.7	2002	66
03	30	6	840	840	12.1	973	58
04	5	6	960	960	15.5	1301	68
	6	3	360	360	4.8	528	73
	7	9	1670	1670	25.3	2087	62
	14	2	540	540	3.6	784	73
	15	4	740	740	9.4	535	37
	23	1	188	188	2.7	308	82
	28	1	300	300	4.8	444	74
			4,758		66	5987	63

The following table 4.3.1.f shows the wastage for each main raw material according to factory experience.

Table 4.3.1.f

RAW MATERIAL WASTAGE IN PERCENTAGE OF WEIGHT

	DENOMINATION	% OF WASTAGE
1.	Banana	30 (43)
2.	Guava	15
3.	Mango	50
4.	Nutmeg pods (after pulping)	30 (43)
5.	Paw Paw - green	45
	- ripe	30
6.	Tamarind	..
7.	Condicion	5
8.	Onion	2-4
9.	Pepper	10
10.	Soursoup	40

Figures on wastage of other raw materials, chemicals and packaging materials are not available.
It must be pointed out that no distinction is made between avoidable wastage (f.i. of sugar) and unavoidable wastage (f.i. of banana) is made. But the table reflects mainly unavoidable wastage.

4.3.2 Material balance and input coefficients for various products

a) Jam

The material balance table 4.3.1 is based on the following assumptions:

- ignoring the sugar content of the pulp, it is assumed that the sugar content of the finished product is due only to the input of sugar;
- there are no other losses than through evapration.

The thereby obtained material balance is the "target" balance.

According to the jam recipe the inputs have to be mixed at the following percentage of weight:

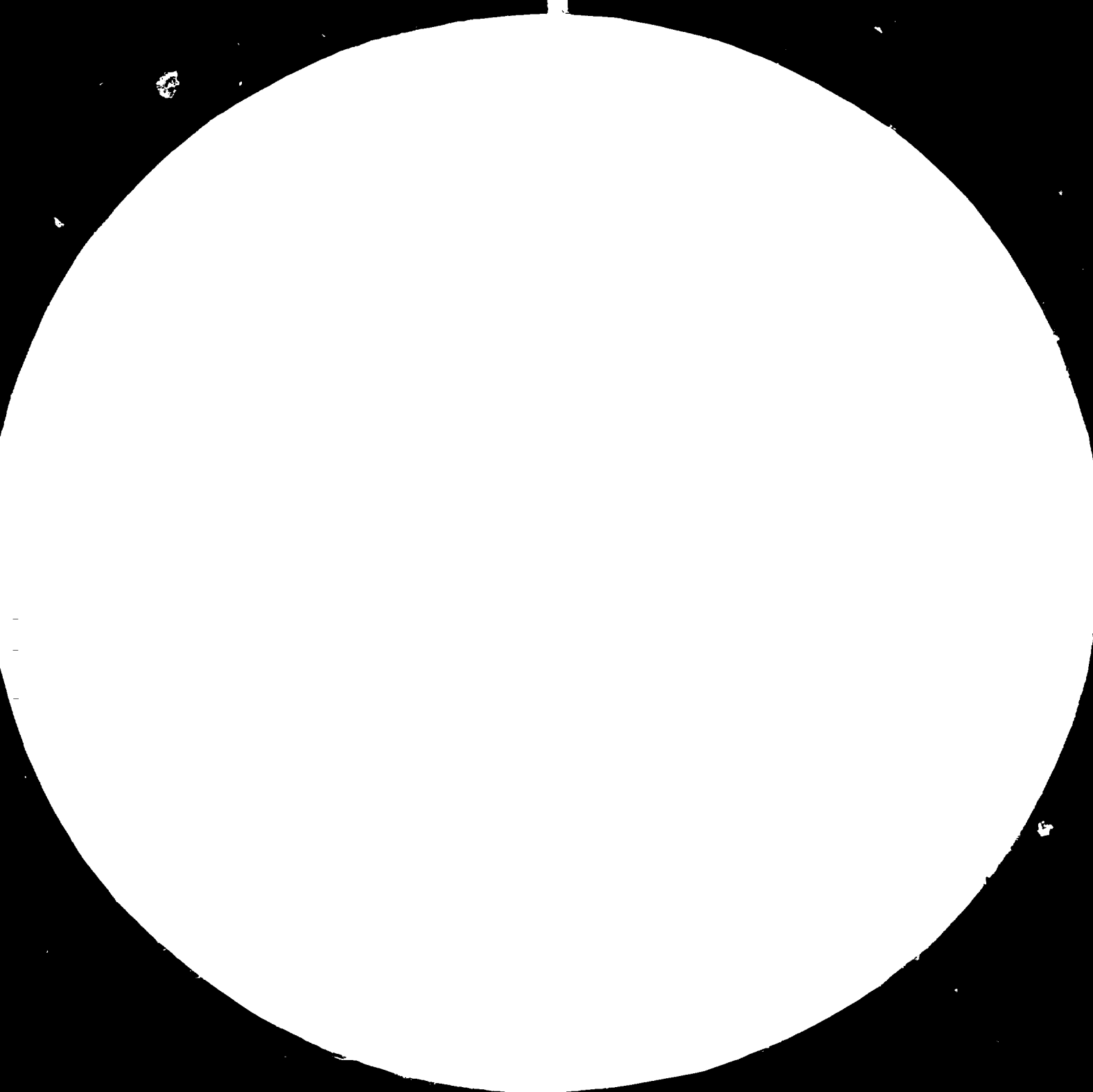
nutmeg puree	16,58%
water	33,17%
sugar	49,75%
pectin	0,50%

The required inputs for 1 kg jam of 66° Brix will therefore be in kg:

nutmeg puree	0,22
water	0,44
sugar	0,66
pectin	0,0065

The evaporation is expected to be 24%.

Input coefficients are given in table 4.3.2.



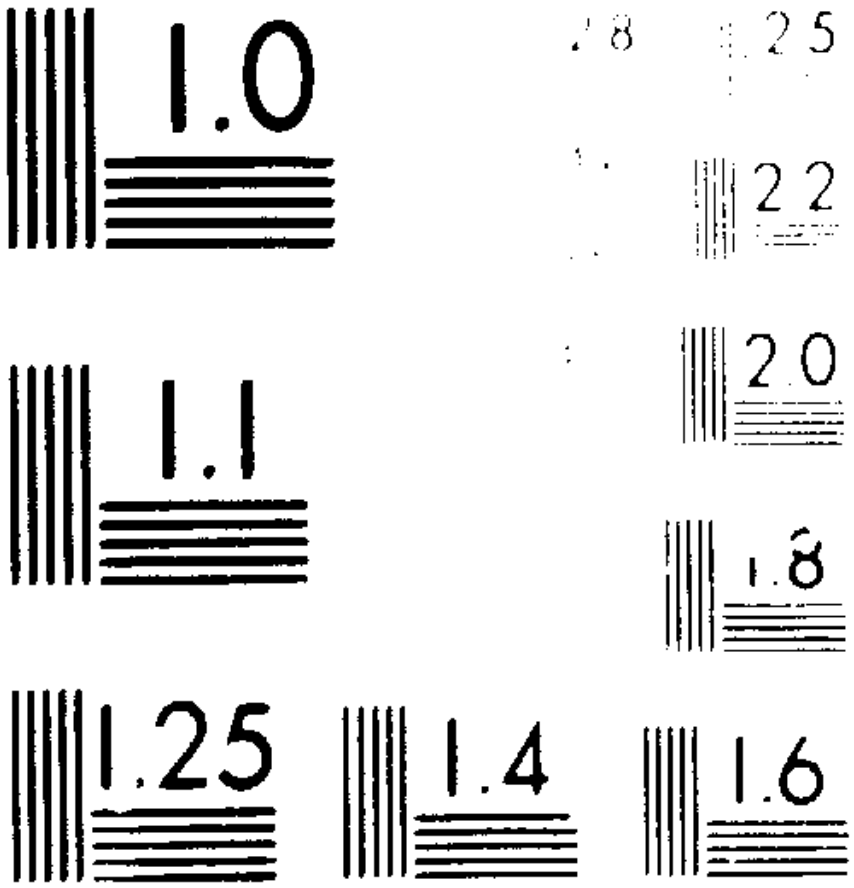

1.0
1.1
1.25
1.4
1.6
2.0
2.2
2.5

Table 4.3.2 Material balance for NM-jam

Inputs:

Weight:	0,0065	+	0,66	+	0,22	+	0,44	=	1.32
% :	0,5	+	49,75	+	16,58	+	33,17	=	100

Puree

Sugar

Water

Boiling until 55° Brix

Evaporation

Output: NM - Jam

Weight: 1.00

% : 76%

Input-coefficient:	Pectin	Sugar	Purce	Water
Weight:	0,0065	0,66	0,22	0,44
Cost per kg:	0,17	1,07	0,09	

Comparison of target inputs with effective inputs:

	Input		Diff.
	target	effective	%
Sugar	0,66	0,7	6
Puree	0,22	0,233	6
Pectin	0,0065	0,0084	29

The comparison shows that the effective input of sugar and puree is by 6% higher than the target input. The use of pectin is 29% higher than it should be.

b) NM- Jelly

The material balance for jelly may be worked out according to the same assumptions. But it is important to show the impact of the margin of sugar content considered admissible.

The applied recipe indicates the following inputs in %:

Nutmeg extract:	49,65%
Sugar:	49,65%
Pectin:	0,70%

Jelly of 56 Brix sugar content will require the following inputs per kg of output:

Nutmeg extract:	0,56
Sugar:	0,56
Pectin:	0,0079

For jelly of 66° Brix the inputs are:

Nutmeg extract:	0,66
Sugar:	0,66
Pectin:	0,0093

The comparison with effectively realised quantities shows the following picture:

	target 56° B	input 66°B	effective input	difference in %
nutmeg extract	0,56	0,66	0,8	43 - 21
sugar	0,56	0,66	0,8	43 - 21
pectin	0,0079	0,0093	0,017	115 - 83

The effective inputs exceed the target inputs by 21 - 43% (extract and sugar) and by 83 - 115% in the case of pectin.

Input coefficients and input cost are shown in the following table:

	Pectin	Sugar	Extract	Total
Jelly at 56° Brix				
Weight coefficient:	0,0079	0,56	0,56	1,13
Cost	0,21	0,91	-	1,12
Jelly at 66° Brix				
Weight coefficient	0,0093	0,66	0,66	1,33
Cost	0,25	1,07	-	1,32
Jelly produced in 1982				
Weight coefficient	0,017	0,8	0,8	1,62
Cost	0,45	1,30	-	1,75

Extract being a joint product of puree, is considered to be free.

c) The material balance for nutmeg puree and extract

Normally, nutmeg pods are cooked in a kettle of 450 lbs. content. Clean pods are mixed with twice as much of water. To get 150 lbs. of clean pods, 215 lbs. of raw pods are required. One batch of 150 lbs. of clean pods and 300 lbs. of water will result in 120 lbs. of puree (after pulping), 240 lbs. of extract, 20 lbs. of solid wastage and 70 lbs. of evaporation.

Consequently, 1 unit of puree will require 1,79 weight units of raw nutmeg pods. The price of nutmeg pods to produce 1 kg of puree is therefore 1,79 times the price for 1 kg of pods:

1 kg of puree costs 0,39 EC$
If the extract would be charged and puree be free, the cost of 1 kg of extract would be 0,2 EC$.

d) INPUT AND COST COEFFICIENTS FOR MANGO NECTAR

Evaporation is very small in the case of nectars. The recipe indicates the following coefficients.

	i.c.	c.c./1 kg
Mango puree	0,3	0,13
Sugar	0,1	0,162
Water	0,599	---
Citric acid	0,001	0,007
Total	1,00	0,299

e) GBN - INPUT AND COST COEFFICIENTS

	i.c.	c.c.
Guava puree	0,192	0,10
Banana puree	0,128	0,04
Sugar	0,09	0,15
Water	0,5896	-
CA	0,0004	0,003
Total	1,0	0,293

f) PPN - INPUT AND COST COEFFICIENTS

	i.c.	c.c.
Paw Paw puree	0,3	0,19
Sugar	0,094	0,16
Water	0,602	-
CA	0,0004	0,003
Total	1,0	0,353

g) TAMARIND NECTAR - INPUT AND COST COEFFICIENTS

	i.c.	c.c.
Tamarind puree	0,226	-
Sugar	0,203	0,33
Water	0,571	-
Total	1,0	

h) SOUR SOP - INPUT AND COST COEFFICIENTS

	i.c.	c.c.
Soursop puree	0,363	0,27
Sugar	0,091	0,15
Water	0,5458	-
Citric Acid	0,0002	0,002
Total	1,0	0,422

i) HOT SAUCE - COFFICIENTS

The coefficients for the sauces are rough estimates. To simplify computations, 10% of evaporation is assumed. Changes of composition after boiling are not taken into account.

Input	% acc. to recipe	estimate i.c.	c.c. EC$
Water	49,78	0,55	-
Green PP	11	0,12	0,07
Condicion	11	0,12	0,06
Pepper	11	0,12	0,12
Onion	5,5	0,06	0,11
Brown Sugar	3,5	0,04	0,06
A.A.	3,5	0,04	0,14
Starch	3	0,033	0,13

	% acc. to recipe	estimate i.c.	c.c. EC$
Salt	1,5	0,016	0,01
Tumeric	0,06	0,0007	0,02
Ginger	0,06	0,0007	0,02
Cinnamon	0,06	0,0007	0,02
S.B.	0,02	0,0002	0,001
Total	1,00	1,1	0,76

j) SPICY SAUCE - COEFFICIENTS

Input	Recipe	i.c.	cc. EC$
Mango Slices	29,01	0,32	0,14
A.A. 6%	43,51	0,48	0,10
BSU	16,98	0,18	0,25
ON	4,93	0,055	0,11
SA	3,62	0,04	0,02
ST	1,09	0,01	0,04
PE	0,29	0,003	0,01
GI	0,29	0,003	0,09
CI	0,29	0,003	0,07
BR	0,406	0,004	0,05
Total	1,00		0,38

At present the effective coefficients are 59% higher!

k) MANGO-CHUTNEY - COEFFICIENTS (FORMULA!)

Input	Recipe	i.c.	c.c. EC$/kg
Mango Slices	34,47	0,38	0,17
A.A. 6%	34,47	0,38	0,08
BSU	20,1	0,22	0,31
ON	5,74	0,06	0,11
SA	2,87	0,03	0,02
ST	1,27	0,013	0,05
GI	0,36	0,004	0,12
CI	0,36	0,004	0,12
PE	0,36	0,004	0,10
BR	0,36	0,004	0,05
Total	1,00	1,1	1,02

4.A.4 CASH OUTFLOW FOR MATERIALS IN 1981 AND SIX MONTHS OF 1982

The books show the following payments:

Input - Purchases	1981	1982*
Sugar	54,976	51,454
Onions	2,845	3,428
Fruits, Vegetables	37,228	39,420
Chemicals	2,549	49,883
Spices	1,250	852
Salt	346	300
Browning	1,946	-
Packaging and Labels	157,303	202,919
Freight on Imported Materials	2,907	12,542
Total	261,350	360,798
Stock (Inventory)		
Input		

* There are considerable stocks of various materials, but no figures are available.

4.A.5 CALCULATION OF MATERIAL COST (DIRECT) BY PRODUCT

4.5.1 Nectars

Nectars have the same structure of direct materials. The first raw is taken from 4.A.3.2. d-h.

Table 4.5.1

MATERIAL COST IN EC$ FOR

1 t = 3,530 cans

	GBN	MN	PPN	SSN	TN
Raw and other materian inputs acc. to 4.A.3.2	293	299	353	422	-
Can	2329	2329	2329	2329	2329
Labels	529,5	529,5	529,5	529,5	529,5
Carton	176,5	176,5	176,5	176,5	176,5
Total mat. cost	3035	3041	3095	3164	-

1 can of 283 ml				
GBN	MN	PPN	SSN	TN
0,083	0,085	0,10	0,12	-
0,66	0,66	0,66	0,66	0,66
0,15	0,15	0,15	0,15	0,15
0,05	0,05	0,05	0,05	0,05
0,94	0,95	0,96	0,98	-

4.5.2 Jar and jelly and mango-chutney

The same packaging is used for the three products.

Material cost in ECS for

	1 t = 2 200 jars			1 jar of 454 gr = 16 onces		
	NJY	NJM	MCH	NJY	NJM	MCH
Raw and other mat. acc. to 4.3	1.320	1.320	1.020	0,60	0,60	0,46
Jar	1.870			0,85	0,85	0,85
Cap	484			0,22	0,22	0,22
Label	176			0,08	0,08	0,08
Carton	154			0,07	0,07	0,07
Total mat. cost	4.004	4.014	3.704	1,82	1,82	1,68

4.5.3 Sauces

Hot sauce and spicy table sauce have the same packaging and may be dealth with together.

	Material cost in ECS for 1 t = 3,330 bottles		bottle = 300 ml = 11 onces	
INPUT	H.S.	S.S.	H.S.	S.S.
Raw and other material (4.3)	760	880	0,23	0,26
Bottle	2131	2131	0,64	0,64
Cap	333	333	0,10	0.10
Label	200	200	0,06	0,06
Carton	333	333	0,10	0,10

4.B. Measures in the field of storage of Raw Materials and other Material Inputs and finished Goods

4.B.1 Storage of inputs

Considerable losses of materials could be avoided through better storage and store-keeping.

Necessary steps are:

1) Nomination of store-keeper, who should be responsible fore all stocks of inputs.
2) Stores have to be locked or at least forbidden to everybody except the store-keeper.
3) Exact stock taking of all materials. This should be a document signed by the manager and the store-keeper now and at least once a year in the future or whenever the store is handed over to another storekeeper.

4) Then the stores have to be handed over to the store-keeper.
5) All entries and withdrawals or deliveries (all movements of materials) have to be registered in a stock-book and a stock-card.
6) Information on all stock movements must be communicated to the accounts department daily.
7) The "first-in-first-out" principle must be applied (there is still sugar in stock which has been received in 1981!).
8) Measures against rats and crawling insects should be taken.
9) Material should be withdrawn against certificate only (copy to the accounts department).
10) Withdrawals of inputs for one day's production could be planned and prepared the day before.
11) Materials, which cannot be used in production in time - like onions - should be sold instead of perishing.
12) The management is supposed to control proper store-keeping and to react in a consequent way.

4.B.2 Storage of finished products

Similar measures have to be taken as far as storage of finished products is concerned.

1) A separate room should be allocated to store finished products.
2) Nomination of a store-keeper.
3) An exact inventory has to be made by physical checking of all stocks and signed by the store-keeper and the manager. This procedure has to be repeated at least once a year or whenever the store is handed over to another storekeeper.
4) All finished products have to be put in cartons the very day after production; the cartons have to be sealed.

Nota bene:

Breaking up sealed cartons means damage!

5) The storekeeper of finished products has to certify to the processing department the exact quantity of finished products received for packaging every day (!!) with a copy of the certificate going to the accounts department .

6) All movements of finished products have to be registered immediately in a stock-book and a stock-card.

7) Each carton should show the date of production (use a date stamp).

8) All products - like unset jam and jelly - should be disposed of as soon as possible.
It is not acceptable that they perish slowly in the store!!

9) Need of space: 4,5 m^3/ per day's production ($1m^3$ = 1 008 jars).

4.B.3 Handling of packaging material

a) Caps of jars and bottles have to be stored properly in the storeroom. If the original carton is damaged they have to be put in another which will protect them!.

b) The cartons in which jars are supplied will be used again to pack finished products. Consequently they should be handled with care!

4.B.4 The inventory of the cold store should be built up according to the production plan. Most of the raw materials should be used during a production cycle. Example: Nutmeg pods.
In order to guarantee full production of jam and jelly during one week, it is necessary to build up a stock of pulp and extract though fresh pods are used every day. The stock of pulp and extract can be built up whenever there is an opportunity (free capacity in the departments of preparation, in kettle and at the pulper). But the stocks should be used entirely during the next nutmeg cycle. Exception: Tamarind must be stored for several production cycles (the point has still to be discussed!) taking into account that it is available during a short season.

Such a case needs even more planning of inventory. Planning of inventory should contribute to avoid spoilage of raw materials.

5. Location and Site

5.B. Environment

It is recommended to improve the environment. Possibilities are:

- To plant some trees;
- To clean and tidy up around the building;
- To repair the fence ;
- To plant some flowers;
- To build some benches and tables and a shelter to allow the personnel to have lunch with more comfort;
- To install a nice sign-board.

6. Technical Analysis

A. The present situation

The whole analysis of the present situation is based on the analysis of the technical conception of the plant. Though operations are simple, the analysis is more complicated owing to the lack of structure. In the present approach it is attempted to spot first the production process and its phases, to allocate consequently machinery and equipment, space, personnel, other material inputs and auxiliaries.

A.1 The production process

The production process may be divided into a sequence of operations, moves, delays, inspections and storage by which raw material inputs are transformed into the finished products. For analytical purposes the production process will be detailed in a process chart. The elements of the process chart are steps, which may be defined as follows:

Operations are activities which result in a physical or chemical change in the material inputs and include assembly and dis-assembly;

Moves comprise any kind of transportation, prepositioning etc. of a component for a subsequent operation, inspection, storage, delay.

Inspection means comparison or verification of characteristics - but also operations - against a quality or quantity standard, or the optimum process.

Delays are the time periods during which the product(s) or components are waiting for an other operation, inspection, move or during which they are setting, cooling, drying or anything else not considered as an operation.

Storage means holding of the components or products for authcrized removal, in anticipation of use or sales or to prevent from perishing during a delay (cold storage).

In the case of the agro-industries project, there are as many production processes as products divisible in various phases to be analysed, though there are similarities. It seems to be appropriate to analyse the following 20 production processses or phases:

1) Nutmeg pods - extract - cooked pods
2) Nutmeg extract - jelly
3) Cooked pods - Jams
4a) Preparation of green mangoes
4b) " " pepper
4c) " " onions and pepper
4d) Spicy sauce
5a) Preparation and storage of Paw-Paw
5b) " " " " Pepper
5c) " " " " Condicion
5d) " " " " Onion
5e) Hot sauce
6) Mango chutney
7) Mango pulp
8) Tamarind pulp
9) Guava pulp
10) Banana pulp
11) Paw-paw pulp
12) Sour sop pulp
13) Nectar

PROCESS CHART: Nutmeg Pods ——→ Extract

Cooked pods

Nº. 1

Step	Operation	Move	Inspection	Delay	Storage	Description	Machine	Equipm.	Plant area	Pers.	Other inputs or outputs
1						Collect NM pods with truck	truck	cra-te		1-3	
2						Truck-doors-reception-sink			A1	3-	
3						Wash, ...		S1	A1	1	
4						Sink, ...					
5						Peel, select		Kni-fe	A1	3	
6						Sink					
7						Wash		S1	A1		
8						Fill in bags balance				1	bags
9						Weigh: pods + wastes	B1	B1	A1	1	
10						cold storage				1	
11						+ 5° or - 15°			A2 / A3		
12											
13						Weigh: 1 batch = 150 lbs. of pods	B	B		1	
14						Kettle Nº. 1, fill 150 lbs. of pods	K1		A4	1	
15						Pods: Water 1:2 boil 45-60'					Water steam
16						separate extract from pods (screen)					Extract
17						in plastic containers or cont. process		cont	A2 A3		Extract
18						in plastic contai-ners (pods)		cont			Cooked pods
19						or continue processing			A2 A3		Cooked pods

PROCESS CHART: Nutmeg – extract NM-Jelly Nº. 2

Step	Operation	Move	Inspection	Delay	Storage	Description	Machines	Other Equipment	Area	Pers.	Other inputs or outputs
1						Extract, sugar, pectin			A4	1	sugar, pectin
2						weigh batch	3				
3						kettle: extract, sugar 3	3			1	
5						mix extract, +5/6 sugar dissolve, boil	105				sugar steam
6						sugar cont. 51–62° Brix		Lab.			
7						blend 1/6 sugar + pect. diss. with hot extract					sugar + pectin
8						add to boiling extr., stir					
9						setting					
10						allow temp. to drop to 190° F = 38° C					
11						steel buckets to table		st.b st.t			
12						fill in sterilized jars					jars, caps
13						cap					
14						in crates		crate			
15						wash jars, with cold water					water
16						mobile shelves		shel-ves			
17						cool and setting over night					
18						is jelly set					
19						label					labels
20						place in cartons of 12 or 24					cartons + partitions
21						seal					glue
22						storeroom			A6		
23						wait for quality certi-ficate					
24						dispatch	truck			4–	Jelly

PROCESS CHART : Cooked pods XM Jam № 3

Step	Operation	Move	Inspection	Delay	Storage	Description	Machinery	Other Equipment	Area	Pers.	Other Inputs or outputs
						To brush the pulper					
1											
						pulp cooked pods, add					45 pdns. of pods
2						water	BP	cont	A4		- 9 pds. of wat
						to storeroom or					
3						kettle		cont			
									A2		
4									A3		
						to kettle 2, 4, 5	XP				sugar, pectin
5							4, 5				
						mix pulp with 5/6 of					pulp, steam
6						sugar, dissolve, boil	4, 5		A4	1	sugar
						sugar cont.: 55° Brix					
7								Lab.			
						blend 1/6 sugar + pect,					sugar, steam
8						mix, stir, boiling					pectin
						test setting					
9											
						allow temp. to drop					
10						to ...					
						in steel buckets		St.b			
11						to table		St.t			
						fill in sterilized					jars
12						jars				10	
											caps
13						cap					
						in crates		crate			
14											
						wash jars with					
15						cold water					water
						mobile shelves		shel-			
16								ve			
						cooling, setting					
17						over night					
18						setting					
						label					label
19											
						place in cartons					cartons
20											
						seal					glue
21											
						storeroom					
22									A6		
						wait - certificate					
23											
						dispatch		truck			Jam
24											

PROCESS CHART: Preparation of green mangoes No. 4a

Step	Operation	Movement	Inspection	Delay	Storage	Description	Machinery	Other Equipment	Area	Pers.	Other Inputs or outputs
1						Collect	truck			1	
2						truck - door 1 reception area			A1	1	
3											
4						into sink					
5						wash, select		SI			water
6						in crates		crate			
7						peel, select, slice, drop into buck		knife bucket		3	
8											
9						wash		SI			water
10											
11						weigh	B				
A 12						in plastic buckets		buck.			
A 13						store in 10% salt sol. at room temp.			A1	1	salt + water
A 14						to sink					
A 15						desalt		SI			water
B 12						in plastic bags					bags
3 13						cold store		c.st.	A3		
AB 10						to balance					
AB 11						weigh	B				
12						to chopper					
13						chop	Ap	buck.	A4	1	
14						in buckets to mill					
15						grind with acidic solution	Mill Hob.	buck.			AA + water
16						in buckets to kettle 4 or 3					

PROCESS CHART : Preparation of pepper — Nº. 4b

Step	Operation	Move	Inspect	Delay	Storage	Description	Machinery	Other Equipment	Area	Perm.	Other inputs or outputs
1						door 1 to reception area			A1		
2											
3											
4						wash in sink		S1			water
5											
6						clean		knife		3-	
7											
8						wash					water
9											
10						weigh	B				
A 11						in plastic bags					bags
A 12						cold store		c.st	A3		cold
A 13											
A 14						weigh	B				
11						to chopper					

PROCESS CHART: Preparation of onions and pepper — No. 4c

Step	Operation	Move	Inspect	Delay	Storage	Description	Machinery	Other Equipment	Area	Path	Other Inputs or outputs
1						door 4 store	van truck		A5		
2									A5		
3						to receiving area			A1	1	
4						clean, select		knife		3-	
5											
6						wash	S1	S1			water
7											
8						weigh	B				
9						to chopper					
10						add pepper chop	Ap	buck	A4	1	Pepper + onion + EL
11						in buckets to mill					
12						add acetic acid sol, grind	Hob	buck		1	AA + water EL.
13						in buckets to kettle 4 or 5					

PROCESS CHART - Spicy Sauce No. 4d

Step	Operation	Move	Inspection	Delay	Storage	Description	Machinery	Other Equipment	Area	Para.	Other inputs or outputs
1											
2						Measure all quantities of ingredients	B-		A4	1	
3						Blend AA with W 6% solution					AA + water
4						Mix in kettle 4 or 5: 2/3 AA + M+Pe+On+SU	K4 5				M+Pe+On+SU
5						Bring slowly to boil and boil 15', stir					steam EI.
6						Blend spices in little AA-sol., mix, boil 5'					spices steam
7						in large sterilized cont.		cont.			
8						age 2 weeks			A2		
9						to kettle	K4 5				
10						heat to 150° F = 66° C			A4		steam
11						Dissolve startch in rest AA sol., add, stir 5'					starch EI.
12						in steel buckets to table		St.b St.t			
13						fill in bottles				10	bottles, steam(sterilize
14						cap					caps
15						in crates			crate		
16						wash					water
17						mobile shelves		shel- ve			
18						cool over night					
19						label					labels
20						place in cartons of 24					cartons, glue + partitions
21						seal					
22									A6		
23						wait certificate 5-7 days					
24						dispatch	truck van				

PROCESS CHART: Preparation and storage of Paw-Paw No. 5a

Step	Operation	Move	Inspection	Delay	Storage	Description	Machinery	Other Equipment	Area	Pers.	Other inputs or outputs
1						Collect from agts. truck	truck	crate			
2						door 1 - rec. area or sink			A1	2-	
3						wash		T1		1	water
4						in crates		crate			
5						peel, remove seeds, select		knife			
6											
7						weigh	B				
A 8						in plastic bags					bags
9						chilled or cold room			A2 A3		
10						to balance	B				
B 8						plastic cont.					
9						10% salt sol.					salt + water
10						room temperature			A1		
11						to sink					
12						desalt		S1			water
13						to balance	B				

PROCESS CHART: Preparation and storage of pepper № 5b

Step	Operation	Move	Inspection	Delay	Storage	Description	Machinery	Other Equipment	Area	Pers.	Other inputs or outputs
						Collect from agts.	truck				
1								crate			
2						in crates door 1 to sink or rec. area			A1	2	
						wash					water
3								S1			
4						in crates		crate			
5									A1		
6											
7						cut stems, select		knife	A1		
8											
9						weigh	B				
A 10						in plastic bags					bags
12						cold store		c.st.			El.
13						to balance	B				
B 10						prepare AA %sol. 6%					AA-water
11						in plastic cont. with 6% AA sol.		cont.			
12						room temp.			A1		
13						remove from AA sol. place in bucket, to bal		buck			
10						to chopper					

PROCESS CHART: Preparation and storage of condicion Nº. 5c

Step	Operation	Move	Inspection	Delay	Storage	Description	Machinery	Other Equipment	Area	Pers.	Other inputs or outputs
1						Collect from agts.	truck	crate			
2						in crates door 1 to sink or rec. area			A1	2-	
3						wash					water
4						in crates		crate			
5						cut stems, select		knife		3-	
6											
7						weigh	B				
A 8						in plastic bags					bags
9						chilled or cold +5°C - 15°C		c.st.			El.
10						to balance					
B 8						prepare 10% salt sol. inpl. cont.		cont.			salt-water
9						cond. in salt sol. to ...					
10						room temp.			A1		
11						to sink					
12						desalt in water		S1			water
13						to balance					

PROCESS CHART: Preparation and storage of onion — Nº. 5d

Step	Operation	Move	Inspection	Delay	Storage	Description	Machinery	Other Equipment	Area	Pers.	Other inputs or outputs
						door 4					
1											
						storage					
2									A5	2-	
3											
						clean, peel,		knif-			
4						select		fe	A1	3-	
						to sink					
5											
						wash					water
6								S1			
						in plastic bags					bags
7						to balance					
						weigh					
8							B				
A						chilled room					
9											
10								c.st.			E1.
						to balance					
11											

PROCESS CHART: Hot Sauce — Nº. 5e

Step	Operation	Move	Inspection	Delay	Storage	Description	Machinery	Other Equipment	Area	Pers.	Other inputs or outputs
1						Collect prepared ingredients					
2						weigh batch	B				
3						to chopper (Hobart)	Hob				
4						chop: PP, Co, Pe, On together			A4	1	PP, Co, Pe, On El
5						in bucket to mill (Apex)		buck			
6						grind	Ap.				El.
7						in bucket to kettle 4 or 5					
8						add: SU, SA, SB, 2/3 AA sol., mix	K4 5			1	SU, SA, SB, AA water
9						blend AA sol. with spices, add					spices
10						Boil 15', turn off st.					steam, El.
11						dissolve starch in remaining AA sol. add					screen
12						stir 5'					steam El.
13						in steel buckets to table		st.b st.t.			
14						fill into bottles				8	bottles
15						cap				2	caps
16						in crates		crate			
17						wash in jet of water					water
18						mobile shelves		shel-ve			
19						cool overnight					
20						label					labels
21						place in boxes of 24 and seal					cartons, partitions, glue
22											
23						certificate 5-7 days					
24						dispatch					

PROCESS CHART: Mango Chutney No: 6

Step	Operation	Move	Inspection	Delay	Storage	Description	Machinery	Other Equipment	Area	Pers.	Other inputs or outputs
1						Collect ingredients all cleaned					
2						weigh batch	B				
3						blend 6% AA with 94% water			A4	1	AA + water
4						chop: M, Pe, On in Hobart	Hob buck				M, Pe, On
5						in buckets to kettle 4, 5 (2)					
6						mix in kettle with SU, SA, BR, 2/3AA, Gi, Ci	K4 (2)5				SU, SA, BR, Gi, Ci
7						boil 15-20'					steam
8						dissolve starch in 1/3 AA, add, cont. stir	5'				starch El.
9						add B. to get desired colour					
10						in steel buckets to table		st.b st.t			
11						fill bottles				8	bottles
12						cap				2	caps
13						in crates		crate			
14						wash jet of water					water
15						mobile shelves		shel-ve			
16						cool overnight					
17						label					labels
18						place in cartons of 24, seal					cartons, part., glue
19											
20						wait for certificate 5-7 days			A6		
21						dispatch	truck				

PROCESS CHART: Mango Pulp No. 7

Step	Operation	Move	Inspect	Delay	Storage	Description	Machinery	Other Equipment	Area	Pers.	Other inputs or outputs
1						Collect ripe M in crates	truck	crate			
2						door 1			A1	2-	
3						weigh	B				
4						to sink					
5						wash, select		S1			water
6						to retort steel crates		steel crate	A4	1	
7						blanch	Ret.				steam
8						crane to tank	cra-ne	tank			El. water
9						cool					
10						remove	cra-ne				El.
11						peel, select		kni-fe	A4	3-6	
12						in white bucket to brush pulper		buck			
13						pulp	BP				El.
14						separate seeds pulp in bucket		buck			
A 15						cold store		c.st.			cold
16											
15						weigh	B				
16						to kettle 1 or 3					

PROCESS CHART: Tamarind Pulp No. 8

Step	Operation	Move	Inspection	Delay	Storage	Description	Machinery	Other Equipment	Area	Pers.	Other inputs or outputs
1						Collect T	truck	crate		1-3	
2						door I			A1		
3						weigh	B				
4						in crates		crate			
5						0 - 60 days			A		
6											
7						deshell		knife	A1		
8						in plastic bags					bags
9						weigh	B				
10						in cont. or to kettle		cont.			
A 11						soak overnight in water 1:2					water
B 11						mix in kettle with 4 parts water	K4 5				water
12						bring to 80°C stir					steam
11						in buckets to brush pulper		buck			
12						pulp	BP		A4	1	El.
13						in buckets to kettle 4,5		buck			
14						heat to 60-80°	K4 5				steam
15						screen over bucket		screen buck			
16						to balance					
17						weigh	B				

PROCESS CHART: Guava Pulp Nº. 9

Step	Operation	Move	Inspection	Delay	Storage	Description	Machinery	Other Equipment	Area	Pers.	Other inputs or outputs
1						Collect G in crate					
2						door I- rec. area sink			A1		
3						wash		S1			water
4											
5						cut off ends, select		knife buck			
6											
7						wash		S1			water
8								buck			
9						weigh	B				
10						to chopper					
11						chop	Hob	buck	A4	1	E1
12						in bucket to kettle 4,5					
13						add water:G:W=2:1, heat to 60°C, stir	K4 5				water steam, el.
14						in buckets to brush pulper		buck			
15						pulp	BP	buck			
16						in buckets					
17						weigh	B				

PROCESS CHART: Banana Pulp No. 10

Step	Operation	Move	Inspect	Delay	Storage	Description	Machinery	Other Equipment	Area	Part	Other inputs or outputs
1						Collect in crates ripe or nearly ripe	truck	crate			
2						door 1 – rec.area sink wash			A1		
3						allow to ripe		S1			water
4											
5						peel		knife buck			
A 6						put in SU solution of 10%					SU-water
7											
8						chilled store 5°C		c.st.			cold, El.
6											
7						weigh	B				
8						in bucket to mill					
9						mill	Ap	buck			El.
10						in bucket					

PROCESS CHART: Paw-Paw Pulp — N°. 11

Step	Operation	Move	Inspection	Delay	Storage	Description	Machinery	Other Equipment	Area	Pers.	Other inputs or outputs
1						Collect ripe P	truck	crate			
2						door 1 - rec.area sink			A1	2-	
3						wash, select let ripe green P		shelve S1			water
4						in crates		crate			
5						peel, remove seeds select		knife			
6						in plastic bags					bags
7						weigh	B				
A 8											
9						cold store - 15°C		c.st			cold, el.
10											
11						weigh	B				
8						to pulper					
9						pulp	BP	buck	A4	1	El.
10						in bucket to kettle 1,3					

PROCESS CHART: Sour Sop Pulp № 12

Step	Operation	Move	Inspection	Delay	Storage	Description	Machinery	Other Equipment	Area	Storage	Other inputs or outputs
1						Collect S in crate	truck	crate		1-3	
2						door 1 - rec.area sink			A1		
3						wash, select leave to ripe green		shelve S1			water
4						in crate		crate			
5						peel, remove cover select		knife buck			
6						in plastic bucket					
7						weigh	B				
8											
9						pulp	BP	buck		1	El.
10						in bucket					

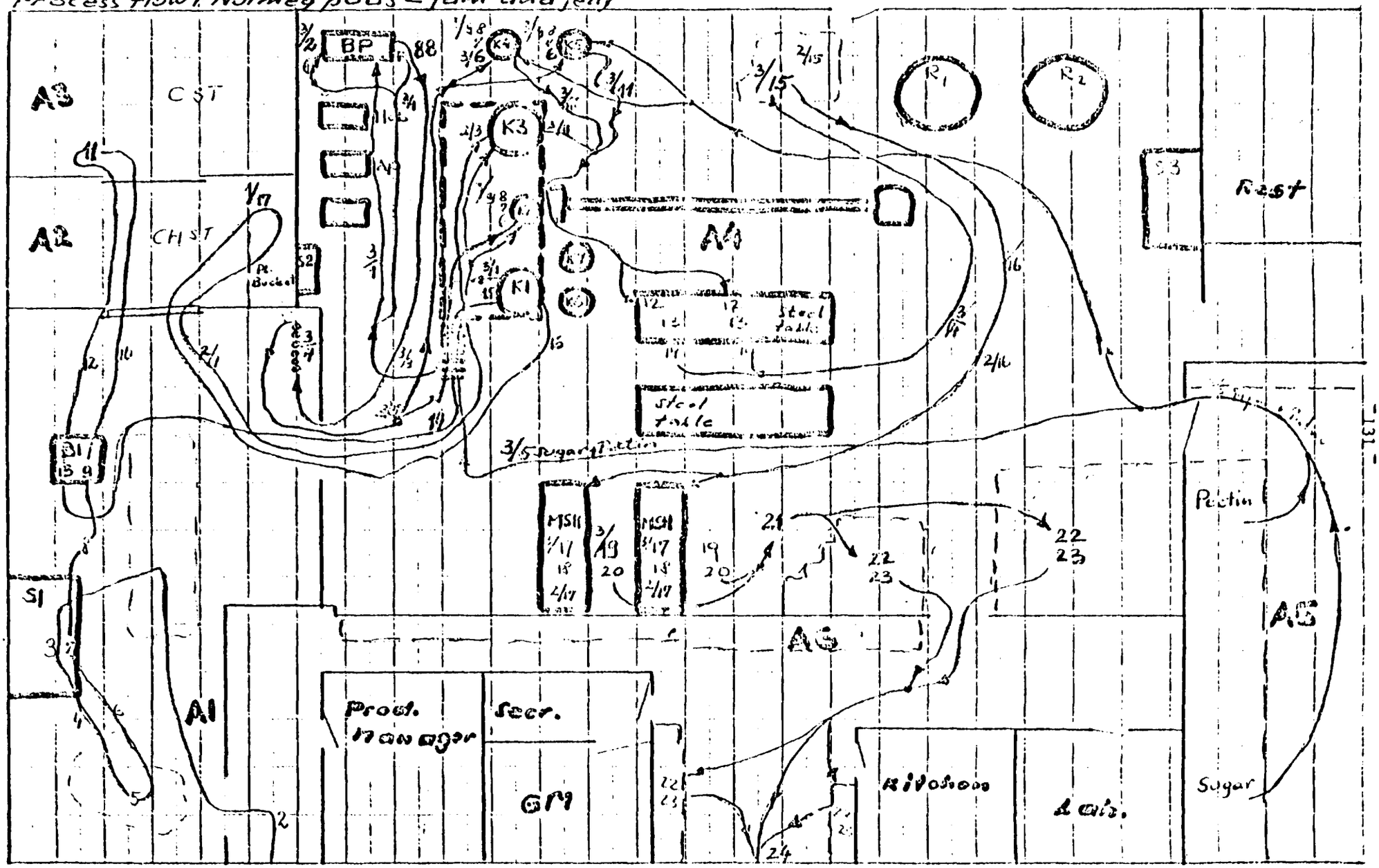
PROCESS CHART: Nectars Nº. 13

	Description					Other inputs or outputs
1	Collect ingred. kettle 1 or 3					
2	weigh batch	B				
3	dissolve sugar in W in kettle 1 or 3	K1 3		A4	1	SU, water
4	add fruit, pulp, mix					pulp
5	Brix 14,4 - 14,7 p.H. 3,7 - 4		Lab.			
6	add necessary SU, CA or land W					sugar, CA water
7	bring to boil 100°C, no stirring					steam
8	in steel buckets to table		st.b. st.t.			
9	fill cans				5+2	cans
10	pass cans through exhaus. box	exh. box				steam El.
11	seal above 86° C	seal			2	
12	steel baskets retort, crane	cra- ne	st.ba		1	El.
13	heat to 100°C (212°F) for 10'	Ret.				steam
14	crane - w.tank cool to 40-50°C	cra- ne	tank			El. water
15	cool to 40-50°C					
16	dry overnight					
17	dry				2	
18	label					labels
19	place in cartons					cartons
20	seal cartons					glue
21				A6		
22	wait for certificate					
23	dispatch	truck			3-	

Process flow 1 shows the main moves necessary to produce jam and jelly under actual conditions following the steps described in process chart 1, 2 and 3.

The process flows for the other products are similar.

Process flow I: Nutmeg pods – jam and jelly



6.A.2 Investment

Total investment comprises:		EC$
1. Equipment:		
1 Steam Boiler:	Fulton Boiler Works Inc. P.O. Box 122 Pulaski, N.Y., N.W. 13142	66,760.00
2. Retorts:	Kurhan Company, 216 Fifth Avenue N.Y. 10016 U.S.A. Diam Inside 30", Depth 36".	15,525.00
1. Single Line Exhouster	A.K. Robins, 713-29 E. Lombar Str., Baltimore, MD, 21202, Length 17" 6", Width 2' 2'''' High 21' 7'' H.P. required 1/2	13,214.00
1 Process Controller and Timing Instruments:		6,785.00
1 Overhead Hoister with conveyor steel track Robins for retorts only.		1,500.00
1 Can Closing Machine for 2 and A_2 cans Lubeca LW 211 Automatic Seamer: Robins H.P. required 2 HP		23,300.00
1 Air Compressor: Saylor Beoll Cap: 200 P.S.I.		1,550.00
1 Vertical Cutter - Hobart Manufact. From: Robins		14,900.00

1 Portable Platform Scale "Hobart"	
Cap: 1000 lbs.	1,584.00
1 Cold Room with 2 Compressors	43,470.00
12' x 12' = 3,65 x 3,65 m	
Cap: m^3	
2 Trucks	Nil
1 Stainless Steel Kettle: Dixie Canner Equipment	
P.O. Box 1348, Athenas, GA 30603	
Cap: 114 l	13,350.00
1 All Purpose Dolly Truck: Hand Cart	
18" x 30" from Dixie Canners	1,550.00
6 Dishpans with covers 20 qt. 40 qt.	
From Dixie	578.00
8 Stock pots with covers cap. 3 gals.	1,200.00
2 Table scales: 16 ounces	62.00
24 Knives	75.00
12 Forks (18")	224.00
12 Spoons (18")	186.00
4 Stainless steel tables: 6' x 2' x 2'	4,850.00
1 Electric wall clock	300.00
1 Punching clock	2,000.00
1 Heavy duty waring blender	1,550.00
	216,513.00

Estimates:	1 Mill Apex	15,000.00
	1 Brush Pulper	20,000.00
	6 Kettles, diff. sizes	100,000.00
	Installation Electricity	20,000.00

Total equipment:	1980:	371,513
	81:	48,863
	82:	50,274
Total equipment	1980- 82:	470,650

2. Land: Nil. The land is owned by the Government. The company is supposed to pay a rent of EC$ 18,000 per year.

3.	Building:	1981 :	30,018
		1982 :	8,405

4. Implementation: Nil

5. Start up expenses: 50% of 1981
Expenses 1981 303,870.00

6.A.3 Maintenance

There is no systematic maintenance. The consequence is:

a) accelerated depreciation of any equipment,
b) more and more frequent breakdowns,
c) decrease in performance,
d) negative influence on the quality of products.

Steampipes are leaking, partly not isolated, rusty. Therefore the heat balance is bad, fuel consumption high, some pressure gages are out of order, most thermometers and other instruments are missing or out of order.

Electric wires are not always covered properly. Covers are taken off and not replaced, switch boards are in general in very bad shape. The one on the boiler is more or less knocked out though it

is the heart of the boiler! Not to repair it, may cause heavy damages to the boiler and make the boiler work inefficiently.

Machines are often "repaired" by incompetent personnel. This may lead to severe damage.

Most of the machinery and equipment is of the heavy duty type (like the boiler), but they will have a shortened life cycle, if maintenance is not improved.

6.A.4 New equipment

The factory has received several machines as a gift from FAO. But there is no plan to install it, capacities do not correspond with the needs. It will be difficult to make good use of it.

6.A.5 Operating costs

The factory has been operating for 18 months and the various costs are available. Unfortunately, they have a very limited value, because they do not really correspond to operating costs of normal operations. Taking into account the circumstances, it is suggested to consider all expenses made during the first six months of 1981 as start-up expenditure. The operating costs of the first six months of 1982 are considered as guidelines for the whole year.

Operating costs	1981	1982
a) Material (total item (1) - (4)	137,831	723,498
	(81)	(82)
1) Raw material	49,295	190,300
Sugar		51,454*
Onions		3,428*
Raw material, fruits etc.		39,420*

	Spices		(81)	352*
(2)	Packaging	78,650		405,338
(3)	Chemicals	1,270		100,366
(4)	Others, stores	3,616		26,994
(b)	Utilities	15,000		79,290
	Telephone			
	Electricity			
	Water			
	Fuel			
(c)	Other Services	29,410		86,748
	Insurance			
	Travel			
	Vehicle Maintenance			
	Ado.			
	Repairs			
	Freight			

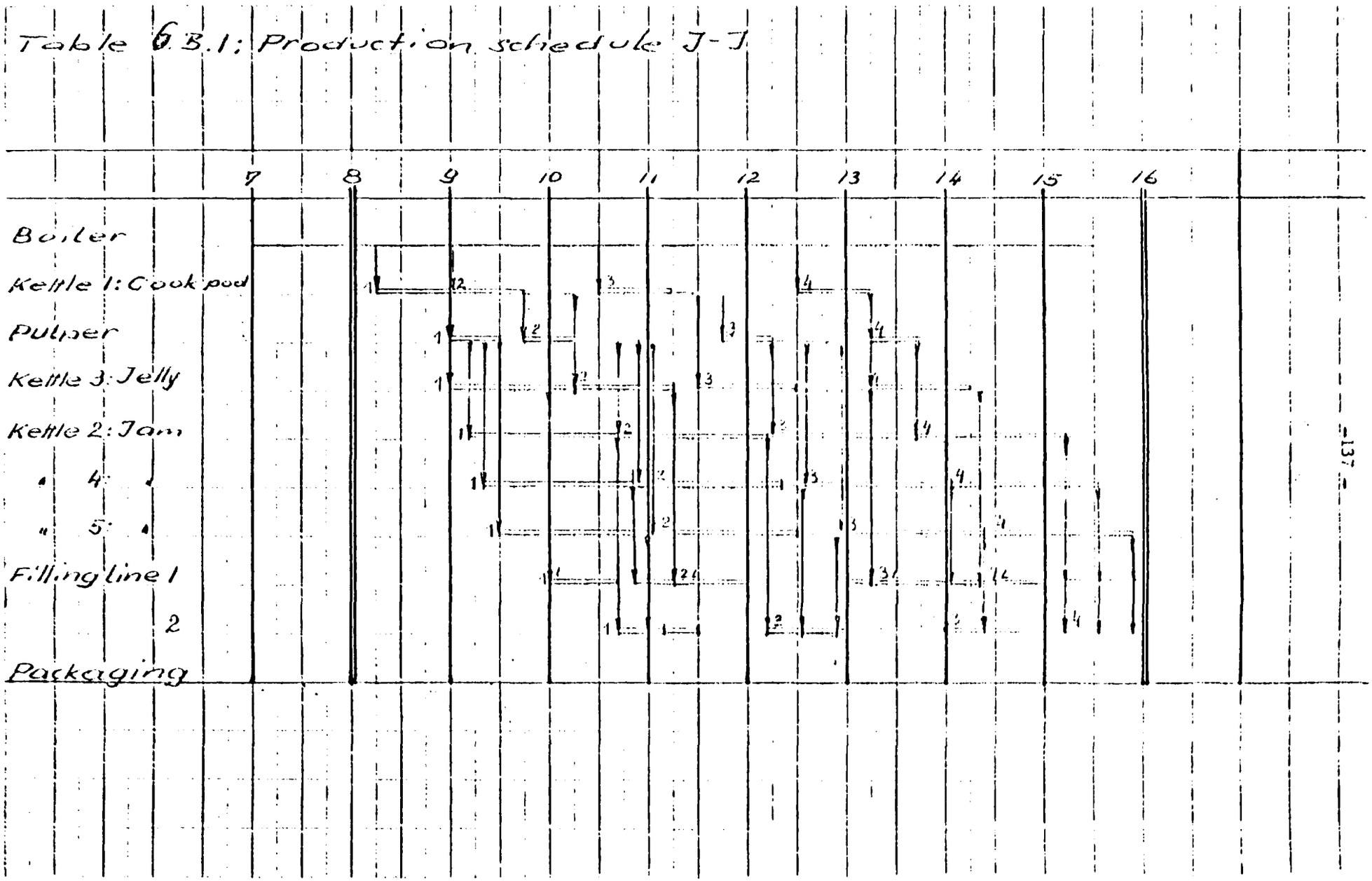
6.B. Reorganisation of Production

6.B.1 Production plan: Jam and Jelly

At the beginning of the implementation of the new programme the production of jam and jelly should be improved and raised to full capacity utilisation.

Table 6.B.1. shows the daily production schedule for jam and jelly. It reflects available data and may be adapted to new conditions. The schedule discovers several constraints.

Table 6.B.1: Production schedule J-J



1. The boiler has to be started about one hour before utilisation.
2. In order to get hot extract, pods have to be cooked 45' before starting cooking of jelly and before starting pulping of freshly cooked pods.
3. All other operations follow with some time lag.

4. Filling can start the earliest, one hour after the beginning of cooking of jelly or one hour and a half after beginning cooking of jam.

5. A lunch break of one hour seriously disturbs the production flow. It could and should be reduced to half an hour and not be taken. by all at once but in two successive breaks in order to maintain continuous production.

6. The real bottle-neck may consist in the small capacity of kettles 2,4,5, respectively in the long duration of cooking of jam. It should be possible to shorten cooking time! . There are anyway several possibilities to shorten this critical path.

According to the schedule it should be possible to make four full cycles, if cooking of pods is also started earlier than the successive operations. Four full cycles correspond to a production of four times 336 jars of jelly equal 1.344 jars perday and of twelve times 168 jars of jam equal 2.016 jars per day.

New figures obtained after first trial run:

Jelly	: 4 times 550 jars	= 2 200
Jam	: 4 times 570-600	= 2 400
	Total	4 600

The first target of the new programme is to fulfill the production plan. The second target is to find out full capacities of each phase of processing. The third target is to establish an optimum production schedule.

6. B.2 Input requirement

One day's production at the proposed level would require the following inputs:-

1.	Nutmeg pods	800-1100 lbs
2.	Sugar	2 220-3040 lbs
3.	Pectin	25-35 lbs
4.	Jars	3,360-4600
5.	Caps	3,360-4600

Continuous production of jam and jelly should last at least one week or two, preferably four weeks without interruption. During such a period the co-operation of the various departments could be co-ordinated and optimized.

Such an experience would allow reliable cost accounting, the conception of a reliable inventory policy, final assignment of duties and other organizational measures.

Very Important:

Before starting the new programme it is necessary to take the stocks of all relevant inputs, to record the counter for electricity and water in order to be in a position to identify the input requirements exactly at the end of the period.

6.3.3 Washing of filled jars:

The experience of the first trial run of the new production programme has shown that cleaning of the total production of jars (3000-4600 per day) takes a long time, it can hardly be done between two kettles and is in fact not necessary. Only blotted jars should be separated (they are less than 5%) and washed. The time gained would allow to fill another 600 jars min.

6.3.4 Kettle operations:

The experience has shown that each operator must concentrate on smooth operation of his kettle. The operator's functions are:

(1) To check if the kettle is clean and in good conditions: valves must be serviced to remain tight:

(2) To fill the kettle; batches should be prepared by the store-keeper, but checked again by the kettle operator, who is responsible for the quality achieved:

(3) To cook the product; over boiling must be avoided!! adding of pectin and sugar must be done at the right moment; precise timing will improve the quality:

(4) To emply the kettle and carry the buckets to the table of the filling line: any time lag should be avoided:

(5) The next batch should be started as soon as possible;

(6) At the end of operations, the operator should clean his kettle himself;

(7) Changes from one kettle to another must be avoided:

6.3.5 Installation of new FAO equipment

At present, nobody knwos how the equipment was conceived to be incorporated in the present plant. There is no drawing, no description. Particularly, it is not known, if the pasteurizer should replace the retorts - it is hardly believable - or if it should be installed just in addition to the present equipment which would not make any sense, because nectars would be rein acted during filling.

On the other hand, the dozer would be very usefull for jam and jelly as well as for necters, which would have to be pumped from the various kettles to the dozer, where jam and jelly could be capped, while nectars could be guided into the exhaust tunel (orginal length) and straight to the sealer. The use of a pump would be very important for all kettles, but particularly the ones on the plat-form to avoid accidents and to facilitate transport of hot liquids.

7. Organization and Management

A. Actual situation

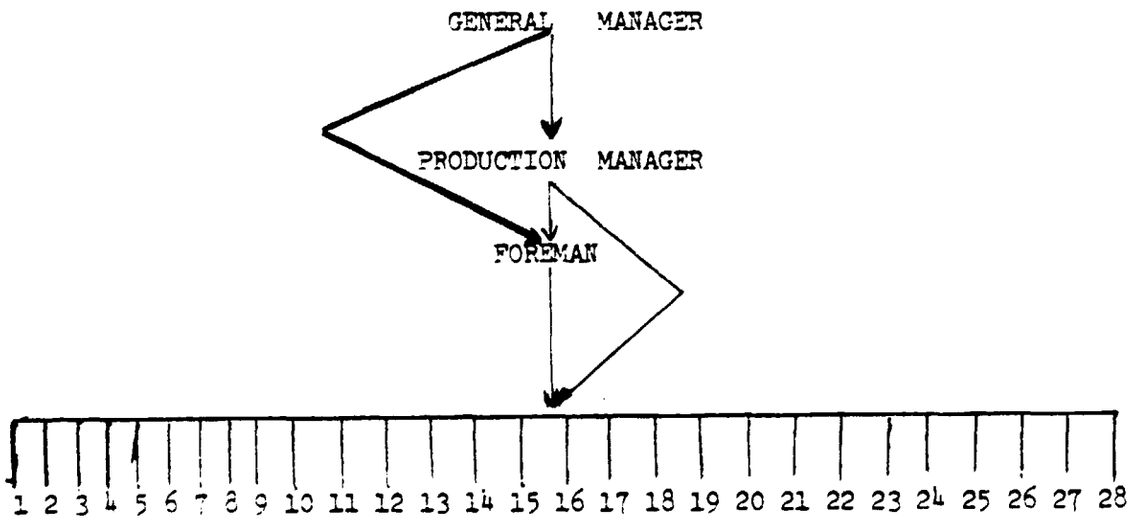
7.1 Distribution of functions at the production level.

Table 7.A.1. shows the actual distribution of the main functions (activities) at the production level.

Five persons have clearly defined duties: maintenance, driving, watchman, gardener. The other personnel is divided in more or less two groups. Every member of the groups does roughly everything the groups are supposed to do.

7.2 Management

The management has the following structure (apparently):



	Collecting raw materials	Transport chemicals	Unloading	Washing	Filling of crates	Cleaning	Cutting in slices	Choosing (Robert)	Grinding Apex	Brush Pulping	Transport cold & chilled room	Washing	Transport in t jackets	Transport of plastic	Transport in crates	Transport in cartons	Transport in metal buckets	Filling of bottle	Processing, boiling etc.	Filling of steel buckets	Filling of cans, jars etc.	Sealing of cans	Filling of boxes	Cleaning	Control PH, brix	Label	Filling of bottles, jars	Wash empty cans, bottle etc.	Steam Sterilize	Returns	Loading tank	Moving trolly (shelves)	Operate: Crane	" Boiler etc.	" Compressor	" Generator
B. Horsford																																			
R. Layne								X	X	X	X	X	X	X	X		X	X	X	X	X			X	X			X			X	X	X	X	X
O. Alexander	X	X	X																											X		X			
E. Japal		X																																	
R. Duncan			X					X	X	X	X	X	X	X			X	X	X	X	X			X	X			X				X	X	X	X
A. Bullen				X	X	X	X	•				X									X									X		X	X	X	X
G. Issac																														X		X			
D. Joseph																														X		X			
A. Horsford			X					X	X	X	X	X	X	X			X	X	X	X		X		X	X			X	X		X			
M. Mitchell			X					X	X	X	X	X	X	X			X	X	X	X		X		X	X			X	X		X			
W. Depradine			X					X	X	X	XX	X	X	X	X	X	X	X	X		X					X			X	X	X	X			
C. Vincent			X					X	X	X	X	X	X	X	X		X	X	X							X			X						
J. Johnson			X					X	X	X	X	X	X	X	X	X	X	X	X					X	X				X						
J. Redhead			X					X	X	X	X	X	X	X			X	X	X						X				X						
M. Mitchell					X	X							X						X					X					X	X	X				
M. Phillip					X	X							X						X					X					X	X					
M. Langaige					X	X							X						X					X	X				X	X					
M. Smith																						X		X							X				
J. Mitchell					X	X							X									X		X	X				X	X					
G. Moore					X	X							X						X			X		X											
S. James					X	X							X	X							X	X		X		X	X								
A. Bain					X	X	X	X	X		X		X	X					X			X		X	X	X									
D. Antoine					X	X							X						X			X		X	X				X	X					
E. Charles					X	X	X	X	X	X			X	X								X		X	X										
T. Richards					X	X							X	X								X		X		X									
D. Frame					X	X							X									X		X	X										
C. Peters					X	X							X	X								X		X		X	X								
N. Doyle					X	X							X	X								X		X		X	X								
P. Nelson																																			
J. Moore				X								X		X			X	X	X					X											
B. Wilkinson							X	X							X									X		X									
J. Clarence							X	X							X									X		X	X								
F. Debellote		X		X																															
S. Plentie																																			
L. Mark																																			

Footnote:

1/ St. = Steel

• P. = Plastic

▲ M. = Metal

7.B. Proposed Organization

7.B.1 Need and general approach of reorganization

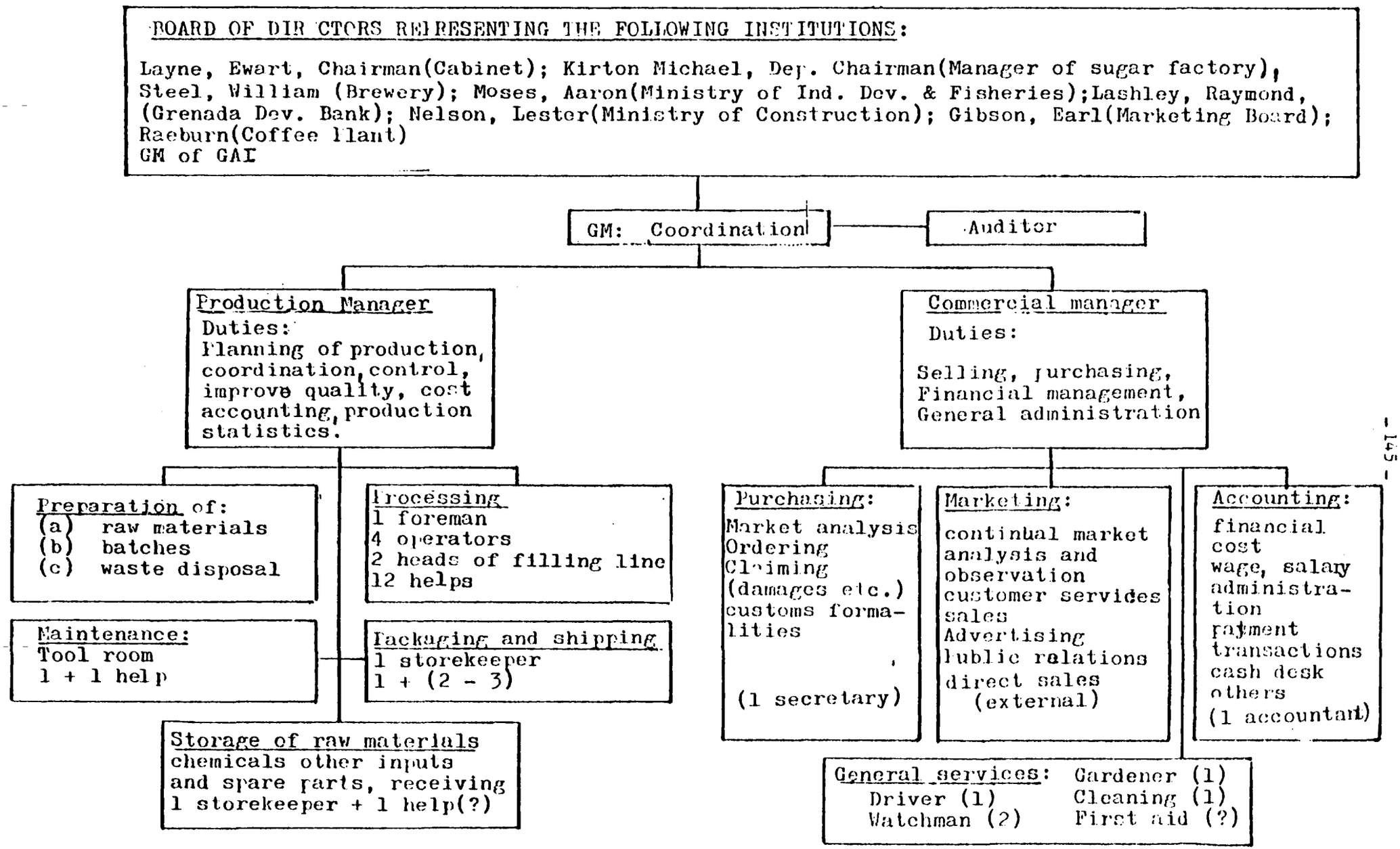
At present there is only a very limited organizational structure, responsibilities are not determined, the ratio between superior and subordinates is unacceptable and inefficient. Therefore. the structure shown in table 7.B.1 os proposed.

The managerial functions are divided into two: Commercial functions and production. The general manager is supposed to assume in addition to its PR, co-ordination and planning functions and functions of the a manager of one of the two groups. He (she) may be general manager and commercial manager or production manager and general manager at the same time owing to the small size of the factory. The section of production is sub-divided into five departments with their won field of responsibilities and functions:

- Preparation: This department has to:
  - (a) prepare (wash, clean, weigh etc.) raw materials;
  - (b) to make batches and
  - (c) to dispose of wastes

There should be nominated one person (foreman) responsible for all operations and in particular for the batches. There or more helps may be needed.

TABLE 7B1: ORGANIZATION CHART



- Processing: It comprises the main activities, like milling, chopping, pulping, mixing, boiling in kettles, retort-operations, filling and sealing. The personnel should comprise:

  1. head, responsible for the whole processing
  2. operations for the various machines or kettles:
  3. two foremen for 2 filling lines with about 6 helps each as necessary.

- Storage I It comprises storage of:

  - raw materials
  - chemicals, other inputs (bottles, jars etc.)
  - spare parts and receiving of all materials.

  personnel requirement, 1 storekeeper + 1 help.

- Packing and Shipping: Functions:

  (a) Packing of products in cartoons;

  (b) Storage of finaished products;

  (c) Shipping;

  Personnel requirements:

  1 storekeeper

  2-3 or more helps for labeling, sealing etc.

- Maintenance: Functions:

  Maintenance and repair of all electrical and mechnical equipment.

  Personnel requirement: 1 mechanic or electrician + 1 help.

The commercial section comprises four departments:

- Marketing:

Functions:

(a) continued market analysis and observation,

(b) customer services (claims)

(c) sales,

(d) advertising,

(e) public relations,

(f) direct sales (to customers).

The functions a - d have been delegated to the marketing board for good reasons, but it is absolutely necessary that the management keeps in touch with the market. Regularly market reports should be supplied by the marketing board, otherwise responsible management is impossible.

Direct sales may be considered for special offers like unset jellies etc. Normal products should not be sold to consumers at ex factory prices. It could upset retailers.

Personnel requirement: Management functions to be assumed by the commercial manager: Direct sales by the cashier (payment) and the shipping department.

- Purchasing:

Functions: (a) Market analysis for all inputs

(b) Ordering at the right time to assure supply in time,

(c) Claiming (bad quality, damaged goods etc. should not be accepted!!)

(d) custome formalities

Personnel requirements: The functions could be assumed by the commercial manager, assisted by his secretary (typist).

- Accounting:

  Functions: (a) financial accounting

  (b) cost accounting (with production manager)

  (c) wage and salary administration

  (d) payment transactions

  (e) cash desk (petty cash)

  Personnel requirement: 1 accountant

- General services:

  Functions: (a) transport of personnel, visitors and goods

  (b) security

  (c) cleaning

  (d) first aid

  (e) others

  Personnel requirements: 1 driver (could also supervise other services)

  2 watchmen

  1 gardener (part time)

  1 help

8. Personnel

A. The present situation

8.1 Production labour

Production labour comprises twenty nine persons. Their daily wages vary between 10 and 15 EC$, and amount to 271.00 EC$.

8.2 Other labour

The factory employs two maintenance workers at a daily wage of 52,50 EC$ together, one driver, two watchmen and a gardener at a daily wage of 99,90 EC$ together. The daily wage for the whole group is therefore 112,40 EC$.

8.3 Staff Employee's

The group comprises five employees with a monthly salary of 4,608 EC$ together. Based on an average of 19 working days per month, the daily amount is 243,40 EC$.

8.4 Salaries and wages per working day

Production labour	271.00
Other labour	112.00
Salaries share	243.00
Total	626.00

Table 8.4

Salaries and Wages

	NAMES OF WORKERS	MONTHLY	DAILY/DAY
1.	Brigdette Horsford	$1500.00	
2.	Raymond Layne	1083.00	
3.	Osborne Alexander	750.00	
4.	E. Japal	625.00	
5.	Roy Duncan	650.00	
6.	Allison Bullen		$14
7.	Arnold Horsford		12
8.	Mitchell		12
9.	Wayne Depredaine		12
10.	Cletus Vincent		15
11.	Jeffrey Johnson		12
12.	Jeffrey Redhead		10
13.	Margaret Mitchell		12
14.	Mavis Langaigne		12
15.	Margaret Phillip		12
16.	Jemma Moore		12
17.	Cheryl Peters		10
18.	Joan Clarence		10
19.	Elizabeth Charles		10
20.	Jennyline Mitchell		10

NAMES OF WORKERS		MONTHLY	DAILY RATES
21.	Nutrice Doyle	-	10
22.	Bernadette Wilkinson	-	10
23.	Denise Frame	-	10
24.	Sharon James	-	10
25.	Thelma Richards		10
26.	Godfrey Isaac		37,50
27.	Davis Joseph		15
28.	Patrick Nelson		12
29.	Angela Bain		10
30.	Frank Bartholomew		22
31.	Mabel Smith		12
32.	Daphne Antoine		12
33.	Samuel Plentie (Watchman)		13
34.	Lucas Mark (Gardener)		10
35.	Joseph Moore (Watchman)		13

9. Implementation

Because of lack of information and instructions, this chapter was not elaborated.

10. Economic Analysis

A. The present situation

10.A.1 Financing

The financial status of the Grenada Agro-Industries will not be analysed in this report, nevertheless, available information will be reproduced below for information.

According to the post-investment appraisal done by Aaron Moses: "The financing for the factory equipment installation, fixtures and furniture, was in the form of a soft loan at 3% from the Cocoa, Nutmeg and Banana Board's respectively. This sum of EC$650,000 was supplemented by funds out of the Ministry of Agriculture's capital budget allocation to the sum of $157,216. A projected requirement of working capital of EC$ 1 million was to be partially long-term and partially revolving."

But this financing arrangement for working capital never materialized. "Operational activities during the year 1981 were financed by central government funds to the sum of EC$524,871 and cash sales of EC$152,285.

In 1982 again, financial needs were covered by the central government.

10.A.2 Economic performance in 1981 and the first six months of 1982

According to the accounts (table 10.A.2.1.) expenses amounted to EC$607,741 in 1981 and to $618,306 after six months in 1982. There are no data on stocks available.

TABLE 10.A.2.1

Expenses 1951

Month

Denomination	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	TOTAL
Tel. & cables			374			366			314	120	262		1436
Electricity				1500		3000					4000		8500
Water 18/100 gals.					709						2000		2709
Fuel 15.36/300 gals.		572.75	1476	1850		1476	2952	1476	2952	1476	1476	1476	17183
Staff increase		3500				177	357		266	342	2822	2639	10103
Uniforms	68655	184	144		485	355	1422		597			689	4565
Sugar		3.52	6113	8052	7235	3114	21323	1066			3877	944	54976
Onions	1423	57	500						566		560	1148	2845
Fruits veg.		202	815	8508	3131	4276	2497	5591	5279	2212	2448	2269	37228
Chemicals		388			273				1511		577		2949
Salaries	6487	7561	11809	10655	13231	11674	17852	16459	12862	17074	15617	23254	164535
	316	5745	691	1591	450	496	3379	280	512	185	1604	3250	18507
Stationery	35635	1051			175	120		330	104		206		2340
Fixtures	295	18202	7753	4016	288	569	16340	400			1000		48863
building Completion	390998	872	836	1590	2879	691	4653	1309	5849		7029	400	30048
Vehicel Maintenance (truck, van)	26695	179	930	617	1063	699	1260	903	1214		1550	534	9509
Freight & (raw mat. chemicals)						240	373	485	779	280	280	750	2907
Sundries (anything not budgeted otherwise)						355	2000	533	533			1884	4752
Packaging			28560	18219	550	43517	30150	7756	1754	1000	26400	17	157363
Stores (detergents, rop, brushes etc.)	15512	845	364	29	1266	639	2189		2473	1072			10882
Spices		150	275				71	3814 275	5784 433	404		143	5941 5043
Dressing			681	606		180	600			40			

TABLE 10.A.2.2: EXPENSES 1982, JANUARY - JUNE

	I	II	III	IV	V	VI	£
Tel. & Cables			773	249	250		1272
Electricity			1434	17000	4000	3000	25434
Water		2500	417	196		510	3723
Juel	1536	1536		3072	1536	1536	9216
Insurance			4867				4867
Uniforms				299			299
Sugar	16792		10308	3268		16086	51454
Onions	350	350	1013		1715		3428
Raw Materials	3414	5296	13775	8513	3640	3152	39420
Chemicals		1435	28281		20167		49883
Salary	15478	14510	22475	19963	18751	15037	106214
	1496	3718	1117	340	470	430	757
Stationary	21	760	507	132	92	2703	4215
Fixtures	3292						3292
Building	1136	3908	1130	22 58			8405
Vehicle Maintenance	1226	1274	2596	2920	2463	2992	13471
Packaging	23709	5542	106300	150	54667	12051	202919
Stores	256	180	338	739	1280		3293
Salt		300					300
Spices	754		98				852
Browning			40				40
Repair & Maintenance	374	1730	173	504	2102		4883
Freight & Transport	717		972	7034			12542
Gas tax deductions			6347	865	718	718	8648
Sundries	350	338	302	300	3060	1333	5683
Spares, equipment		17839		2790	5599	20754	46982
Total	75347	61316	208082	75732	120510	80302	

The Management reported sales of EC$257,642 in 1981 and of a total production value of $325,972 and a manufacturing loss of $50,687 as well as a net loss of $202,524. The above figures are taken from a report for general information only.

TABLE 10.A.2.3. SALES IN 1981 AND JANUARY TO JUNE

(a) Sales in 1981

	GBN	MN	PPN	SSN	TN	NJY	NJM	HS	SS	MCH	Total
Cartoon	24	173	24	81	131	21	34	299	50	18	
	235	798	-	-	89	278	504	429	89	109	
Paid in 82 only	31	27	-	-	1	159	168	147	74	99	
Total 1981	228	944	24	81	219	140	370	581	65	28	
Price	6720	-	-	-	-	68	68	46	58	69	
Sales value	15321	63436	1612	5443	14716	9526	25174	26726	3770	1932	167,944 = 167,656

(b) Sales in 1982 (1 - Fi)

Cartoons	31	27	-	-	1	159	168	177	74	99	
	36	19	-	-	-	850	1860	907	645	107	
	-	-	-	-	15	872	449	-	-	-	
Total cartoons	67	46	-	-	16	1881	2477	1054	719	206	
Sales value 82 6 mths.	4502	3091	-	-	1075	63991	84267	48484	41702	41214	283,795 = 261,326
Sales value 81 and 82	19820	66527	1612	5443	15791	73517	109441	75210	45472	16146	

10.A.3. Structure of direct material cost of some products

Direct cost of nutmeg jam:
The direct cost of one jar of nutmeg are the following (based on the results of I-V):

		Quantity	Cost	
1.	Nutmeg pods			0,10
2.	Sugar	0,74 kg	0,37	0,54
3.	Pectin	0,0103	0,06	0,124
4.	Jar	1	0,85	0,85
5.	Cap	1	0,22	0,22
6.	Label	1	0,08	0,08
7.	Cartoon	1/29	-	0,07
Total direct material cost			1,58	1,984
Sales price			3,24	3,24
Gross margin			1,66	1,256

Direct cost of nutmeg jelly

1.	Netmeg pods	(0,16)		-
2.	Sugar	0,8		0,59
3.	Pectin			0,14
4.	Jar			0,85
5.	Cap			0,22
6.	Label			0,08
7.	Cartoon			0,07
Total direct material cost				1,95
Sales price				3,24
Gross margin				1,29

Mango nectar

Quantity: 283 mil

	Quantity	
Mango	169g	0,04
Sugar		0,05
Water		-
Citric acid		0,002
Can		0,66
Label		0,15
Cartoon		0,05
Total direct material cost		0,95
Sales price		1,60
Gross margin		0,65

10.B Economics of the reorganization programme:

Based on the assumptions made in Section B, an economic analysis may be made:

10.B.1 Estimated sales revenue:

Assuming that the total current production of nutmeg jam and jelly may be sold, the sales revenue should amount to:

	DAILY	PER YEAR
Quantity produced	3360	672,000
Price	3,24	3,24

10.B.2 Different categories of costs:

Production requires a number of inputs, which may be divided into groups according to the degree of their variability or their dependence on the output:

The following groups are used here:

(a) Direct material costs
(b) Direct labour cost
(c) Overhead costs, depending mainly on operation, but not output
(d) Salaries and fixed wages
(e) Investment cost or depreciation
(f) Start-up cost

Direct material cost depend directly on the output. They are considered as variable in the short run.

Cost groups (b) through (f) are considered here as fixed, but the groups (b) to (c) are avoidable.
Cost of group (a) can be obtained from 4.5 They are for 1 Jar EC$1,32.
Table 10.3.2 shows the various groups of costs calculated for 1 day and for 1 year (based on 200 working days.)

TABLE 10.3.2: VARIOUS COSTS CATEGORIES

(a)	Direct material cost (100% cap.)	6,115	1,223,000
(b)	Direct labour	271	54,200
(c)	Overhead	830	166,038
(d)	Salaries and fixed wages	355	71,000
(e)	Investment cost (Depreciation 5 yrs)	510	102,000
(f)	Start up cost (5 years)	300	61,000
b - f		2,266	453,200
Total		8,381	1,676,200

10.3.3 BREAK EVEN POINT

Under the asumption of a single product production (jam - jelly) the cost estimates result in a break even production of 1600 jars per day, or 320.000 jars per year, covering thus all cost (except financial cost).
Table 10.3.3 shows the relationship between daily (yearly) production and the corresponding cost and sales revenues.
Any production beyond 1.100 jars day would contribute to pay back the accumulated investment cost.

10.B.4 NATIONAL VALUE ADDED

In the present case it is appropriate to compile the value added for a normal year only.

Annual sales revenue	2,177,000
Annual current material inputs	1,389,000
Depreciation	102,000
Share of material inputs in start up cost (estimate)	40,000
Total national value added	646,000
Salaries and wages	125,000
Value added surplus over wages	521,000

The social surplus will be still higher, if we take into account that opportunity cost for inputs like nutmeg pods are zero.

10.B.5 NET FOREIGN EXCHANGE EFFECT

The assessment of the foreign exchange effect of the project will be made roughly only and in two stages. In a first step the balance of payments effects will be complied. In the second step we estimate the import substitution effect.

Foreign exchange flows:	EC$
1. Import of capital goods	500,000
Material inputs for 5 years	6,115,000
Indirect imports of material	650,000
Subtotal	7,265,000
2. Foreign exchange inflows:	
Sales (exports) 50% of turnover	5,400,000

Balance of payments effect	- 1,865,000
Import substitution 50% of local sales only	2,700,000
Net foreign exchange effect	835,000

According to our assumptions the net foreign exchange effect may become positive over an estimated life span of 5 years. The main assumptions on which result depends are:

- exports of total production amounts to 50%
- import substitution concerns 50% of local sales
- the value of imported inputs does not change
- there will be no major imports of spare parts or machinery necessary.

It is certain that the effect could be improved considerably (Deposit on jars and recycling).

10.B.6 OTHER EFFECTS

Other effects like employment effect, distribution effect etc. will not be dealt with here.

Industrial Survey of Grenada 1982 - the manufacturing industries

In 1982, the contribution of the manufacturing industries to GDP amounts to 7 716.000 EC$; total employment of manufacturing industries is 763.

This will roughly correspond to 10% of GDP, and 7.5% of total employment in all economic activities.

Table A shows the structure of manufacturing industries at a 3 digits level.

The most important sector is manufacturing of food, beverages, and tobacco with an employment of 402 and a value added of 5,431.000 ECS. Second come textile, wearing apparel and leather industries with 235 jobs, a value added of 1,039.000 EC$ and the lowest value added per capita. Nevertheless, this sector has the highest export rate (77-95%).

The following products are manufactured in Grenada:
Bread, cakes, flour, coconut oil, laundry wap, coconut meal, animal feed, fish filet, jams, jellies, nectars, syrups, juices, ketchup, table sauces, noodles, spices, rum, sugar, beer, malt, coffee, soft drinks, cigarettes, underwear, garments, sportswear, overalls, school uniforms, jeans, shirts, handicraft items, furniture, parfumes, remoulded tyres, hand bags, belts, foam mattresses, cement blocks, mufflers, boats.

The import dependency is high for most industries owing to the lack of industrial linkages.

Table A. The structure of manufacturing industries in 1982

ISIC	Denomination
31	Manufacturing of food, beverages and tobacco
311	Food manufacturing
312	Manufacture of food products not elsewhere classified
313	Beverage industries
314	Tobacco manufacture
32	Textile, wearing apparel and leather industries
322	Manufacture of wearing apparel, except footwear
33	Manufacture of wood and wood products, incl. furn.
331	Manufacture of wood and wood products, exc. furniture
332	Manufacture of furniture and fictures
34	Manufacture of paper and paper products; Printing
342	Printing, publishing and allied industries
35	Manufacture of chemicals and chemical products
352	Manufacture of other chemical products
355	Manufacture of rubber products
356	Manufacture of plastic products not elsewhere cl.
36	Manufacture of non-metallic mineral products
369	Manufacture of non-metallic mineral products
38	Manufacture of fabricated metal products
382	Manufacture of fabricated metal products
3	Manufacturing

Employment	Value added in 1000 EC$	VA per capita in 1000 EC$
402	5 431	13,5
242	2 890	12
11	34	3
135	2 435	18
14	72	5
235	1 035	4
235	1 035	4
28	261	9
4	56	14
24	205	8,5
5	48	10
5	48	10
27	257	9,5
5	32	6
9	50	5,5
13	175	13
42	460	11
42	460	11
24	220	9
24	220	9
763	7 776	10

INDUSTRIAL SURVEY - GRENADA

The Government of Grenada is presently preparing the country's first Development Plan which will also include a part on the Industrial Sector. As the existing information on industry and the manufacturing sector of Grenada is very limited, UNIDO was requested to assist in an Industrial Survey.

In the context of the Multi-Island Project - CAR/73/001, Industrial Promotion, an Industrial Adviser was sent on a short-term mission to Grenada. During the briefing in Barbados, it was agreed with the Resident Representative that the Consultant would concentrate his activities on Grenada's agro-industries and that the UNDP Office would provide assistance in the preparation of the Industrial Survey. After approval from Headquarters, the UNIDO JPO went to Grenada from 21 September to 2 October 1982 in order to collect data for the Survey.

A questionnaire for the interviews was put together, which included questions on production, sales employment, cost structure and capacity of the industrial enterprises (see attachment 1).

About two to three years ago a list of manufacturing businesses had been prepared by the Statistical Service of Grenada (See attachment 2). However, it had never been up-dated. A number of manufactures had closed down in the meantime. Some were not operating anymore, because the owners had migrated, other firms were operating only occasionally upon demand. These were not contacted during the interviews. Several firms were unknown to the Ministry of Industrial Development and Fisheries and could not be contacted because apart from a postal box in St. George's, neither phone number nor address were indicated. Therefore, this list

could not be used as a basis for drawing a sample of manufacturing enterprises. It was decided to contact only those firms which were known to the Ministry. Another eleven (11) enterprises which did not appear on the list are included in the Industrial Survey. The Survey was limited to Grenada, leaving out the smaller islands, Carriacou and Petit Martinique. Pages one (1) to twenty one (21) of this report show the more detailed information obtained in the interviews.

The UNIDO JPO interviewed 21 managers or owners of manufacturing enterprises. Information on another 12 firms were provided by the Grenada Development Bank. The data collected is presented in three (3) tables.

The last column of table 1 gives estimates of the value added of the single enterprises. Data on sales as well as on inputs and costs were in many cases insufficient, especially when only approximate averages could be provided (frequently enterprises had no proper book-keeping). Thus, the estimates often represent very rough guesses of the national value added. The value added is calculated from information on sales and inputs or, if not available or unreliable, from salaries and profits.

Several enterprises have been unable to provide the figures required for the Survey. Some others had promised to send additional data, but in most cases the required information was not received by the time of compiling the Industryial Survey. A reliable figure of the national value added, i.e. produced by the total industrial sector of Grenada required more detailed data from several enterprises as well as the collection of information from some some other smaller enterprises, particularily ship and boat builders from Carriacou.

In spite of these short-comings, the results of the Industrial Survey provide an idea of the importance of Grenada's manufacturing sector. They show the range of products manufactured in the island (listed according to the ISIC code), sales of the single enterprises, employment in the industrial sector and the structure of inputs (especially in view to imported goods).

The investment value, capacity utilization and import dependency (inputs that are imported directly as percent of total sales) for the enterprises that were contacted during the Survey are listed in Table 2. Table 3 shows the average investment value, average capacity utilization and estimates of the average value added per employed person for the industrial sub-sectors (according to the ISIC code).

ATTACHMENT I

QUESTIONNAIRE INDUSTRIAL SURVEY - GRENADA

1. What products?
   Number of Production

2. Output per year (export separate)
   Sales per year (turn over)

3. Employment
   - Number of jobs per activity
   - Male - Female
   - Expatriates

4. Salaries and Wages (month/year)

5. List of inputs (quantity, total cost, imported?)
   a) Raw Materials
   b) Intermediate Products
   c) Packaging Material
   d) Utilities (total costs apart from above)
      - Electricity
      - Fuel (specify)
      - Water
      - Telephone
      - Travel, stationary, etc.
   e) Main Services received from other firms
      (Maintenance, repair of machinery)

6. Approximate investment value at prepsent or estimate capital required to set up the same plant today

7. Installed capacity (what maximum quantity could be produced) and capacity utilization.

8. Problems

3.1.1.3 GRENADA FOODS - Tempe

Food Products

1. - Ketchup - 2,000 cartons)
   - Juices - Concentrates - 2,000 cartons) about 24
   - Jams - Jellies - 200 cartons) bottles/jars
   - Syrups - 500 cartons)

2. 500,000 $ sales/year (local consumption)

3. 5 workers (1 female)

4. Salaries - 16,000 $/year

5. a. Raw Materials - 160,000 $ imported (tomato paste)
   - 20,000 $ local fruit/vegetable
   c. Packaging - 160,000 $ (bottles and jars imported, products in jars are then sold in the same cartons)
   d. Telephone - 2,000 $/year
   Electricity - 3,000 $/year
   Water - 2,500 $?year
   Repair/maintenance - 13,000 $/year (self or mechanics from Grenada)
   Rent for factory - 6,600 $/year
   Vehicles - 13,000 $/year
   Insurance - 4,000 $/year
   Travel - 6,000 $/year
   Accounting fees - 2,800 $/year
   Advertising - 1,000 $/year
   Stationary - 3,000 $/year
   Miscellaneous - 1,200 $/year

6. Investment about 500,000 (own financing)

7. Capacity utilization about 25%

8. Problems. Firm cannot compete against imported materials and complains that Government does not introduce more restriction measures for imports. At time of interview firm was not producing at all and had high stocks.

3.1.1.4 FISH PROCESSING PLANT

1. Shark, Flying fish, other fish - salted, smoked
   Shark oil, shark fins

Shark	-	59,300 pounds processed	in 1981
Flying fish	-	2,216 pounds smoked	
Flying fish	-	6,762 pounds processed	
Others	-	22,900 pounds processed	
Shark Oil	-	45 gallons/month	
Shark fins	-	2,400 pounds	

3. 3 permanent staff and temporary workers

Additional data to be provided

3.1.1.5 TEMPE MANUFACTURING CO. LTD. - Manufacturer of Cooking Oils, etc.

Manager: Mr. Michael Julien

1. Refined coconut oils - 50,000 gallons)
   Laundry Soap - 200,000 pounds) Locally consumed
   Coconut meal - 350,000 pounds)
   (for Animal feed)

   Intention to diversify production (sun tan lotion, liquid detergents, margarine, personal care products).

2. Turnover - 1.5 million $/year

3. 20 people (of which 5 are females, 4 in management)

4. Salaries - 80,000 $ (in 1981, for 1982+12%)
   Profit before tax - 52,000 $

5. Inputs - 1,067,000 $ total direct costs and raw materials
   a) Raw materials - 954,000 $/year
   b) Packaging material - 113,000 $/year
   c) Fuel - 120,000 $/year
      Electricity - 18,000 $/year
      Administration - 91,700 $/year

      (Total overhead excl. salaries)
   d) Repairs and maintenance - 11,000 $ (inside of firm, some from Government work-shops)

      (Depreciation - 26,000 $)
      (Building of Tanks - 14,000 $ (cost of material)

6. Investment

   Net assets (1980) - 174,600 $
   1981 (after revaluing assets) - 863,000 $ (more realistic value of assets)

7. Capacity utilization
   15% - 18%

8. Demand is limiting production.

3.1,1,6

\+ 3.1.2.2 CARIBBEAN AGRO INDUSTRIES LTD.

Flour Mill Manager: Mr. Baumgartner

1. 3 types of flour (baker's, softwheat, family's)

10,000 hundred weights

animal feed (upon demand) 2,500 hundred weights. Export about 2,000 of flour.

2. 600,000 $/month

3. 39 (4 females), of which administrative staff.
15 for flour, 8 for feed, 2 for maintenance
3 security guards, 1 gardiner
1 expatriate

4.

A. Grain, soja bean etc.	-	2.9 million $/year	imported
C. Packaging material	-	400,000 $/year	
D. Electricity	-	30,000 $/month	
Water	-	600 $/month	
Fuel (diesel and gasoline)	-	52,000 $/year	
Telephone (communication)	-	50,000 $/year	
Total operating expenses	-	460,000 $/year	

(Administration marketing, insurance, etc.).

E. Maintenance/repair by 2 persons in the factory. (85,000 $ total cost including salaries, 68,000 $ for spare parts).

6. 7.5 million $
Partnership enterprise, 51% owned by U.S. Company

7. for flour production - 65%
for animal feed - 35%

8. Lack of demand, limited demand for feed products in farming. Local livestock breeding should be increased and then decreased import of food products.

3.1.1.7 BLUE DANUBE BAKERY

1. Bread - 7040 piexes/day (704 per 2 bags of flour)
   - 400 pieces/day (199 per 2 bags of flour)

   Some cakes, coconut cakes

2. Average sales per day 3,000 $

   --------- 78,000 $ sales/month

   (2 - 3% of output damage)

3. 34 (8 females)

4. Wages - 2,455 $/week

5. Total costs are estimated to be 96,000 $/month (incl. salaries)

   a. 25 bags of flour/day at 66.94 $ from Grenada flour
   24 working days per month
   (this could come to about 40,000 $/month)

   The owner said that on average 30,000 $.month is spent on flour
   In addition margarine, yeast and sugar are imported

   c. Pastic bags - 10,000 $/month - imported
   (68 $ per 1,000 bags)

   d. Electricity - 400 $/month
   Fuel - 1,500 $/week
   Water - 430 $/month

   e. Maintenance by a Grenadian

6. 450,000 $

7. Shift work could increase capacity utilization.

8. The market forms the bottleneck.

3.1.1.7 SOLOMON AZAR (Home-Made)

1. Bread)
   Cakes) about 1,000 pieces per day
   Rolls)

2. 500 - 700 $ per day
   On average 14,000 - 15,000 $ per month
   (local consumption)
   (between 5 - 10% of products remain unsold)

3. 6 (3 males, 2 females, owner)
   plus 4 women selling

4. 440$/week

5.

a.	Flour	5,100$/month	(from flour mill)
	Yeast	200$/month	)
	Margarine	500$/month	) IMPORTED
	Sugar	400$/month	)
c.	Packaging material	500$/month	
d.	Gas (oven)	500$/month	
	Water	50$/month	
	Electricity	100$/month	
e.	Maintenance	400$/year	

6. About 200,000 $

7. Capacity utilization close to 100%

3.1.1.7 SUNLIGHT BAKING AND TRADING CO.LTD.

Edzel Thomas

1. Bread)
   Cakes) 20 bags of 100 pound flour used per day

2. 4,000 $/day
   An average 50,000 $/month (local consumption)

3. 20 (2 females)

4. About 1,940 $/week
   1981: 40,620 $ (of which 4,800 $ Director's salary)
   Operating profits 5,000 $ (1981)

5.

a.	Total raw materials	-	386,500 $)
b.	Packaging material	-	28,300 $)
c.	Electricity/telephone (has own generator)	-	2,600 $)
	Fuel (diesel)	-	30,990 $)
	Interest	-	16,700 $)
	Insurance	-	7,200 $)
	Trade Licence	-	5,000 $)
	Travel	-	2,400 $)
	Legal/Accountant fees	-	3,300 $)
	Advertising	-	1,200 $)
	Motor vehicle expenses	-	50,200 $)
e.	Repairs/Maintenance	-	13,672 $)

Total direct expenses - 1981 (incl. depreciation) 106,584 $

General expenses (plus depreciation) 105,084 $

6. Fixed assets 321,000 $ (1981)

7. Production could be 50% higher.

3.1.1. (?) GRENADA AGRO-INDUSTRIES/SPICE GRINDING

Tanteen

1. Spices (Nutmeg, Cinnamon, Cloves, Mace, Pimento, Trimeric, Ginger)

   Estimated output for 1982 - 95,000 jars

2. 8,000 $/month, 60% export to CARICOM. Sales price average 2 $ per jar/

3. 4 (one female) 1 Project Director, 1 Technician, 2 Factory assistants

4. 14,060 $/year

5. a. 24,000 $/year (locally produced)
   c. 45,000 $/year (imported)
   d. Electricity - 250 $/month
      Water - 100 $/month

   e. Maintenance through Ministry of Construction

6. Equipment app. 92,000 $
   New Building 75,000 $

8. Problems with regular supplies of raw material. Limited marketing possibilities.

3.1.1.8 GRENADA SUGAR FACTORY

1. Rum - 51,136/year (production all over the year)

   Sugar - 499 Bags/year)
) production - January - June 82
   Syrup - 179,635 gallons/year)

   Local consumption

2. 1,076,463 $ (January - June 1982)

3. 58 in the Factory (6 females) 102 during crop
   7 in the Office (5 females)

4. Salaries - 420,250 $ - January - June 1982

   (after this period somewhat lower)

5. Sugar Cane: 403,150 $/year

   (8,063 tons of cane, 50 $ per ton)

   Local maintenance of machinery

   Further information to be provided.

7. Capacity utilization - 80%

3.1.2. (?) COFFEE PROCESSING PLANT

1. Coffee (roasted, ground) 1981: 9,000 pounds

   16,000 planned for 1982, up to August 1982, 12,000 pounds were roasted, and 9,500 pounds final production

2. 85,000 $ sales 1981
   Up to August 1982 sales 87,000 $
   Export app. 10,000 $/year

3. 11 (of which 3 males and total of 9 workers)

4. 2,800 $/month

5. A. Raw Coffee Beans - 78,000 $, 20,000 pounds - 90% imported from Trinidad

   C. Packaging material - 11,000 $/year imported

   D. Electricity - 2,000 $/year
   Telephone - 1,500 $/year

   E. Repairs by workers of plant or other Grenadians.

6. 156,000 $ (building equipment)
   Government owned

7. Maximum capacity 40 - 50,000 pounds/year
   Capacity utilization about 30%

8. Problems in marketing coffee (and consequently in cash flow)

3.1.3 CARI BEER / GRENADA BREWERIES LTD.

Manager: Mr. Guy Renwick

1. Beer - 161,988 cases about 24 bottles per case
   Malt - 79,411 cases about 24 bottles per case
   Guinness - 47,120 cases about 24 bottles per case

   Output = sales

2. 5.495 million $/year (entirely local consumption)

3. 105 - (of which 7 are females, 12 staff in the office)

4. Salaries and wages 877,518 $/year
   + 89,300 $ bonus at the end of 1981

5. For 1981:

   a. Raw materials - 918,682 $
      Chemical supplies - 146,560 $

   c. Packaging materials - 482,792 $

   d. Electricity - 114,182 $
      Water - 76,407 $
      Fuel - 284,611 $
      Telephone - 8,243 $
      Consultant fees - 101,226 $

   e. Repairs/maintenance
      Plant - 134,104 $
      Building - 16,774 $

   Maintenance from employees of plant, at times expert from Grenada

   Exise Duty: - 814,755 $

6. Book Value - 4,499,708 $ in 1981

Factory started in 1961

Actual estimated value about 7 million $

Government	-	35%
Foreign owned	-	10%
Locals and locals living abroad	-	55%

7. Maximum output 30,000 cases per month

Actual 24,000

Capacity utilization 80%

8. Problems with absenteism
20 days sick leave/year

Net profit	500,000 $)	
Renumerations	150,000 $)	
Salaries	722,000 $)	1980
Exise Duty	325,000 $)	
Insurance	15,000 $)	

3.1.3 COCA COLA BOTTLING WORKS

1. Coca, Fanta, Soda, Ginger, Tonic, Sprite

3. 30 (3 Females)

5. e. Maintenance occasionally by Coca Cola Mechanic.

7. Maximum 1,500 cases/day
Actual 1,200 cases/day

Further information to be provided.

3.1.4 THE CARIBBEAN TOBACCO CO.LTD.

Manager: Mr. Kent Joseph

1. Cigarettes (90% without filter)

1,982,500 packs (10 cigarettes - 1981)

2. Sales - 665,520 $ 1981 (entirely local consumption)

3. 12 workers in the factory (3 males) + 2 clerical staff.

4. 18,861 $ per year in 1981 (446 - 532 $ per month)

5.

a. Total raw materials	- 301,717 $	)	
Tobacco	- 120,835 $	)	
b. Making/Blending material	- 726 $	)	Imported
Filters	- 12,445 $	)	
c. Packaging material	- 116,112 $	)	
d. Electricity	- 4,610 $		
Telephone	- 2,153 $		
Stationary/stamps	- 1,275 $		
Insurance	- 10,568 $		
Subscription	- 1,400 $		
Interest	- 6,000 $		
e. Repair/Maintenance	- 1,300 $	(for parts, repairs are made by workers)	
Overhead costs	- 176,000 $		

6. Investment - 268,100 $ book value
- 750,000 $ real value

(own capital and over draft facility)

7. 80%, 1000 cigarettes packs per day maximum production
800 are actually produced
When stocks are high, packaging of cigarettes and boxes that are refused by machines is done by hand.

3.2.2.0 DECO INDUSTRIES

Mr. Edwin De Caul

1. Garment for ladies and children
nighties, slips, panties

3,000 pieces/day output (5 day week)
780,000 per year; 95% export to CARICOM
(Extension of plant underway)

2. 200,000 $/month = 2,400,000 $/year

3. 100 (5 male) workers

4. Salaries - 20,000 $ per month

5. Input

a. Raw Materials	-	600,000 $/year	imported from U.S.
b. Intermediate products	-	25,000 $/year	imported from B,dos (elastics)
c. Packaging material	-	8,000 $/year	imported from St. Lucia (cartons)
		6,000 $/year	imported from St. Vincent (Plastic bags)
d. Electricity	-	21,600 $/year	
Water	-	3,600 $/year	
Telephone	-	3,600 $/year	
Travel	-	20,000 $/year	
Insurance	-	10,000 $/year	
Stationary	-	2,000 $/year	

Maintenance by one staff member

6. Investment Value (end 1981)
- Machinery 350,000 $
- Raw materials 300,000 $
- Finished goods 250,000 $
- Insured value 200,000 $
factory area

own financing - continuous re-investment of profits

7. Running production at higher capacity would lead to lower quality, capacity extension possible at most through longer hours with machinery i.e. capacity utilization approx. 100%.

8. No major problems.

3.2.2 LIBERTY GARMENT LTD.

Manager: Mr. Kishore Karnani

1. Garments for children/ladies/gents,
Changing products according to market.
Since different products of a wide range, it is difficult to give figure or units of output.

2. For 10 months (Sept. 1981 - June 1982)

Total sales 1,323,010 $, of which 1,019,396 $ export to Trinidad and Barbados, the rest local sales.

3. 32 (30 Females).

4. 9,500 - 10,000 $ per month
1 1/2 months salary is paid as bonus at the end of the year.

5. a. Raw materials (cloth) 548,479 $
(for five months up to Sept. 1982) imported from U.S. and Far East

c. Packaging material	-	40,000 $/year	(imported)
d. Electricity	-	16,800 $/year	
Water	-	1,500 $/year	
Telephone	-	3,000 $/year	
Insurance	-	18,000 $/year	
Vehicles	-	5,000 $/year	
Sundry	-	6,000 $/year	
Stationary	-	3,500 $/year	

Repair and Maintenance from Grenadians

6. Investment value - 950,000 $

7. 25% higher production could only be possible with extra hours

8. Demand is limiting production extension.

3.2.2 HADEFD - GARMENT MANUFACTURE

Mr. Habib Hadeed

1. Jeans - 72,000/year
   T-Shirts/Sport Shirts - 36,000/year
   Shirt Jack - 28,800/year

2. Sales - 3 Million $/year
   (70% increase over last year's production)
   90% exports rest locally sold

3. 70 (6 males) employed

4. Wages - 280,000 $/year

5. Raw materials - 2,658,000 $/year
   Packaging material - 20,000 $/year
   Electricity - 800 $/month
   Water - 100 $/month
   Telephone - 1,000 $/month
   Travel - 50,000 $/year
   Maintenance - 5,000 $/year

   (For major problems from Trinidad, also from Grenada)

6. Investment

   1981 - 176,827 $ for fixed assets (+ 60,000 $ purchased since end 1981)

   - 1,285,947 $ current assets (end 1981)

7. Capacity utilization to be increased only by running 2 shifts - 50% more production possible. Demand is limiting factor for production.

3.3.1 GRENCRAFT

1. Hammocks, Baskets, Bags, Lamp Shades, Hats, Table Mats, Fans, Bowls, Suffle, Sticks, Salt Servers, Nut Trays, Wall Hangings, Spice Baskets, Bracelets, Broaches, Necklaces, Afro-combs, Mortars/pestles, Laundry Baskets, Spice Racks, Meat Dishes, Plaques, Towel Racks, Bottle Holders, Wine Baskets, Hanging Baskets, Pencil Holders, Napkin Holders, Spice Dolls.

   Total of 8,700 units produced up to September 1982.

2. Sales, September 1981 - August 1982 - 294,317 $
   Export (March - September 1982) 6,088 $

3. 8 persons paid byGrencraft
   plus 4 paid by Ministry of Education
   (1 male)
   25 regular suppliers of handicraft products

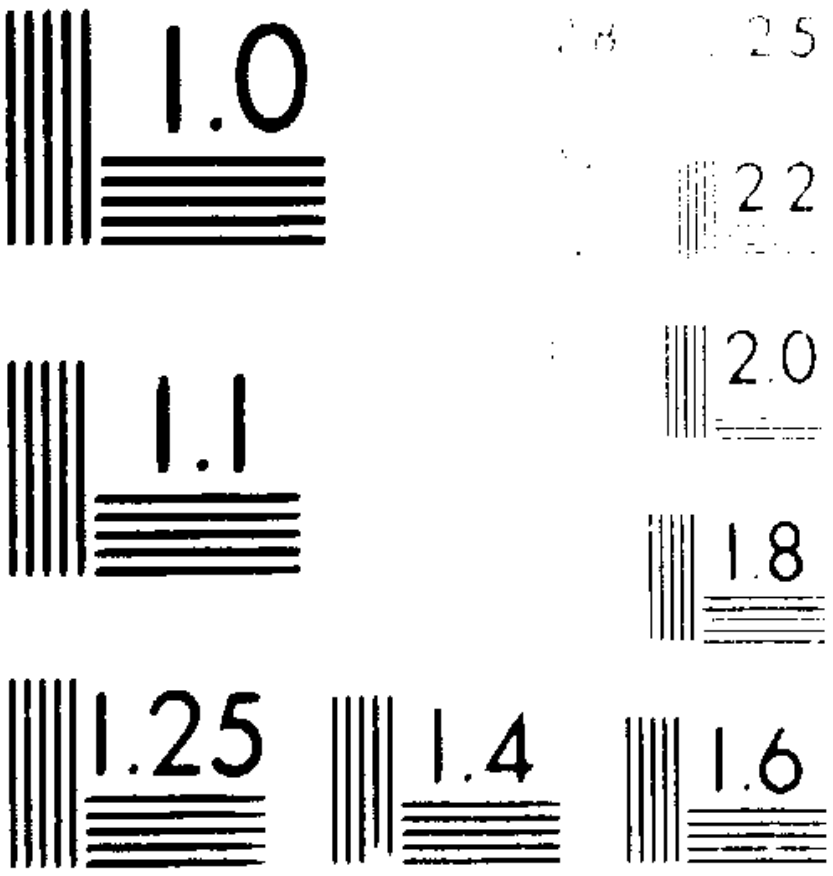
4. 3,132 $/month for Grencraft staff.
   About 1,400 $ for persons from Ministry.

5. a. Raw materials - 6,746 $/year (local products)
   Craft supplies - 223,530 $ (locally made)

   d. No electricity bill
   (Paid by Ministry)
   Telephone - 968 $/year
   Advertising, sales promotion 13,514 $/year
   Water - 2,300 $/year
   Maintenance (Vehicles) - 2,607 $/year

   Re-sales - 34,942 $/year

6. Buildings, rooms about 50,000 $.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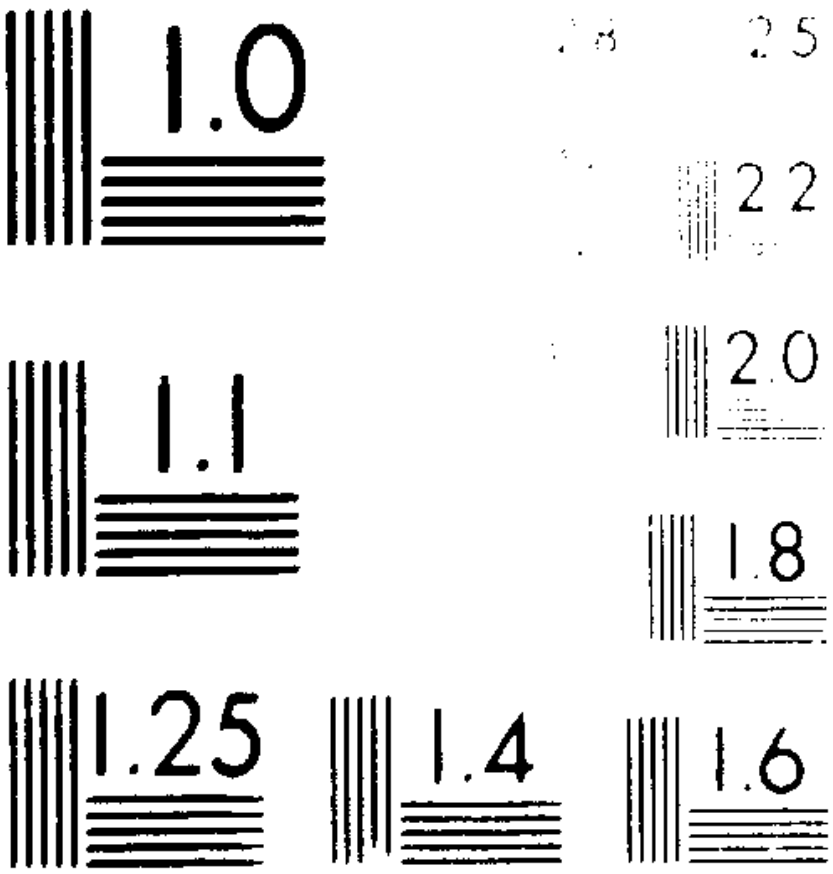
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3.5.2 (?) SPICE ISLAND PERFUMES LTD.

Contact person: Ms. Angela Clements

1. Products
   - Alcoholic perfumes
   - Essential oils
   - Coconut oil products
   - Shampoo
   - Body lotion
   - Pot puiries
   - Teas
   - Spices

2. Sales 144,000 $ (fiscal year 1981)
   Most local sales to tourists, 3-4% export, (7,756$)

3. 4 - 6 (1 male)

4. 32,663 $/year

5. Most material is imported and for some items the products are only locally bottled.

a. Raw materials	-	69,950 $/year
of which 5,033 local		
d. Electricity/Telephone	-	16,086 $/year
Rent	-	10,800 $/year
Insurance	-	3,000 $/year
Travel	-	36,000 $/year
Accountancy	-	10,000 $/year
Advertisement/Promotion	-	10,600 $/year
Interest	-	19,000 $/year

6. 217,744 E.C. $ invested
   (170,000 $ debts to bank)
   230,000 $ total debts
   220,000 $ stocks
   40,000 $ fixed assets depreciation
   Shareholders - 71% Grenadians
   - 29% foreigners

7. Capacity - n.a.

3.8.2 SIMPSON THEORORE - MECHANIC (Mufflers)

1. Mufflers, about 60 pieces/month

2. 9 - 10,000 $ per year (prices of mufflers range from $ 85,90 cents to $ 225)

These figures are not very reliable. The owner has a very vague idea about what he is producing and selling. If he produces indeed 60 pieces a month and sells them at the lowest price his sales would be more than 60,000 $/year. Only local sales.

3. 4 males

4. 1,140 $/month
and owner's income.

5. Information not available.

6. Stock and machinery 180,000 $.

7. Capacity utilization about 50%. Due to frequent electricity failures continuous production is not possible.

8. Electricity failures.

Workers often leave the enterprise when they have acquired some skills in working with the machines.

3.5.6 (?) REST BEST MANUFACTURE

Owner/Manager: Mr. Edward Fakhare

1. Mattresses - 3,000/year
   - Cushioning and pillows made from waste material. No information on this output.
   - other things related to foam on demand. Everything sold locally.

2. 300,000 $/year
   Probably considerably higher, since no bookkeeping. Operates mainly with cash.

3. 6 workers (2 women) and manager (started with 17 employees).

4. Salaries are between 200 - 372 $/month - total 22,680 $/year.

5.

a.	Chemicals	-	200,000 $	)
b.	Mattress materials	-	60,000 $	) Imported
c.	Packaging	-	6,000 $	)
d.	Electricity	-	1,800 $	
	Water	-	800 $	
	Telephone	-	1,800 $	
	Insurance	-	7,000 $	
	Travel	-	10,000 $	
	Interest	-	20,000 $	

(very rough estimates since no bookkeeping and operation with cash)

6. Investment - 275,000 $ factory , 450,000 $ machinery
   own financing and overdraft facilities.

7. Machine works 8 minutes per week.

Theoretically he could produce 100 mattresses/day, but there is no interest in production, extension or export.

INDUSTRIAL SURVEY

GRENADA

ISIC	ENTERPRISE	PRODUCTS	ANNUAL OUTPUT FIGURES	ANNUAL SALES EC$	OF WHICH EXPORT
3.1.1.3	Grenada Foods	Ketchup, Juices, Jams, Syrups	113,000 Jars	500,000	-
3.1.1.3	Mary Regis	Jams, Jellies	9,000 lbs	16,000	37.5%
3.1.1.3	True Blue Agro-Ind. *	Jams, Nectars	600,000 jars	1,400,000	70%
3.1.1.4	Fish Processing Plant	Shark, Flying Fish Other Fish	N.A.	N.A.	-
3.1.1.5 (3.1.2.2.)	Tempe Manufacturing	Coconut Oil Laundry Soap) Coconut Meal)	50,000 g 550,000 lbs	1,500,000	-
3.1.1.6 (3.1.2.2)	Caribbean Agro-Ind.	Flour Animal Feed	10,000 cwt 2,500 cwt	7,200,000	20%
3.1.1.7	Blue Danube Bakery	Bread, Cakes	2,300,000 pieces	900,000	-
3.1.1.7	Sunlight Bakery	Bread, Cakes	N.A.	600,000	-
3.1.1.7	Solomon Azar Bakery	Bread, Rolls	312,000 pieces	180,000	-

TABLE I

EMPLOYMENT	SALARIES + WAGES (PROFIT)	INPUTS (EC$) RAW MATERIAL + INTERMED.	OF WHICH IMPORTED
5	16,600	180,000	(160,000)
3	1,500	3,820	(2,160)
36	170,000	120,000	(80,000)
3 **	N.A.	N.A.	
20	80,000 (52,000)	954,000	(400,000)
39	480,000	2,900,000	(2,900,000)
34	128,000	480,000	N.A.
20	40,620 (5,000)	386,500	N.A.
10	23,000	75,000	(13,200)

PACK-AGING IMPORTED	UTILITIES OTHER COSTS	ESTIMATED VALUE ADDED
160,000	58,100	100,000
2,970	760	8,500
520,000	154,000	500,000
N.A.	N.A.	(7,000)
113,000	240,700	132,000
400,000	460,000	1,080,000
120,000	82,000	160,000
28,300	133,260	46,000
6,000	13,000	85,000

INDUSTRIAL SURVEY

GRENADA

ISIC	ENTERPRISE	PRODUCTS	ANNUAL OUTPUT FIGURES	ANNUAL SALES EC$	OF WHICH EXPORT
3.1.1.7	E and T Enterprises	Noodles	36,000 lbs	21,275	-
3.1.1.	Grenada Agro-Ind./ Spice Grinding	Spices	95,000 jars	96,000	60%
3.1.1.8	Grenada Sugar Factory	Rum Sugar Syrup	51,136[3)] 499 bags 179,635 gall.	1,076,463[3)]	-
3.1.2	Coffee Processing Plant	Coffee	15,000 lbs.	130,000	10%
3.1.3	Carib Beer	Beer Malt	288,500 cases	5,495,000	-
3.1.3	Coca Cola Bottling	Soft Drinks			
3.1.4	Caribbean Tobacco	Cigarettes	1,982,500 packs	665,520	-
3.2.2.0	Deco Ind.	Underwear	780,000 pieces	2,400,000	95%
3.2.2	Liberty Garments	Garments	N.A.	1,543,000	77%

TABLE 1

EMP-LOY-MENT	INPUTS (EC$) SAL-ARIES + WAGES (PROFIT)	RAW MATERIAL + INTERMED.	OF WHICH IMPORTED
3	2,250	12,545	(320)
4	14,060	24,000	-
65	420,250 [3)]	403,150 [3)]	-
11	33,600	78,000	(70,000)
105	966,800 (500,000)	1,065,242	(1,065,242)
30			
14	18,861	301,717	(301,717)
100	240,000	625,000	(625,000)
32	135,000	1,300,000	(1,300,000)

PACK-AGING IMPORTED	UTILITIES OTHER COSTS	ESTIMATED VALUE ADDED
6,000	13,000	85,000
310	900	7,200
45,000	4,200	15,000
11,000	3,500	33,600
482,800	755,547	1,712,000
116,112	27,300	72,000
14,000	60,800	400,000
40,000	53,800	180,000

INDUSTRIAL SURVEY

GRENADA

ISIC	ENTERPRISE	PRODUCTS	ANNUAL OUTPUT FIGURES	ANNUAL SALES EC$	OF WHICH EXPORT
3.2.2	Alston Johnson's Sports-wear	Sportswear	N.A.	403,000	83%
3.2.2	Blinns Gar-ment Factory	Overalls School Uniforms	N.A.	56,000	-
3.2.2	Habib Hadeed	Jeans, Shirts	137,000 pieces	3,000,000	90%
3.3.1	Creative Designs	Wooden Doors	1,360 units	172,500	35%
3.3.1	Gren Craft	Handi-craft Items	8,700[4)]	294,317[4)]	2%
3.3.2	Septimus Simon	Living-room Suits	53 units	54,600	-
3.3.2	Wilfred Bailey	Living-room Suits	186 units	60,000	-
3.3.2	Antione Woodwork	Living-room Suits	N.A.	208,000	-
3.5.2	Spice Island Perfumes	Perfumes, Oils, Spices	N.A.	144,000	5%
3.5.5	Grenada Tyre Service	Remoulded Tyres	3,000	79,000	-

TABLE I

EMP-LOY-MENT	SAL-ARIES + WAGES (PROFIT)	INPUTS (EC$) RAW MATERIAL + INTERMED.	OF WHICH IMPORTED
27	54,000	273,000	(246,000)
6	16,000	21,500	(17,000)
70	280,000	2.658,000	(2,658,000)
4	25,000	113,250	(45,000)
12	54,400	6,746	-
4	17,880	20,500	(10,000)
7	13,000	16,650	(9,000)
13	46,000	74,000	(44,000)
5	32,600	69,950	(64,917)
9	40,000	25,500	(24,000)

PACK-AGING IMPORTED	UTILITIES OTHER COSTS	ESTIMATED VALUE ADDED
20,000	10,000	80,000
1,120	4,000	29,000
20,000	77,800	350,000
-	3,120	56,000[5)]
-	20,400	54,000
-	1,200	33,000 [5)]
-	1,000	42,000 [5)]
-	2,400	130,000 [5)]
N.A.	105,500	32,000
N.A.	3,500	50,000[5)]

TABLE I

INDUSTRIAL SURVEY

GRENADA

ISIC	ENTERPRISE	PRODUCTS	ANNUAL OUTPUT FIGURES	ANNUAL SALES EC$	OF WHICH EXPORT	EMPLOYMENT	SALARIES + WAGES (PROFIT)	INPUTS (EC$) RAW MATERIAL + INTERMED.	INPUTS (EC$) OF WHICH IMPORTED
3.5.6	Neitha Williams	Hand bags and belts	N.A.	47,000	-	6	10,000	20,200	-
3.5.6	Rest Best Manufacture	Foam Mattresses	3,000	300,000		7	22,680	260,000	(260,000)
3.6.9.9	Thunder Bolt Construction	Cement Blocks	115,200	93,000	-	11	48,000	29,200	(5,000)
3.6.9.9	George Williamson and Associates	Cement Blocks	600,000	571,000	-	31	113,600	167,000	(116,000)
3.8.2	Simpson Theodore	Mufflers	720	N.A.	-	4	13,700	N.A.	N.A.

NOTES TO THE TABLE

* Estimated figures with the assumption that plant will operate at 50% capacity utilization

** Plus temporary workers

3) For production January - June 1982, 102 workers employed during crop

4) Figures for September 1981 to August 1982

5) Estimates of the national value added are too high. It appears that the data provided by the Grenada Development Bank show too low figures for utilities (in comparison to data from interviews).

N.A. = Figures not available.

PACK-AGING IMPORTED	UTILITIES OTHER COSTS	ESTIMATED VALUE ADDED
310	900	25,000 5)
6,000	41,400	150,000
-	2,000	60,000 5)
-	21,000	400,000 5)
--	N.A.	20,000

TABLE II

INVESTMENT, CAPACITY UTILIZATION AND IMPORT DEPENDENCY

ICIS	ENTERPRISE	INVESTMENT VALUE (EC$)	CAPACITY UTILIZATION IN %	IMPORT DEPENDENCY *
3.1.1.3	Grenada Foods	500,000	25%	64%
3.1.1.3	Mary Regis	5,000	n.a.	32%
3.1.1.3	True Blue	570,000	50%	43%
3.1.1.4	Fish Processing Plant	n.a.	n.a.	n.a.
3.1.1.5	Tempe Manufacturing	863,000	18%	34%
3.1.1.6	Caribbean Agro-Ind.	7,500,000	65%	45%
3.1.1.7	Sunlight Bakery	321,000	70%	20%
3.1.1.7	Solomon Azar	200,000	95%	11%
3.1.1.7	E + T Enterprises	36,000	32%	3%
3.1.1.	Grenada Agro-Ind./Spice	167,000	65%	47%
3.1.1.8	Grenada Sugar Factory	n.a.	80%	n.a.
3.1.2.	Coffee Processing Plant	156,000	30%	62%
3.1.3.	Carib Beer	7,000,000	80%	28%
3.1.3.	Coca Cola Bottling	n.a.	80%	n.a.
3.1.4.	Caribbean Tobacco	750,000	80%	63%
3.2.20	Deco Industries	1,100,000	95%	27%
3.2.2.	Liberty Garments	950,000	95%	87%

TABLE II continued

INVESTMENT, CAPACITY UTILIZATION AND IMPORT DEPENDENCY

ISIC	ENTERPRISE	INVESTMENT VALUE (EC$)	CAPACITY UTILIZATION IN %	IMPORT DEPENDENCY*
3.2.2	Alston Johnson	400,000	n.a.	66%
3.2.2.	Blinn's Garment	136,000	n.a.	33%
3.2.2.	Habib Hadeed	1,463,000	95%	89%
3.3.1.	Grenecraft	50,000	n.a.	-
3.3.1.	Creative Designs	60,000	60%	26%
3.3.2.	Septimus Simon	24,400	70%	18%
3.3.2.	Wilfred Bailey	25,000	32%	15%
3.3.2.	Antoine Woodwork	289,000	n.a.	21%
3.5.2.	Spice Island Perfume	218,000	n.a.	44%
3.5.5.	Grenada Typre Service	132,000	44%	30%
3.5.6.	Neitha Williams	29,000	n.a.	n.a.
3.5.6.	Rest Best Manufacture	725,000	5%	88%
3.6.9.9	George Williamson	207,000	60%	20%
3.8.2.	Simpson Theordore	180,000	50%	n.a.

*) Inputs that are imported directly as percent of total sales

AVERAGE INVESTMENT,

ISIC GROUP	SAMPLE SIZE	AVERAGE INVESTMENT VALUE (EC$)
3.1.1	12	1,061,000
3.1.2	1	156,000
3.1.3	2	7,000,000
3.1.4	1	750,000
3.2.2	5	810,000
3.3.1	2	55,000
3.3.2	3	113,000
3.5.2	1	218,000

TABLE III

CAPACITY UTILIZATION AND VALUE ADDED PER EMPLOYEE

AVERAGE CAPACITY UTILIZATION	AVERAGE ESTIMATED VALUE ADDED/EMPLOYEE
60%	$ 8,900
30%	$ 3,100
80%	$ 16,300
80%	$ [illegible],100
95%	$ 4,500
60%	$ 9,250
51%	$ 8,100
n.a.	$ 6,400

ATTACHMENT 2

MANUFACTURING BUSINESSES

NAME OF BUSINESS	LOCATION	NATURE OF BUSINESS	POSTAL ADDRESS
J. Joseph	Soubise	Shipbuilding	Soubise, St. Andrews
Zephrine McLaren	Windward	Shipbuilding	Windward, Cariacou
Alwyn Eno	Windward	Boatbuilding	Windward, Cariacou
Claudius St. Jacques	Petit Martinique	Boatbuilding	Carriacou
Levan Clements	Petit Martinique	Boatbuilding	Carriacou
Roy de Lisle	Petit Martinique	Boatbuilding	Carriacou
T.M. Phillip	Belmont	Dress Design, Items of Clothing	Belmont, St. George's
Simpson Theordore	Tempe	Mechanic	Tempe, St. George's
Thaddeus Baptiste	Victoria	Blockmaking	Victoria, St. Marks
Ethellen Harry	Sauteurs	Handicraft	Sauteurs, St. Patricks
Neckles, Trevor + Ernest	Woolwich Rd.	Noodles Manufacture	
Mr. Alston Johnson	Richmond Hill	Garment/Sportswear	Richmond Hill, St. George's
Baldwin de Roche	Petit Martinique	Boatbuilding	Carriacou
Opius Caezer	Petit Martinique	Boatbuilding	Carriacou
Ambrose Mitchell	Petit Martinique	Boatbuilding	Carriacou
Moses St. Jacques	Petit Martinique	Boatbuilding	Carriacou
James Bethel	Windward	Boatbuilding	Windward, Carriacou
Habib Hadeed	True Blue	Garment Manufacture, Mattress + Toilet Prod.	True Blue, St. George's
Jeffery Aban + Associates		Manufacturing of Detergents	P.O. Box 153

NAMES OF BUSINESS	LOCATION
Norris Hestick	Tyrrel Street
Herreras Furniture	L'ance aux Epines
John D. Saville	Belmont
Easton Edwards	Low. Depradine Street
Sunset Furniture Centre	Low. Depradine Street
Carliste Patrick	Victoria
Thunderbolt Concrete Blockmaking	Queen St.
Terry Clarkson	Parade
Anna Charles	La. Mode
East Caribbean Cement Products Ltd.	L'ance aux Epines
G/DA Manufacturing Co.	9 Granby Street
B + C Holding Ltd.	Archibald Ave.
Regis Skeridge	River Road
Linford Charles	St. John's Street
Phillip Fakhre	
Grenada Foods	Tempe
Acme Agencies	St. George's
George H. James	Sendall Street
Agro-Industry Plant	True Blue
Fish Processing Plant	True Blue
Tempe Manufacturing Co.Ltd.	Tempe

NATURE OF BUSINESS	POSTAL ADDRESS
Furniture making	Tyrrel St.St. Georges
" "	P.O. Box 367
" "	P.O. Box 418, St. George
Manu. + Sales Furniture	Lowerdep. St. Gouyave
" " "	" " "
Upholstery	St. Marks
Block making	Queen St. Victoria
Cement Block making	St. Pauls St. George
" " "	St. Patrick
Manu. of Cement Products	P.O. Box 187
Manu. of Straw Goods + Novelties	9, Granby Street
Manufacture of Arts + Crafts	P.O. Box 125
Cabinet Makers	River Road
" "	St. John's
Production of Matresses + Divan Sets	P.O. Box 109
Food Products	Tempe, St. George's
Remanufacturing of Tyres	P.O. Box 423
Manufacturer of Lime (white)	Sendall St. Grenville
Canning of juices + fruits	True Blue, St. George's
Fish Preservation	" " " "
Manufacturer of cooking oil etc.	Tempe. St. George's

NAME OF BUSINESS	LOCATION
Sunkiss Products Ltd.	St. George's
G/DA Sugar Factory Ltd.	Woodlands
Solomon Azar	Tanteen
Ghetto Style Culture	St. John's Street
Craigston Eastate Lime Factory	Carriacou
Morning Star Bakery	"
Emmanual Cruickshank	Westerhall
Edzel Thomas	Palmiste
Caribbean Agro-Industries Ltd.	Mt. Gay
Samuel Evelyn	Marian
Beslait (Grenada) Ltd.	Brun's Point
Grenada Spice Blenders	" "
A.A. Moses	St. Patricks
Coffee Processing Plant	Telescope
Westerhall Estate Ltd.	Westerhall
Sweety Beverages	Snug Corner
Grenada Breweries Ltd.	Grand Anse
Federal Investments	Mt. Guy
Coca Cola Bottling Works	Tempe, Kaunda Square
Grenada Beverages Ltd.	Tempe
Caribbean Tobacco Co.Ltd.	Carenage

NATURE OF BUSINESS	POSTAL ADDRESS
Manufactures of jams and jellies, juices	c/o Pannell Fitzpatrick + Co., P.O. Box 98
Sugar Manufactured + Rum dist'd	P.O. Box 50, St. George's
Bread making	Tanteen, St. George's
Crafts making	St. John's Street, St. John's
Lime Processing	Craigston Estate, Carriacou
Bakery	Main St., Carriacou
Sugar Manufacturer/Rum	Westerhall St. David's
Bakery	Palmist, St. John's
Flour Mill/Feed	P.O. Box 46, St. George's
Sugar Milling	Marian , St. George's
Dairy Plant	P.O. Box 204, St. George's
Spice Blending	Box 281, St. George's
Manufactures of Essences	St. Patrick's
Coffee Preparation	Telescope St. Andrew's
Distillery	P.O. Box 221, St. George's
Bottling of soft drinks	Snug Corner St. George's
Brewery	Grand Anse St. George's
Bottling works	Mt. Gay, St. George's
e " "	Tempe St. George's
Manufacturing of soft drinks	P.O. Box 252, St.George's
Manufacturing of cigarettes	P.O. Box 184, St. George's

NAME OF BUSINESS	LOCATION
Francis Brothers Ltd.	12, Lucas Street
Liberty Garment Ltd.	River Road
Hadeed Garment Factory Ltd.	True Blue
Teco Industries	Mt. Gay/Tempe Junction
Sherman Byam	Happy Hill
Antoine Woodwork Manuf.Co.Ltd.	Mt. Parnassus
Aban's Mattress Manufacture	Tempe
Rest Best Manufacture Co.	True Blue
Felix Justin	Calvigny Road
Goodwin Williams	" "
Mt. Guy	The Limes
David Moses	Grand Roy
Bryce Woodroffe	Grand Anse
Summit Products Ltd.	St. Paul's
Grenada Knitted Fabrics	True Blue
Carib Industries Ltd.	St. George's

NATURE OF BUSINESS	POSTAL ADDRESS
Cement Manufacture	12, Lucas Stree, St. George's
Manufacturing of Garments	P.O. Box 184, " "
" "	P.O. Box 320. " "
" "	P.O. Box 170. " "
Craft manufacturing	Happy Hill " "
Woodwork	Tempe P.O. " "
Mattress Manufacture	Tempe, St. George's
" (Foam) "	P.O. Box 109, St. George's
Furniture making	Calivigny Road, St. George's
" "	" " " "
Wood " "	Grand Anse. St. George's
Woodscraft	Grand Roy, St. John's
Conemaking Machine, Flour Bicarbonate of Soda	Grand Anse, St. George's
Manufacturer of Sweets, Jams, Toffees, Beverages	St. Pauls, St. George's
All Kinds of Knitted Fabrics	True Blue St. George's
Manufacturing Candles, Plastic and Paper Products	P.O. Box 44

Annexe 4.4: Data on the Economy of Grenada

Table of content:

1. Area and land use
2. Climate
3. Population
4. Natural resources and production:
   a) Nutmeg
   b) Cocoa
   c) Bananas
   d) Sugar
   e) Summary tree crop production
   f) Agricultural production
   g) Livestock
   h) Fish
   i) Mineral resources
   j) Industrial production
5. Energy consumption
6. Foreign trade:
   a) Balance of trade
   b) Exports
   c) Imports
7. Balance of payments and exchange rate:
   a) Balance of payments
   b) Foreign exchange transactions
   c) Some exchange rates
8. Government revenue and expenditure:
   a) Revenue
   b) Expenditure
9. Employment by economic activities
10. Gross domestic product
11. Grenada and the ECCM-Countries

1. Area and land use: The country comprises mainly three islands: Grenada, Carriacou and Petit Martinique. The total area is 345 sq. km. The use of land could be improved and extended considerably.

Land Area:

	Acres
Grenada	75,370
Carriacou	8,550
Petit Martinique	500
	84,420

Land Use:

		1961	1975
Land under tree crops		28,091	23,153
Arable land	a) Temporary crops	13,101	6,994
	b) Temporary pasture		2,540
	c) Temporary fallow		1,398
	d) other arable		1,833
Grassland	a) cultivated	705	391
	b) uncultivated	5,939	1,703
Forest/Woodland		9,504	7,635
Other/Agricultural land		2,857	930
All other land		24,223	37,863
		84,420	84,420

LAND USE BY PARISH - 1961

ACRES

	St.Marks	St.Patricks	St.Johns	St.Andrews	St.George's	St.Davids	Carriacou	TOTAL
Tree Crops	2,386	6,997	3,235	8,919	2,659	3,256	639	28,091
Arable land	896	2,720	871	3,199	3,015	1,807	593	13,101
Grassland i) cultivated	54	37	32	225	199	131	32	705
ii) uncultivated	239	581	217	766	3,114	547	475	5,939
Forest/Woodland	1,426	2,422	1,280	1,514	1,935	897	30	9,504
Other Agric. land	131	77	109	1,543	433	558	6	2,857
Total Agric. land	5,132	12,834*	5,744	16,166	11,350	7,196	1,775	60,197
Total land Area	5,805	10,515*	9,594	22,201	16,742	11,795	8,467	85,120 1)

Notes: 1) Discrepancy with Table 1 - Source: Grenada Handbook 1946

* This discrepancy irreconcilable.

Source: West Indian Census of Agriculture 1961

LAND USE BY PARISH - 1975

ACRES

	St.Marks	St.Patricks	St.Johns	St.Andrews	St.George's	St.Davids	Carriacou	TOTAL
Tree Crops	2,168	4,322	3,382	8,303	1,751	2,732	495	23,153
Arable, and under:								
i) temporary crops	142	1,117	331	1,307	1,949	915	1,233	6,994
ii) temporary pasture	206	176	159	308	548	57	1,086	2,540
iii) temporary fallow	200	140	137	117	109	146	549	1,398
iv) other arable	255	434	230	216	527	110	61	1,833
Grassland i) cultivated	-	59	10	21	168	13	120	391
ii) uncultivated	439	87	4	327	113	233	509	1,703
Forest/Woodland	856	836	1,354	1,005	2,196	863	525	7,635
Other Agric. land	104	146	64	330	83	133	70	930
Total Agric. land	4,370	7,317	5,671	11,934	7,444	5,202	4,648	46,577
Total Land Area	5,805	10,515	9,594	22,201	16,742	11,795	8,467	85,120[1)]

Notes: 1) Discrepancy with Table 1 - Source: Grenada Handbook 1946

Source: Agricultural Census 1975 (unpublished).

2. The Climate:

The temperature varies between 16.1°C (January 1979) and 32.2°C (October 1979) and may be considered as pleasant.

TEMPERATURE

(Pearl Airport)

°F

Month	AVERAGE (1976-1978)				1979			
	Mean Maximum	Mean Minimum	Extreme Maximum	Extreme Minimum	Mean Maximum	Mean Minimum	Extreme Maximum	Extreme Minimum
January	83.1	73.7	84.3	68.7	83.7	67.6	87.7	61.0
February	83.4	73.9	84.7	68.0	84.4	72.3	85.2	66.0
March	84.0	75.5	85.3	70.3	84.8	71.4	87.6	65.9
April	85.0	75.1	86.3	69.0	85.1	73.9	87.5	68.9
May	86.0	77.7	88.0	73.7	87.4	75.2	88.0	71.0
June	85.3	76.8	87.0	73.3	86.2	76.6	87.0	69.0
July	85.3	76.7	87.0	73.3	85.7	74.4	87.0	71.0
August[1)]	86.2	76.2	87.5	72.5	86.0	..	88.0	..
September	86.7	76.7	87.7	73.3	86.0	..	88.3	..
October[2)]	87.1	74.1	88.0	70.5	88.0	..	90.0	..
November	85.2	74.0	88.0	71.3	86.0	..	89.0	..
December[2)]	84.1	73.2	86.0	68.0	85.0	76.6	87.0	71.0

Notes: 1) 1977, 1978

2) 1976, 1978

Source: Caribbean Meteorological Institute and Pearls Airport.

Sunshine varies between 707.7 hours per month (December 1975) and 237.7 hours per month (January 1977).

SUNSHINE

Month	MIRABEAU AGRICULTURAL STATION *					
	1975	1976	1977	1978	1979	Average 1975-1979
January	194.5	172.9	231.7	170.1	202.2	194.3
February	217.5	198.2	188.5	200.4	180.6	197.0
March	200.0	123.6	174.6	190.1	176.8	173.0
April	188.7	176.6	180.4	172.2	176.9	179.0
May	151.3	140.3	174.1	204.2	175.7	169.1
June	126.6	117.1	130.9	141.3	122.4	127.7
July	207.7	155.6	126.8	137.7	160.3	157.6
August	182.5	218.5	168.3	176.7	171.0	183.4
September	195.8	198.0	163.4	216.8	170.0	188.8
October	181.3	223.3	179.7	198.8	187.0	194.0
November	153.8	206.1	115.5	174.9	115.4	153.1
December	107.7	157.2	150.2	152.5	138.2	141.2
TOTAL	2107.4	2087.4	1984.1	2169.8	1976.5	2065.0
Monthly Average	175.6	173.9	165.3	180.8	164.7	172.1

Notes: * 12°07' 70'' N/61° 39' 15'' W

Source: Ministry of Agriculture

Rainfall may vary considerably from region to region (L'ance Aux Epines 1357 mm, St. George's 7792 mm, Mt. Horne 2762 mm, Maran (Gouyave) 2566 mm, average 7976 - 7980 per year) and from month to month (73 mm in February 1978 and 427 mm in November 1979). The rainy season is July to November, but there are anomalies.

RAINFALL

(Pearls Airport)

Inches

Month	AVERAGE (1976-1978)	1978	1979
January	2.10	2.73	1.81
February	3.08	0.57	1.19
March	3.51	1.30	2.09
April	4.79	1.97	3.43
May	2.26	1.02	1.89
June	12.72	6.21	9.84
July	9.61	12.88	13.57
August [1)]	10.43	12.69	9.49
September	5.54	3.99	4.81
October [2)]	6.41	5.68	4.98
November	7.18	4.23	16.16
December [2)]	5.54	2.86	15.33
ANNUAL	73.17	56.13	84.59

Notes: 1) 1977, 1978
2) 1976, 1978

Source: Caribbean Meteorological Institute and Pearls Airport

There may be heavy rains with about 100 mm of rainfall within 24 hours.

RAINFALL INTENSITY*

(Pearls Airport)

Year	MAXIMUM RAINFALL IN 24 HOURS		NO. OF DAYS WITH MORE THAN 0.04 INCHES		
	Inches	Month	No. of Rainy Days	Most Rainy Days in a Month	
				Nº. of Days	Month
1978	2.84	July	163	26	July
1979	3.74	June	205	25	July

Notes: * No complete data for years before 1978

Source: Caribbean Meteorological Institute and Pearls Airport

RAINFALL - SELECTED STATIONS

Inches

Selected Stations	1975	1976	1977	1978	1979
St.George's (Botanical Gdns.)St.G.	+	73.04	63.07	58.23	78.73
Grand Roy, St. J.	..	..	..	..	94.60
Dougaldston Estate, St.J.	..	113.79	114.38	90.42	+
Maran Cocoa Station, St. J.	97.45	93.09	93.09	87.04	122.13
Sausatan Estate, St.P.	..	..	..	..	+
Upper Marli Estate.,St.P.	..	..	..	..	+
Boulogne Cocoa Station,St. A.	84.88	72.64	86.36	81.11	128.21
Mt.Horne Cocoa Station,St.A.	78.51	81.66	72.28	77.42	110.57
Mirabeau Estate, St. A.	..	..	..	..	121.45
Ashendon Cocoa Station, St.D.	105.44	101.64	83.02	67.94	+
La Sagesse Estate, St. D.	..	..	..	..	180.27
The Park Estate, Carriacou	..	..	..	..	+
Belair Park, Carriacou	44.09	45.38	34.43	+	+
L'anse aux Epines, St. G.	52.75	51.67	55.39	40.82	64.94

Notes: + incomplete data

Source: Ministry of Agriculture; L'anse aux Epines - private records.

The relative humidity varies between 67 and 86%.

RELATIVE HUMIDITY

%

Month	0800 hrs. L.S.T.		1400 hrs. L.S.T.	
	Average 1976 - 1978	1979	Average 1976-1978	1979
January	81.0	82	74.0[3)]	75
February	82.7	76	77.3	67
March	82.7	82	77.0	74
April	81.3	77	75.3	75
May	81.0	80	76.0	70
June	83.0	82	79.3	75
July	82.7	83	79.3	81
August[1)]	82.0	86	77.0	79
September	80.3	80	76.9	77

RELATIVE HUMIDITY (continued)

Month	0800 hrs. L.S.T.		1400 hrs. L.S.T.	
	Average 1976-1978	1979	Average 1976-1978	1979
October[2)]	81.5	81	75.5	77
November	81.3	86	78.3	81
December[2)]	80.5	80	76.0	81

Notes: 1) 1977, 1978
2) 1976, 1978
3) 1976, 1977

Source: Caribbean Meteorological Institute and Pearls Airport.

3. The Population

The total population amounts to 109,200 as per December 1980. This corresponds with a density of 316,5 persons per square km.

POPULATION AT CENSUS YEARS

Census Year	Male	Female	Total
1844	..	..	29,650
1871	18.280	19.404	37.684
1881	20.074	22.329	42.403
1891	25.535	27,674	53,209
1901	29,986	33,452	63,438
1911	30,398	36.352	66,750
1921	28,847	37,455	66,302
1946	31,834	40,553	72,387
1960	40,660	48,017	88,677
1970	43,692	49,083	92,775

Source: West Indian Census 1946 Vol. 1 Pts. A and B.
East Caribbean Population Census 1960.

POPULATION ESTIMATES

Year	MID-YEAR ESTIMATES			END-YEAR ESTIMATES		
	M	F	Total	M	F	Total
1970	44,309	50,092	94,401	44,556	51,986	96,542
1971	45,663	53,080	98,743	47,559	54,874	102,433
1972	48,240	55,751	103,991	49,855	57,239	107,094
1973	49,598	57,366	106,964	50,765	55,454	106,219
1974	49,766	54,411	104,177	50,629	55,402	106,031
1975	50,363	55,049	105,412	51,473	56,306	107,779
1976	50,789	55,975	106,764	51,609	56,985	108,594
1977	51,575	56,549	108,124	52,813	56,886	109,669
1978	52,366	56,152	108,518	53,554	56,840	110,394
1979	53,168	55,739	108,907	53,841	56,296	110,137

The population is spread over the whole area.

POPULATION AT CENSUS 1960 AND 1970

BY SEX AND PARISH

Parishes	M	F	Total	M	F	Total
St. George's Town	3345	3958	7303	2910	3403	6313
St. George	9231	10309	19540	11238	12319	23547
St. Johns	3635	4303	7938	4087	4523	8610
St. Marks	1763	2151	3914	1831	2111	3942
St. Patricks	5087	6273	11360	5245	6011	11256
St. Andrews	10319	12015	22334	10653	11883	22536
St. Davids	4358	4972	9330	5193	5425	10618
Carriacou	2922	4036	6958	2545	3405	5950
Not stated	-	-	-	-	3	3
	40660	48017	88677	43692	49083	92775

Source: East Caribbean Population Census 1960.
1970 Population Census of the Commonwealth Caribbean.

The population structure shows two remarkable changes:

a) The base is smaller than the population of 5 to 9 years of age;
b) At the age of 25 there is a crack. (See Figure). The shape of the pyramid may be explained. The number of Grenadians living outside the country (UK, USA, Canada or other countries) is estimated to be very high. But no official data is available.

POPULATION AT CENSUS YEAR

Census Year	1946			1960			1970		
Age Group	M	F	Total	M	F	Total	M	F	Total
Under 5	4,691	4,971	9,662	8,726	8,869	17,595	6,241	6,187	12,401
5-9	5,501	5,189	10,690	6,970	6,972	13,942	8,212	7,932	16,144
10-14	5,115	5,056	10,171	5,350	5,381	10,731	7,508	7,668	15,176
15-19	3,750	4,284	8,034	3,738	4,056	7,794	5,131	5,287	10,418
20-24	2,210	3,330	5,540	2,750	3,507	6,257	3,212	3,543	6,755
25-29	1,509	2,595	4,104	2,052	2,978	5,030	1,903	2,299	4,202
30-34	1,367	2,279	3,646	1,871	2,389	4,260	1,579	1,978	3,557
35-39	1,485	2,306	3,791	1,545	2,216	3,761	1,500	2,100	3,600
40-44	1,224	2,056	3,280	1,421	1,949	3,370	1,614	2,002	3,616
45-49	1,179	1,871	3,050	1,467	1,897	3,364	1,362	1,830	3,192
50-54	878	1,517	2,395	1,440	1,905	3,345	1,277	1,668	2,945
55-59	776	1,344	2,120	989	1,406	2,395	1,142	1,496	2,638
60-64	699	1,200	1,899	814	1,411	2,225	1,145	1,553	2,698
65-69	528	863	1,391	563	968	1,531	775	1,220	1,995
70-74	410	664	1,074	419	867	1,286	481	884	1,365
75-79	247	470	717	246	562	808	327	583	910
80-84	145	307	452	184	371	555	184	424	608
85 and over	90	235	325	115	313	428	126	429	555
N.S.	30	16	46	-	-	-	-	-	-
	31,834	40,553	72,387	40,660	48017	88677	43692	49083	92,775

Source: West Indian Census 1946

East Caribbean Population Census 1960

1970 Population Census of the Commonwealth Caribbean

Births by age of mother are highest between 17 and 23 years of age.

BIRTHS BY AGE OF MOTHER

AGE	1976	1977	1978	1979
15 and under	43	39	48	57
16	88	92	97	93
17	174	174	150	173
18	255	193	175	186
19	230	232	218	249
20	192	215	237	231
21	199	184	178	195
22	156	182	146	173
23	153	166	141	183
24	153	133	145	147
25	125	96	107	127
26	98	111	106	110
27	96	101	105	94
28	89	97	101	99
29	88	84	75	74
30	88	80	82	75
31	42	55	55	45
32	67	62	54	66
33	47	44	38	49
34	37	36	43	39
35	41	21	25	31
36	46	34	27	25
37	32	29	31	22
38	37	29	20	21
39	20	26	21	20
40	21	22	21	13
41	10	5	9	5
42	10	12	10	13
43	-	7	6	1
44	5	5	1	5
45 and over	12	7	3	7
not stated	58	45	47	36
Total	2712	2628	2521	2664

Source: Deputy Registrar General

The following table shows that both the infrant mortality rate and the birth rate have been decreasing for the last 20 years. Emigration is slightly increasing.

ELEMENTS OF POPULATION GROWTH, 1960-79

Year	Infant Mortality Rate per 1,000	Birth Rate per 1,000	Death Rate per 1,000	Rate of Natural Increase per 1,000	Net Migration ('000)
1960	77.9	44.5	11.4	33.1	-2.0
1961	72.1	41.1	11.4	29.7	-2.3
1962	52.4	37.7	9.3	28.4	-1.7
1963	54.3	36.8	8.8	28.0	-0.3
1964	51.0	35.4	8.5	26.9	-0.7
1965	42.5	30.7	8.5	22.2	-0.7
1966	43.6	28.6	8.6	20.0	0.2
1967	44.4	27.9	7.8	20.1	0.1
1968	34.1	29.2	8.0	21.2	-0.2
1969	39.9	26.4	7.4	19.0	-1.6
1970	32.8	29.0	7.9	21.1	-2.0
1971	26.1	28.9	7.4	21.5	3.8
1972	16.0	28.2	6.4	21.8	2.4
1973	18.4	27.4	6.8	20.6	-3.1
1974	31.1	26.2	7.0	19.2	-2.2
1975	23.5	27.4	5.9	21.5	-0.5
1976	27.6	25.4	6.3	19.1	-1.1
1977	16.7	24.3	7.4	16.9	-0.7
1978	29.0	23.2	7.0	16.2	-1.1
1979	15.4	24.5	6.8	17.9	-1.6

Source: 1960-73 World Bank report (ex Registrar General)
1973-79 Registrar General

It may be of interest to note the high percentage of illegitimate births shown in the table below.

MARRIAGES, DIVORCES AND ILLEGITIMATE BIRTHS

Year	No. of MARRIAGES	No. of DIVORCES	ILLEGITIMATE (1) BIRTHS (%)
1972	294	..	72.92
1973	306	..	74.94
1974	331	14	75.13
1975	293	41	76.54
1976	318	25	69.06
1977	331	27	77.09
1978	360	43	77.43
1979	330	21	77.48

Source: Reports of Registrar General

Notes: 1) Percentage of all live births

The ethnic origin of the population is mainly black, more than 10% are mixed.

ETHNIC ORIGIN

Ethnic Origin	Male	Female	Total
Negro/Black	36,902	41,324	78,226
East Indian	1,515	1,668	3,183
Chinese	3	7	10
Amer-Indian	18	28	46
Portuguese	29	49	78
Syrian/Lebanese	30	26	56
White	331	337	668
Mixed	4,792	5,540	10,332
Others	18	22	40
Not stated	54	79	133
Total	43,692	49,080	92,772

The population is mainly Roman Catholoic (65%) or Anglican (20%).

RELIGION

Religion	Male	Female	Total
Anglican	9,647	10,570	20,217
Baptist(orth)	249	340	589
Brethren	193	229	422
Church of God	288	331	619
Methodist	1,576	1,707	3,283
Moravian	8	8	16
Pentecostal	700	870	1,570
Presbyterian/Congregational	675	690	1.365
Roman Catholic	27,957	31,412	59,369
Seventh Day Adventists	1,407	1,818	3,225
Not stated	992	1,105	2,097
Total	43,692	49,080	92,772

Source: Population Census 1970

4. Natural Resources and Production:

a) Nutmeg and mace: The deliveries of nutmeg and mace fluctuate considerably over the years.

DELIVERIES OF NUTMEG AND MACE (LBS)

(Year to 30th June)

Year	NUTMEGS				MACE			
	Green	Dry	Shelled Grinder	Equivalent Shelled 1)	Nº.1	Nº.2	Pickings	Equivalent Cured 2)
1955	7,050,338	2,512,182	118,328	5,087,642	487,778	262,212	-	704,979
1961	1,756,656	476,335	10,132	1,205,575	159,248	47,590	-	194,429
1962	2,178,712	604,556	13,031	1,504,961	174,484	64,897	-	225,018
1963	2,261,027	604,016	13,600	1,546,316	173,760	68,495	-	227,720
1964	2,439,849	639,681	21,839	1,667,555	181,099	87,496	-	252,479
1965	2,826,262	568,221	25,134	1,816,347	211,620	96,249	-	289,397
1966	3,461,515	758,642	43,260	2,278,846	226,275	129,563	-	334,486
1967	4,016,125	745,238	37,841	2,541,975	264,409	155,022	-	394,264
1968	3,986,262	698,525	44,528	2,502,452	210,210	163,577	-	351,361
1969	4,793,056	870,907	41,838	3,018,134	260,940	74,077	108,757	417,148
1970	5,834,534	882,826	58,495	3,563,142	303,311	125,388	93,221	490,606
1971	6,703,709	1,054,264	61,665	4,115,129	329,707	141,757	116,030	552,277
1972	5,401,672	786,957	58,299	3,282,628	243,345	102,502	93,276	412,777
1973	7,111,257	923,084	75,820	4,245,321	335,864	139,650	127,953	567,259
1974	4,343,934	1,383,889	59,731	3,153,096	230,217	98,604	95,855	399,194
1975	8,921,113	1,174,852	97,887	5,339,720	480,278	171,824	166,167	769,173
1976	6,970,282	823,944	70,949	4,103,968	311,562	130,364	126,861	534,660
1977	11,617,022	1,243,154	83,795	6,719,400	562,947	206,729	212,768	923,497
1978	7,633,316	826,514	78,303	4,454,405	309,271	138,569	156,564	568,139
1979	8,987,064	840,014	76,773	9,903,851	321,886	150,893	192,613	665,392

Source: Nutmeg Association Annual Reports

Year to 31st December

1978	7,976,639	847,878	73,582	4,625,709	300,541	140,548	169,052	576,321
1979	9,311,811	826,759	75,603	5,281,178	321,231	155,025	199,782	635,475

Notes: 1) Green reduced by 50%, Dry reduced by 331 1/3 %, Shelled reduced by 2%

2) Reduced by 6%

Source: Nutmeg Association

Sales are more regular.

SALES OF NUTMEG AND MACE

(By Volume)

(Year to 30th June)

Year	NUTMEG (lbs)				MACE (lbs)		
	Selected	Unassorted	Defectives	Total	Nº.1	Nº.2	Total
1965	308,228	1,414,996	870,200	2,593,424	217,000	104,300	321,300
1966	253,560	2,159,149	690,860	3,103,569	264,576	166,550	431,126
1967	199,110	586,717	372,250	1,158,007	127,333	82,301	209,634
1968	303,084	1,904,918	810,850	3,018,852	224,717	108,720	333,437
1969	391,880	2,095,462	667,854	3,155,196	299,675	101,990	401,665
1970	161,575	2,384,543	682,174	3,228,292	199,818	174,090	373,908
1971	509,560	2,329,691	896,550	3,735,801	274,763	246,240	521,003
1972	474,130	2,634,527	1,239,140	4,347,797	368,720	346,800	715,520
1973	261,680	1,796,072	830,376	2,888,128	343,448	285,949	629,397
1974	137,044	1,926,222	952,100	3,015,366	248,496	204,050	452,546
1975	279,800	1,826,320	538,600	2,644,720	140,920	81,040	221,960
1976	611,440	3,319,829	2,597,450	6,528,719	483,400	280,350	763,750
1977	699,963	3,317,144	1,748,310	5,819,417	383,910	356,880	740,790
1978	565,000	3,800,549	1,779,700	6,145,249	264,460	285,040	549,500
1979	409,367	2,615,092	1,509,040	4,533,499	280,270	296,080	576,350

Source: Nutmeg Association Annual Reports

Sales by value show in spite of some ups and downs a clear trend of steady increase over the period from 1967 to 1979.

SALES OF NUTMEG AND MACE

(By Value - E.C.$)

(Year to 30th June)

Year	NUTMEGS				MACE		
	Selected	Unassorted	Defectives	Total	Nº.1	Nº.2 and Pickings	Total
1965	529,425	1,948,312	762,075	3,239,812	555,096	196,522	751,618
1966	514,966	3,586,619	945,337	5,046,922	743,344	361,050	1,104,394
1967	392,475	1,003,095	365,275	1,760,845	366,145	205,050	571,768
1968	327,431	1,577,844	432,781	2,338,056	456,851	184,860	641,711
1969	395,705	1,551,415	414,269	2,361,389	509,682	132,239	641,921
1970	185,706	2,437,966	575,632	3,199,304	367,620	229,612	597,232
1971	586,194	2,003,735	672,086	3,262,015	469,148	251,613	720,761
1972	531,408	2,008,718	807,933	3,348,059	562,704	279,910	842,614
1973	330,954	1,784,101	670,790	2,785,845	692,844	325,306	1,018,150
1974	319,067	3,599,646	1,825,185	5,743,898	1,090,545	711,730	1,802,275
1975	773,946	5,079,742	1,147,960	7,001,648	776,985	391,455	1,168,440
1976	1,428,858	6,831,280	4,078,809	12,338,947	1,728,748	702,918	2,431,656
1977	1,885,647	7,957,233	3,228,684	13,071,564	1,317,953	915,243	2,233,196
1978	1,725,430	9,253,192	3,474,322	14,452,944	906,458	769,375	1,675,833
1979	1,215,482	6,835,480	2,740,366	10,791,328	920,013	741,726	1,661,739

Source: Nutmeg Association Annual Reports

Year to 31st December

1978	1,376,457	6,411,342	2,544,554	10,332,353	828,137	826,665	1,654,824
1979	1,347,088	7,071,175	3,566,911	11,985,173	1,523,489	746,537	2,270,026

Source: Nutmeg Association

The following table shows average prices reliased on the world market and not prices paid to growers. Owing to irrational clements it is hard to analyse the relationship between deliveries, sales and the various prices.

PRICES FOR NUTMEG AND MACE

(Year to 30th June)

Year	NUTMEGS			MACE No. 1	
	Sales Value	Average Price per lb	Net Price To Grower per lb	Sales Value	Average Price per lb
1965	3,239,812	1.25	1.32	555,096	2.56
1966	5,046,922	1.62	1.45	743,344	2.81
1967	1,760,846	1.52	0.82	366,144	2.87
1968	2,338,056	0.77	0.52	456,851	2.03
1969	2,361,389	0.75	0.61	509,682	1.70
1970	3,199,304	0.99	0.76	367,620	1.84
1971	3,212,016	0.87	0.56	469,149	1.70
1972	3,348,059	0.77	0.48	562,704	1.52
1973	2,785,845	0.96	0.49	692,844	2.02
1974	5,743,898	1.90	1.18	1,090,545	4.38
1975	7,001,648	2.64	1.06	776,985	5.51
1976	12,338,947	1.88	1.28	1,728,748	3.57
1977	13,071,564	2.24	1.17	1,317,953	3.43
1978	14,452,944	2.35	1.58	906,458	3.42
1979	10,791,328	2.38	2.58	920,013	3.28

Source: Nutmeg Association Annual Reports.

EC $

	MACE Nº. 2		
Net Price To Grower per lb	Sales Value	Average Price per lb	Net Price To Grower per lb
2.20	196,522	1.88	1.24
2.25	361,050	2.16	1.76
1.58	205,623	2.49	1.44
1.40	184,860	1.70	0.94
1.60	132,239	1.29	0.67
1.52	229,612	1.18	0.68
1.36	251,614	1.02	0.66
1.00	279,910	0.76	0.45
1.34	325,306	1.14	0.66
3.12	711,730	3.48	2.54
1.74	391,455	4.88	0.96
2.20	702,918	2.50	1.34
1.82	915,243	2.56	0.94
1.90	769,375	2.70	1.24
1.90	741,726	2.50	1.24

b) Cocoa

Grenada produces a very good quality of cocoa which is mainly used for blending with lower qualities.

COCOA PRODUCTION AND SALES

(year to 30th September)

Year	Production (lbs)	Export (lbs)	Export Value ($)	Average Export Price per lb.	Average Net Realised Price per lb to Grower
1967	6,084,255	5,310,742	2,921,134	0.55	0.38
1968	6,230,042	5,486,703	3,189,796	0.58	0.46
1969	6,737,560	6,978,030	4,580,789	0.66	0.49
1970	6,451,155	6,038,870	4,376,161	0.72	0.51
1971	6,318,555	5,462,292	3,214,518	0.59	0.38
1972	5,536,095	6,603,296	3,816,824	0.58	0.40
1973	5,344,396	5,463,800	3,674,053	0.67	0 44
1974	5,259,672	5,166,654	5,240,254	1.01	0.70
1975	5,316,127	5,283,000	7,193,434	1.36	0.95
1976	5,982,380	5,858,800	8,460,504	1.44	1.05
1977	4,703,430*	4,693,678*	8,837,940*	1.88	1.20*
1978	5,370,207*	5,203,200*	18,039,941*	3.47	1.67
1979	5,788,633	5,382,667	27,318,780	5.07	2.25

Notes: * Amended Figures

Year to 31st December

Year	Cocoa Board Purchases (lbs)			Export Volume (lbs)	Export Values (EC$)
	WET	DRY	Total Dry Equivalent		
1978	3,190,380	4,478,439	5,754,585	5,079,200	19,142,951
1979	4,110,579	3,933,506	5,577,734	5,340,775	26,840,180

The eastern districts, St. Andrew's, St. Patrick's and St. David's are the main cocoa producers.

ESTIMATED COCOA PRODUCTION BY DISTRICT

1976/77	%
St. George's	7.1
St. David's	13.8
St. John's	8.6
St. Mark's	8.0
St. Patrick's	22.1
St. Andrew's	40.4

Source: Grenada Cocoa Board

c) Bananas:

Banana is an important export crop. Again it is difficult to analyse the relationship between deliveries and average prices to growers.

BANANAS - EXPORT VARIETIES

(31st December)

Year	DELIVERIES		EXPORT SHIPMENTS[1)]		Average Price to Grower (cents per lb)	Average Export Price (cents)
	Quantity (lbs) '000	Value (EC$) '000	Quantity (lbs) '000	Value (EC$) '000		
1961	25,943.3	1,255.5	26,440.6	1,498.2	4.84	5.66
1962	22,180.9	1,042.5	27,521.9	1,217.1	4.70	6.48
1963	32,599.7	1,584.4	32,785.4	1,726.2	4.86	5.31
1964	32,643.2	1,671.3	30,877.2	1,845.4	5.12	5.98
1965	47,164.8	2,141.3	46,291.1	2,275.6	4.54	5.12
1966	46,081.5	2,018.4	46,853.8	2,579.0	4.38	5.30
1967	58,566.1	2,633.5	57,371.4	3,535.1	4.36	5.32
1968	59,938.6	3,086.9	59,938.7	3,864.1	5.15	5.98
1969	51,051.5	2,899.6	50,526.4	3,252.5	5.68	5.74
1970	42,066.2	2,204.3	42,176.7	2,504.5	5.24	5.39
1971	31,537.3	1,402.5	31,273.2	1,767.3	4.45	4.95
1972	28,027.8	1,255.3	29,166.5	1,557.8	4.48	5.80
1973	28,232.4	1,618.0	22,742.7	1,966.5	5.73	11.10
1974	20,768.3	1,115.0	19,737.0	3,466.6	5.37	15.91
1975	30,993.3	2,629.8	28,944.9	6,525.6	8.48	22.05

d) Sugar:

Sugar industry has been declining for many years and Grenada is now importing sugar.

Year	Area under Sugar Cane (acres)	Sugar Cane production	Sugar Manufacture (tons)
1949			1,669.8
1950			1,687.3
1951			2,778.8
1952			1,928.8
1953			2,107.8
1954			2,527.2
1955			2,470.
1956			1,430.
1957	1,800	27,020	2,221.
1958	1,144	17,902	2,002.
1959	832	12,884	1,311
1960	616	9,651	839
1961	610	9,559	896
1962	590	9,231	924
1963	680	9,483	896
1964	605	9,467	844
1965	960	15,034	1,354
1966	1,089	17,044	1,447
1967	1,209	18,919	1,742
1968	1,100	18,919	1,773
1969	1,044	16,333	1,367
1970	851	13,317	1,001
1971	663	10,370	778
1972	600	9,323	595
1973	300	4,700	-
1974	243	3,800	-
1975	300	8,463	-
1976	800	10,184	8.1
1977	900	13,845	514
1978	1,000	15,726	583
1979	1,000	13,319	524

Source: 1949-54: Annual Report Dept. of Agriculture 1954
1955-56: Annual Report Dept. of Agriculture 1958
1957-72: Programme for Destination of Cane Industry 1975
1973-77: Cane Farmer's Association

e) Tree Crops:

Grenada is producer of many tree crops, but the production is often not developed, because there is no economic utilisation.

TREE CROPS PRODUCTION

('000)

ITEM	UNIT	1961	1965	1971	1975
Nutmeg (equivalent shelled)	lbs	1205.6	1816.3	4115.1	5339.7
Mace (equivalent cured)	lbs	194.4	289.4	552.3	769.2
Cocoa	lbs	..	..	6318.5	3316.1
Bananas - export	lbs	25943.3	47164.8	31531.3	30993.3
Avocado	lbs	661.7	..	700.0	740.5
Bananas - no export	stems	554.3	507.4	400.0	130.6
Breadfruit	No.	2829.7	..	2000.0	1841.4
Cinnamon	lbs	..	..	10.7	..
Cloves	lbs	..	..	16.0	..
Coconuts	No.	4626.4	7573.5	8000.0	2140.1
Coffee	lbs	20.1	..	10.0	..
Golden apples	lbs	..	..	200.0	..
Grapefruit	lbs	185.0	184.0	197.5	..
Guavas	lbs	..	..	90.0	..
Kola nuts	lbs	..	..	4.7	..
Limes	lbs	1.4	0.8	0.7	..
Mammie apples	lbs	..	..	4.2	..
Mangoes	lbs	125.3	..	200.0	189.8 (grafted)
Oranges	lbs	224.1	219.9	500.0	..
Paw paw	lbs	..	..	7.0	..
Pimento	lbs	..	..	13.9	..
Plantains	stems	18.2	113.1	100.0	24.5

Source: Nutmeg, Mace, Cocoa, Bananas (export) - Co-operative Boards
1961 - W. Indian Census of Agriculture
1965 - "Agricultural Statistics - current estimates" BDD
1971 - Ministry of Agriculture estimates
1975 - Census of Agriculture 1975 - records destroyed by fire.

f) Agricultural Production:

Grenada produces many kinds of vegetables, spices and fruits of very good quality.

ESTIMATED AGRICULTURAL PRODUCTION*,
VEGETABLES, PERFUMES, ETC.
(excluding Nutmeg, Mace, Cocoa and Sugar)

'000 lbs

ITEMS	1973	1974	1975	1976	1977	1978	1979
Avocado	4500.0	3759.9	3020.9	2000.0	2180.0	2734.6	2725.0
Beans, peas + pulses	120.0	135.0	155.0	165.0	184.0	35.2	..
Beet	..	..	..	..	..	28.2	..
Breadfruit	3350.0	3480.0	3000.0	3350.0	3400.0	3434.0	3605.7
Bluggoes	4265.0	4120.0	4000.0	3995.2	3175.0	..	2952.7
Cabbage	60.0	67.0	70.0	85.0	123.0	126.3	88.0
Callaloo	..	..	..	..	..	1128.5	80.0
Carrot	36.0	39.0	48.0	92.0	96.0	92.4	77.0
Corn	848.0	940.0	968.0	1084.5	1260.0	1461.0	1212.0
Eddoes/Dasheen	375.0	345.0	315.0	360.0	382.0	366.7	363.0
Onions	3.0	5.4	12.0	13.5	16.0	..	0.9
Peanuts	7.8	6.0	5.5	4.9	6.8	10.3	..
Pigeon peas	1485.0	1500.0	1545.0	1620.0	1750.0	1890.0	173.8
Plantain	520.0	528.0	535.0	562.0	568.0	1311.3	406.2
Pumpkin	840.0	820.0	850.0	820.0	750.0	735.0	64.8
String beans	..	..	..	..	..	162.4	74.4
Sweet potatoes	670.0	686.0	700.0	750.0	893.0	862.2	818.4
Tannias	495.0	450.0	501.0	565.0	602.0	617.0	598.4
Tomatoes	116.0	122.5	120.0	148.0	167.8	123.2	92.4
Yams	940.0	1000.0	1005.0	1025.0	1127.5	1093.7	1115.4
Other vegetables[1)]	1420.0	1455.0	1488.6	1510.0	1580.0	..	434.8
Cinnamon	16.5	27.6	16.9	33.8	36.0	..	..
Clove	18.4	57.3	8.3	28.7	28.0	..	..
Other spices[2)]	8.2	6.3	11.6	5.9	..	..	0.1
Coconuts - Fresh	2280.0	3327.0	3382.0	3455.5	4104.6	4349.0	..
Copra	1391.5	301.4	455.7	..	..	864.6	708.6
Cotton	24.6	-	29.5	15.4	15.5	18.0	..

Notes: 1) Celery, Christophere, Lettuce, Ochro, Sweet pepper, Chive + thyme, cucumber, farine, patchoi
2) Hot pepper, gingers
* These estimates are very approximate

Source: Ministry of Agriculture-Statistics section.

LOCAL AGRICULTURAL PRODUCE REACHING LOCAL MARKETS

lbs

ITEM	1974	1975	1976	1977	1978	1979
Beet	3,215	41,131	33,666	39,666	50,541	46,951
Cabbage	26,212	109,216	684,788	79,330	104,790	90,504
Carrot	15,842	102,437	84,787	70,273	102,530	51,418
Calalco	23,350	88,890	54,379	73,985	90,221	58,897
Celery	2,192	14,958	84,847	18,428	35,159	34,465
Christophene	12,201	53,302	52,894	55,790	92,815	52,837
Lettuce	11,162	57,529	54,191	44,123	58,768	56,040
Ochroes	7.039	66,306	18,532	18,801	40,867	27,619
Peas	33,415	75,026	43,910	83,348	105,225	83,358
Hot pepper	6,913	39,459	22,986	23,815	36,561	27,380
Sweet pepper	8,326	49,030	33,621	23,815	56,430	27,757
Pumpkins	23,016	85,114	108,386	60,962	107,170	43,797
String beans	10,575	57,975	339,199	51,875	76,674	42,124
Tomatoes	10,302	143,533	124,344	98,691	94,234	52,543
Yams	97,387	739,743	200,796	255,760	292,845	113,543
Tannias	49,837	304,270	618,097	167,898	124,805	72,220
Sweet potatoes	75,712	484,864	249,971	99,630	202,130	132,113
Eddoes	9,229	50,753	36,207	45,575	45,490	44,208
Dasheen	92,760	298,580	200,207	181,621	212,331	85,588
Ginger	12,419	63,105	23,360	36,128	44,310	53,334
Ripe banana	9,454	262,079	484,113	280,952	217,184	144,329
Green banana	557,985	2632,371	1262,465	1668,350	1230,020	520,477
Bluggees	16,410	1187,111	2663,496	571,066	470,530	230,664
Plantain	120,855	790,577	249,141	275,016	182,960	92,369
Sapodilla	8,940	223,029	43,807	47,093	61,321	67,549
Paw paw	10,387	59,165	38,156	37,049	41,720	40,389
Mangoes	20,715	191,867	102,692	114,011	150,705	120,101
Grapefruit	57,870	144,249	200,003	266,663	161,155	96,360
Oranges	80,145	271,299	196,680	234,375	224,038	120,151
Mandarines	13,980	9,000	131,011	79,770	78,505	64,659
Limes	877,830	993,316	44,410	7,554	80,313	71,189
Cucumber	4,360	33.104	67,040	38,465	57,152	46,419
Avocadoes	19,982	146,360	141,526	47,140	108,465	31,267
Chive + Thyme	..	..	..	22,675	52,431	44,945
Breadfruit	..	..	..	224,320	241,650	251,654
Coconuts- Dry	137,624	41,311	411,374	377,551	336,015	399,107
Coconuts - Green	15,660	4,121	122,365	128,400	116,350	74,360

ESTIMATED AGRICULTURAL PRODUCTION*

FRUITS

(excluding Export Bananas)

'000 lbs

ITEM	1973	1974	1975	1976	1977	1978	1979
Oranges	1,913.0	1,646.4	1,700.0	1,653.0	1,964.8	2,119.1	2,224.2
Grapefruit	2,256.0	2,125.0	2,700.0	2,760.0	3,429.0	4,428.5	4,648.6
Limes	2,125.2	1,703.0	1,280.0	1,400.0	980.0	1,100.4	1,078.0
Other citrus	2,932.0	2,715.0	2,428.0	2,124.0	1,957.0	2,039.0	..
Custard apple	..	..	..	..	..	12.5	..
Genip	..	..	..	..	..	1,055.8	..
Golden apples	795.0	805.0	828.0	850.0	885.0	959.2	222.8
Guava	315.0	306.0	300.0	292.0	285.0	261.4	..
Mammia apples	..	..	..	..	..	72.2	70.9
Mango	4,433.7	3,505.7	2,474.4	2,783.7	3,204.6	3,186.4	3,344.0
Paw paw	..	..	..	..	..	168.8	121.3
Plums	1,000.0	1,000.0	1,000.0	1,080.0	1,150.0	1,195.0	..
Sapodilla	375.0	378.0	381.0	390.0	394.0	381.0	419.3
Sour-sop	608.1	569.7	585.3	572.0	583.0	680.0	590.0
Sugar apples	485.0	510.0	502.0	480.0	425.0	420.7	137.2
Taramind	560.0	520.0	500.0	465.0	460.0	386.0	45.0
Water melon	30.0	33.0	35.0	42.0	55.0	..	..
Other fruit[1)]	750.0	700.0	625.0	610.0	585.0	..	171.6

Only a small fraction of total production of most of the species reaches the local markets. Very often market prices are discouraging for the produces, in particular four species delivered to agro-industries. Sometimes prices are discouraging for the consumer, because more seller wish to earn enough for their life, selling very little. Conclusion: the distribution is not efficient at all!.

g) Livestock:

As the following table shows, the livestock is not very important. But it can be developed. Large amounts of meat are imported though local production is possible.

LIVESTOCK NUMBERS

	1961	1964	1971	1975
CATTLE	7999	6801	6600	3907
of which: Immature males	958	1151	..	39
Immature females	2400	1818	..	619
Mature males	769	713	..	392
Mature females	3872	3119	..	2497
SHEEP	6248	10448	9000	8313
of which: Mature females	3722	5861	..	5736
Others	2526	4587	..	2577
GOATS:	5673	4262	7500	6192
of which: Mature females	3347	2777	..	4456
Others	2326	1485	..	1736
PIGS:	8301	11049	15000	6354
of which: Mature females	4174	5265	..	4487
Others	4127	5784	..	1867
POULTRY:	106400	122000	250000	153629
of which: Mature females	61800	73100	..	91808
Others	44600	48900	..	51821
HORSES	33	..	..	1325
MULES	129	..	..	367
ASSES	2735	..	..	143089
DRAFT OXEN	47	..	..	..
BUFFALOES	21	..	..	..

Source: 1961 - West Indian Census of Agriculture 1961
1964: "Agricultural Statistics, current estimates 1964-65". BDD, Nov. 1966
1971: Ministry of Agriculture estimates
1975: Census of Agriculture (unpublished).

The table below shows controlled slaughterings. Unrecorded private slaughterings are estimated to be as percentage of recorded figures:

Cattle - 10%
Sheep - 100%
Goats - 100%
Pigs - 33%

ANIMALS SLAUGHTERED

YEAR	CATTLE	SHEEP	GOATS	PIGS
1961	1377	848	290	1340
1962	1421	807	304	1120
1963	1470	838	281	984
1964	1510	910	290	922
1965	1582	882	284	1063
1966	1915	855	280	1041
1967	1625	905	275	1240
1968	1922	229	76	2269
1969	1941	236	79	2192
1970	2044	210	70	2170
1971-76*	..	..	..	..
1977	950[1]	67[2]	52[3]	986[1]
1978	870	105	60	962
1979	1088	119	65	1478

Notes: * Records destroyed by fire

1) Excludes Sauteurs + Victoria for November and December

2) St. George's only for November; St. George's and Grenville only for December

3) St. George's and Grenvill only for December

Source: 1961-1975: Agricultural Statistics Handbook: W. McMillan (F.A.).).

1977-1978: Ministry of Agriculture

h) Fish:

Grenada is surrounded by rich fishing grounds, which are little exploited by Grenada, but rather by other nations.

ESTIMATED FISH LANDINGS* (1000 lbs)

FISH SPECIE	1976	1977	1978	1979
Ocean Gar	598.5	628.6	714.6	87.3
King Fish	308.5	323.9	350.6	161.3
Baracuda	256.0	268.9	293.3	233.0
Red Fish	52.4	55.2	59.7	821.7
Yellow Fin Tuna	694.0	728.8	789.0	1146.2
Black Fin Tuna	135.7	142.4	154.2	117.0
Long Gar	52.4	55.0	59.5	45.1
Bonita	259.2	272.0	314.2	166.9
Flying Fish	1110.6	1166.0	1256.2	2377.8
Jacks	1018.2	1069.8	1127.8	1461.1
Dolphin	536.8	563.6	585.0	229.0
Sharks	487.4	510.8	557.3	15.1
Sprats	92.5	98.2	103.5	125.1
Round Robin	222.0	233.4	255.3	465.1
Grouper	43.0	45.0	49.8	24.0
Moonfish	222.4	234.0	254.1	..
Spanish Fish	18.5	19.4	20.2	1.0
Butter Fish	9.3	10.8	11.9	17.9
Cavalli	..	..	..	184.9
Hind	30.4	32.6	35.3	462.0
Snapper	..	..	..	86.9
Other	21.6	24.6	26.2	683.8
TOTAL	6169.0	6483.0	7017.8	8912.2
Lobster	..	..	..	23.6
Lambie	..	..	..	69.2

About 75% of landed fish is sold on local markets or exported.

FISH MARKET	1978 (lbs)	1979 (lbs)
Carenage, St. George's	385,098	132,527
Melville St., St. George's	839,203	362,677
Gouyave	617,896	316,282
Victoria	75,083	51,039
Sauteurs	71,500	14,118
Grenville	306,132	169,204
TOTAL	2,294,912	1,045,847

Source: Fisheries department Ministry of Agriculture.

i) Mineral resources:

There is practically no mineral resource based industry (apart from some guarries). Geological surveys do not exist or are not available.

j) Industrial production:

The production of the main manufacturing goods is shown in the following table. Apart from those goods flour has been produced since 1980 (4,600 t of flour, 1,400 t of animal feed and 7.700 t of bran). Manufacturing of various garments has some importance too. Processing of agricultural products and of fish is still very limited, but increasing.

INDUSTRIAL PRODUCTION

ITEM	UNIT	1973	1974	1975	1976	1977	1978	1979
Rum[1]	'000 Proof gals	57.0	83.9	86.1	95.0	87.5	72.8	78.3
Beer [1]	'000 Bulk gals	101.2	48.1	93.8	141.9	266.0	303.7	368.0
Malt [1]	'000 gals	9.3	5.8	16.7	37.4	51.4	89.2	106.8
Cigarettes [1]	'000 cartons	186.7	161.0	180.6	173.8	143.1	133.9	113.0
Edible oil [2]	'000 gals	90.1	25.5	32.5	78.5	53.6	64.0	67.7
Coconut meal[2]	'000 lbs	325.1	88.8	200.8	297.1	233.7	330.9	296.0
Laundry soap[2]	'000 lbs	174.0	45.1	34.3	71.5	54.2	56.8	59.1
Sugar[3]	Tons	-	-	-	8.1	514.0	583.0	524.0
Soft drinks[4]	'000 cases	..	..	..	..	366.2	248.9	224.8

Sources: 1) Customs dept.
2) Tempe manufacturing
3) Cane Farmers Assoc.
4) W.E. Julien + Co., Federal Investments and Grenada Beverages

5. Energy consumption:

Supply of electricity is weak owing to the old vintage of the power stations. There is no spare capacity, but regular breakdowns.

ELECTRICITY[1)]

UNITS CONSUMED AND GENERATED

Year	UNITS CONSUMED (KWH'S)					Units Generated	Employment*
	Domestic	Commercial	Industrial	Street Lights	Total		
1970	..	..	..	..	12,536,679	15,183,110	..
1971	..	..	..	..	15,498,369	18,330,446	..
1972	..	..	..	..	16.167,099	19,730,780	..
1973	7,307,299	8,604,115	1,263,394	164,436	17,339,244	20,527,560	..
1974	5,612,502	5,468,561	572,963	148,387	11,802,613	14,528,758	..
1975	6,607,229	7,426,686	698,148	162,204	14,894,267	17,874,430	92
1976	6,648,075	7,786,692	540,464	178,728	15,153,959	18,947,270	96
1977	7,297,140	9,372,736	879,571	190,476	17,739,923	21,561,240	120
1978	8,255,304	10,142,134	842,249	194,846	19,434,740	24,006,650	105
1979	8,840,724	10,237,739	810,438	190,476	20,099,377	24,510,760	114

Notes: * December

The sales of electricity are shown below: 1979: 7,044,457 EC$.

ELECTRICITY

Nº OF CONSUMERS AND REVENUE

Year	Nº. OF CONSUMERS				REVENUE EC$		
	Domestic	Commercial	Industrial	Street Lights	Electricity Sales	Fuel Surcharge	Total
1970	..	..	..	..	..	-	1,118,955+
1971	..	..	..	..	..	-	1,453,921+
1972	..	..	..	..	..	-	1,667,914+
1973	7,246	856	23	10	..	-	2,074,716+
1974	7,507	852	21	10	1,523,776	574,577	2,098,353
1975	7,097	839	19	10	2,287,052	785,771	3,072,823
1976	7,426	892	20	9	2,318,578	1,233,164	3,573,178
1977	7,967	948	18	9	2,656,399	1,619,923	4,289,211
1978	8,518	938	18	9	3,200,331	1,902,241	5,102,572
1979	8,772	945	19	9	3,903,618	3,140,839	7,044,457

Notes: 1) Excludes Carriacou
+ Includes other miscellaneous receipts

Source: Grenada Electricity Services Ltd.

Quantities of various kinds of fuel consumed are shown in the following table:

FUEL CONSUMPTION

Year	Gasoline (gals)	Diesel (gals)	Kerosene (gals)	Liquid Gas (lbs)
1970	2,331,961	1,354,797	872,968	1,356,653
1971	2,530,458	1,486,505	904,774	1,699,569
1972	2,706,599	2,139,062	897,045	1,946,902
1973	2,176,849	1,837,285	948,209	1,798,720
1974	2,084,512	1,293,755	515,451	1,098,906
1975	1,876,439	2,414,424	445,107	1,551,241
1976	2,081,451	1,832,033	544,127	1,791,800
1977	2,049,997	1,897,152	304,583	2,339,578*
1978	2,059,468	1,961,031	470,860	2,339,578*
1979	2,193,379	2,041,362	371,504	2,162,619*

Note: * Gross withdrawals.

Source: Customs Department - Drawn from Bond
(Importation = Consumption)

Supply of fuel is satisfactory.

6. Foreign Trade:

a) Visible balance:

The visible balance of trade has been in deficit for at least twenty years. And the deficit amounts to about 50% of imports.

BALANCE OF VISIBLE TRADE

ECS

Year	Exports			Imports	Balance of Visible Trade
	Domestic	Foreign	Total		
1960	6,996,370	167,318	7,163,688	14,831,753	- 7,668,065
1961	5,770,707	159,120	5,930,027	16,082,555	- 10,152,528
1962	5,920,373	147,347	6,067,720	15,318,789	- 9,251,069
1963	7,783,764	71,068	7,854,832	15,023,617	- 7,168,785
1964	7,027,219	193,536	7,220,755	17,672,781	- 10,452,026
1965	10,677,505	194,947	10,872,452	19,077,304	- 8,204,852
1966	10,003,062	192,899	10,195,961	21,724,311	- 11,528,350
1967	8,421,205	159,503	8,580,708	24,081,317	- 15,500,609
1968	9,869,774	283,184	10,152,968	26,346,092	- 16,193,124
1969	14,777,414	661,830	15,439,444	34,225,678	- 18,786,234
1970	10,953,239	1,121,616	12,074,855	44,631,756	- 32,556,901
1971	9,290,751	902,443	10,193,194	46,051,213	- 25,858,019
1972	9,954,581	575,762	10,530,343	42,811,694	- 32,281,351
1973	13,637,029	874,989	14,512,018	42,487,129	- 27,975,111
1974	17,650,476	1,615,437	19,265,913	37,079,822	- 17,813,909
1975[P]	25,888,102	1,027,336	26,915,438	52,818,000	- 25,902,250
1976[P]	32,913,768	1,207,242	34,121,010	66,215,392	- 32,094,382
1977[P]	37,031,546	1,419,766	38,451,312	84,763,336	- 46,312,024
1978[P]	44,495,563	1,279,337	45,774,900	96,268,746	- 50,493,846
1979[P]	56,015,811,	2,463,611	58,479,422	117,660,222	- 59,180,800

Notes: P - Provisional

Source: Central Statistics Office

b) Exports

The most important export products are cocoa (27 mill. EC$), nutmeg (12 mill. EC$), bananas (10 mill. EC$), mace (2.5 mill. EC$), and other fruits and spices.

The export value of garments has been increasing for the last 10 years.

Export figures are wither complete now reliable. (See table). Since 1977 there has been a steady increase of exports.

Exports go mainly to UK (18 mill EC$), FRG (9,5 mill EC$), Belgium (8,8 mill. EC$), Netherlands (6,3 mill. EC$) and Trinidad (2,5 mill. EC$) (See table).

PRINCIPAL DOMESTIC EXPORTS

EC$

Domestic Export	1974		1975[P]		1976[P]		1977[P]		1978[P]		1979[P]	
	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume
Cocoa lbs	5,427,630	5,171,714	6,762,703	4,794,200	8,576,884	5,880,000	8,890,998	4,590,600	19,573,630	5,254,080	27,025,282	5,257,910
Bananas lbs	3,466,579	19,737,024	6,525,640	28,944,884	7,664,839	33,837,720	8,638,604	30,888,534	9,313,782	31,513,136	10,460,740	31,212,222
Nutmeg lbs	6,120,254	2,365,950	9,943,135	4,490,020	12,482,041	5,968,464	16,006,813	6,618,211	10,739,363	4,351,990	12,103,573	4,261,245
Mace lbs	1,605,726	320,744	1,424,432	356,330	2,766,013	921,100	1,628,197	490,026	1,740,790	587,598	2,446,636	834,201
Lime Oil lbs	..	..	..	..	..	..	..	..	..	..	..	..
Lime Juice gals	44,294	249,400	73,935	403,776	29,135	197,900	..	..	..	..	..	..
Cinnamon lbs	60,580	23,930	33,051	13,446	80,950	30,744	69,366	21,256	44,364	10,745	36,833	6,755
Cloves lbs	230,911	56,715	29,119	5,550	152,622	26,099	19,295	2,021	521,343	54,194	751,024	78,890
Other Spices lbs	..	..	..	..	..	..	..	..	..	..	..	..
Cotton lbs	..	..	26,591	29,017	13,479	9,911	9,235	5,497	..	..	..	..
Avocadoes lbs	..	..	..	..	..	..	..	..	..	..	..	..
Copra	..	..	..	..	..	..	..	..	..	..	..	..
Other Fresh Fruit	30,868	169,537	80,935	469,720	85,355	345,005	127,495	347,984	569,125	855,584	1,071,249	1,469,112
Fruit pastes lbs	..	..	..	..	..	..	..	..	..	..	..	..
Vegetable juices g.	23,647	29,019	..	..	..	..	..	..	..	..	..	..
Preserved Tomatoes	..	..	35,618	59,441	23,267	24,585	..	..	..	..	..	..
Fish (fresh and chilled) lb	..	..	..	..	..	..	..	..	..	..	..	..
Goat and Sheep No.	..	..	73,378	2,787	31,575	1,218	56,257	2,970	75,923	2,826	120,950	3,890
Syrup gals	..	..	160,514	122,020	148,121	154,392	66,485	81,250	11,865	51,778	10,211	46,273
Sauces and Condiments lbs	140,226	161,297	175,385	154,750	58,479	55,388	23,620	19,327	29,830	20,957	40,466	23,964
Men and Boys Shirts Doz.	383,602	12,889	383,426	..	339,969	..	743,144	..	1,011,938	..	961,759	..
Men and Boys Outer Garments Doz.	..	..	..	..	..	..	..	..	..	..	..	..
All others	..	..	..	..	..	..	..	..	..	..	..	..
TOTAL	7,650,476		25,888,102		32,914,000		37,031,546		44,495,563		55,820,696	

Domestic Export - Direction of Trade (EC$ '000)

COUNTRY	1969	1970	1971	1972	1973
United Kingdom	7,952.0	5,794.3	4,209.7	3,827.4	4,791.0
Netherlands	2,454.0	1,416.4	1,351.0	1,891.1	1,899.7
W. Germany	1,646.0	989.5	1,309.9	1,517.2	2,702.4
U. S. A.	829.4	1,114.7	645.6	718.5	1,064.2
Canada	315.4	270.2	371.8	257.2	319.3
Belgium	250.0	394.9	224.0	130.9	739.9
Trinidad	183.2	84.7	110.7	463.4	445.0
Argentina	174.3	153.4	121.2	182.5	147.0
France	145.6	13.0	9.2	46.6	-
Dominica	-	102.7	0.8	12.2	19.2
Poland	61.5	101.9	188.0	100.3	43.0
Libya	29.2	123.1	321.0	82.2	17.3
Spain	193.7	152.9	180.0	258.4	286.7
Guyana	30.4	49.1	52.1	79.6	426.8
Brazil	-	-	-	22.6	162.9
Peru	-	-	-	-	-
China	-	-	-	-	85.8
All Others	512.2	192.4	195.7	364.5	486.8
TOTAL	14,777.4	10,953.2	9,280.7	9,954.6	13,637.0

Notes: Any Country over EC$ 100,000

Source: Central Statistics Office

1974	1975[P]	1976[P]	1977[P]	1978[P]	1979[P]
7,504.2	11,332,856	12,782,381	14,418,468	18,752,572	22,240,672
4,092.5	3,784,006	5,956,717	5,552,436	4,546,855	6,346,290
2,255.2	4,422,309	6,622,788	6,699,424	10,048,829	9,542,548
427.4	1,291,577	1,427,539	1,407,873	1,146,001	895,615
346.2	501,239	681,948	851,209	1,105,683	1,612,085
454.1	768,895	1,256,376	1,827,583	2,531,948	8,837,838
638.9	677,271	791,425	1,078,631	1,829,747	2,477,901
-	230,417	282,102	910,817	313,309	585,943
-	373,673	601,205	291,405	357,602	12,384
19.6	-	-	-	-	-
808.4	776,160	455,760	793,216	1,225,039	1,074,608
-	-	-	-	-	-
229.5	516,137	674,671	602,990	437,601	527,833
146.6	49,596	176,151	99,892	361,147	207,625
57.0	15,840	..	..	142,071	28,898
217.7	-	-	-	-	-
120.0	414,187	115,200	1,288,991	309,143	354,842
333.2	-	-	-	-	-
17,650.5	25,888,102	32,914,000	37,031,546	44,387,632	55,820,696

c) Imports:

The structure of imports is surprising in the sense that against all expectation food is by far the most important item. Next course manufactured goods, chemicals, machinery, (including transport equipment), and mineral fuels. Imports by SITC sections are shown in the following table.

Other statistics on selected items are given on the following pages. Flour is not imported any more since the start up of the new flour mill. Instead cereals are imported from USA.

Imports of milk and milk products, fish and fish products as well as poultry meat are remarkable.

IMPORTS - SELECTED ITEMS

ITEM	1975[P]		1976[P]		1977[P]		1978[P]		1979[P]	
	Qty(lbs)	Value	Qty(lbs)	Value	Qty(lbs)	Value	Qty(lbs)	Value	Qty(lbs)	Value
Potatoes	904,253	213,947	479,878	341,387	504,798	464,950	865,365	261,980	796,191	316,237
Onions	519,307	176,806	487,200	195,203	632,090	182,257	448,543	209,907	424,970	188,495
Carrots	..	..	..	..	..	..	240	499	2,500	1,250
Garlic	3,647	3,851	15,580	14,842	47,284	93,645	19,810	37,726	57,513	57,961
Bacon	53,930	60,135	13,580	43,060	..	..	..	..	65,711	164,755
Ham	94,293	271,498	29,215	942,315	57,499	109,516	6,350	18,535	199,574	411,612
Fresh Pork	121,543	100,080	170,076	122,662	358,337	141,187	66,726	88,426	54,395	65,280
Pickled Pork	320,030	285,179	335,788	330,144	270,857	308,800	197,103	430,161	270,583	359,041
Mutton	..	..	12,886	30,357	..	..	3,091	34,677	38,932	112,227
Fresh Beef	..	..	..	..	618,999	334,760	..	..	106,660	349,949
Frozen Beef	..	..	..	..	..	..	189,317	1,283,161	..	..
Pickled Beef	..	..	54,486	84,976	124,303	170,631	88,444	364,866	138,687	307,371
Poultry Meat	1,681,741	1,015,014	2,152,607	1,508,827	2,525,763	2,234,308	2,225,745	1,545,418	2,314,130	2,176,761

IMPORTS - SELECTED ITEMS

ITEM	1975[P]		1976[P]		1977[P]		1978[P]		1979[P]	
	Qty(lbs)	Value	Qty(lbs)	Value	Qty(lbs)	Value	Qty(lbs)	Value	Qty(lbs)	Value
Meat + Meat Products	..	..	..	..	..	..	1,004,975	1,432,144	278,560	844,950
Fish + Fish "	..	..	..	..	..	..	960,775	1,395,330	999,575	1,229,590
Peanuts	70,988	41,020	48,256	98,398	80,499	22,837	48,298	96,843	41,201	138,569
Baked Beans +Beans	18,976	22,987	..	..	..	..	..	..	..	..
Black Eye Peas	5,000	3,900	..	..	..	..	..	..	1,000	1,168
R.K. Beans	..	..	3,642	2,473	2,280	1,469	..	..	12,558[1)]	16,082[1)]
Peas + Beans	..	..	..	..	..	..	48,309	41,044	..	..
Black Pepper	1,538	3,834	1,233	4,608	2,229	6,814	..	..	1,482	31,517
Cocoa Products	..	..	..	..	..	..	160,571	359,200	67,891	316,519
Copra	..	..	..	..	..	..	143,360	73,536	134,400	70,630
Milk + Milk Prod.	..	..	..	..	..	..	3,046,811	3,573,406	3,014,852	4,135,655
Insecticides	..	..	..	..	..	..	67,151	361,201	56,970	341,930
Fertilizers	..	..	..	..	..	..	2,597,750	582,817	6,241,390	1,318,981

Notes: P - Provisional

1) Includes other beans.

Source: Ministry of Agricultural Statistics Unit.

IMPORTS - DIRECTION OF TRADE

(EC$'000)

COUNTRY	1969	1970	1971	1972	1973	1974	1975	1976
United Kingdom	10,881.3	13,834.0	14,104.7	10,935.3	11,306.5	9,799.1	13,273,2	15,854.5
U.S.A.	4,021.4	5,890.4	4,689.7	4,195.9	3,972.1	2,978.1	4,445.9	6,246.3
Canada	2,998.7	4,372.4	3,649.3	3,902.9	3,364.5	3,331.1	4,811.4	6,653.3
Trinidad	5,185.1	6,934.4	8,229.8	7,959.0	8,322.7	8,298.0	12,413.4	15,362.8
Barbados	1,014.8	1,313.5	1,230.0	1,412.7	1,485.8	1,546.1	2,012.8	2,483.2
Jamaica	454.5	597.1	646.4	720.8	578.3	636.2	960.6	1,215.1
Guyana	723.5	870.1	1,058.3	1,131.1	870.6	1,004.5	1,650.2	1,298.5
Other Caricom	403.0	142.5	71.0	356.6	283.8	1,197.0	1,129.4	2,872.7
Netherlands	1,412.2	1,428.7	1,958.5	1,485.5	1,294.2	1,169.7	1,584.4	1,603.0
W. Germany	702.5	1,058.4	1,046.6	1,201.0	1,241.4	704.8	1,022.6	1,220.6
Japan	587.9	927.1	1,327.3	1,283.3	1,341.4	636.0	797.9	1,418.5
Denmark	648.1	766.4	1,020.1	829.3	845.3	700.5	823.3	766.1
France	754.0	878.3	912.6	901.2	534.4	206.6	344.5	506.3
Dominican Rep.	90.6	..	69.7	218.2	609.8	565.1	-	-
Venezuela	375.9	69.6	91.8	321.2	821.4	82.1	91.6	84.4
New Zealand	320.9	326.6	621.0	603.0	541.1	405.6	584.4	551.3
Honduras	743.0	1,032.0	894.0	969.8	823.3	424.6	632.3	870.2
Hong Kong	572.6	655.7	753.5	644.6	422.0	258.4	387.6	450.7
Italy	219.6	433.2	462.9	502.1	344.3	157.7	490.1	615.9
All Others	2,116.1	3,101.4	3,214.0	3,509.2	3,484.2	2,978.6	5,169.2	6,176.0
TOTAL	34,225.7	44,631.8	46,051.2	42,811.7	42,487.1	37,079.8	52,625.1	66,249.6

Source: Central Statistical Office

IMPORTS BY S.I.T.C. SECTIONS 1960 - 1974

(EC$)

	0	1	2	3	4	5	6	7	8	9
	Food	Beverages and Tobacco	Crude Materials Inedible, except Fuels	Mineral Fuels, Lubricants and related materials	Animal and Vegetable Oils and Fats	Chemicals	Manufactured Goods	Machinery and Transport Equipment	Misc. Manufac-tured Articles	Misc. Transac-tions n.e.s.
1960	4,383,989	650,774	474,013	861,492	96,476	1,403,254	3,209,870	1,891,732	1,838,860	21,286
1961	4,293,135	576,714	641,211	688,843	83,921	1,499,558	3,515,111	2,700,932	2,057,218	25,912
1962	4,529,117	431,076	690,218	738,884	111,203	1,439,567	3,322,036	1,841,786	2,191,036	23,866
1963	4,887,494	520,278	396,838	874,165	76,022	1,694,806	2,749,763	1,749,981	2,052,349	21,929
1964	5,125,817	521,919	737,039	1,463,795	81,122	1,923,609	3,391,960	1,899,312	2,508,960	19,248
1965	5,451,663	577,627	668,770	1,298,346	112,880	2,177,732	3,685,344	2,674,921	2,414,143	15,878
1966	6,273,254	674,625	901,518	804,824	107,930	2,366,320	4,252,177	3,267,658	3,066,119	9,886
1967	6,641,407	791,393	1,190,097	848,394	46,143	2,661,934	4,759,658	3,753,089	3,377,959	8,565
1968	7,468,513	751,551	1,160,321	1,066,425	235,939	2,884,439	5,400,570	3,336,951	4,025,695	15,692
1969	8,969,509	1,011,583	1,967,835	1,439,857	194,386	3,295,791	7,008,386	4,948,431	5,374,674	13,270
1970	10,996,582	1,586,825	2,129,772	2,056,181	91,407	3,587,764	10,282,421	7,076,656	6,807,002	17,146
1971	12,985,964	1,973,719	1,665,601	2,230,248	124,837	3,852,317	8,965,097	7,234,774	7,003,727	14,929
1972	13,284,485	1,355,584	1,703,427	2,341,946	117,639	3,825,227	7,681,632	6,781,064	5,696,499	24,191
1973	14,540,408	1,075,231	1,193,822	2,509,852	142,105	3,610,240	7,836,900	6,066,853	4,698,997	12,739
1974	15,083,813	1,489,627	1,152,674	3,155,556	259,994	3,503,970	6,616,612	2,792,378	3,020,910	4,288
1975	18,256,459	2,002,920	1,275,639	4,344,016	343,789	6,610,942	10,444,603	4,269,632	5,075,427	1,680
1976	21,504,747	2,149,491	2,089,934	5,712,592	316,231	7,330,333	13,637,380	6,836,434	6,661,112	11,377
1977	..	..	..	..	..	..	..	..	..	..
1978	..	..	..	..	..	..	..	..	..	..

Source: Statistics Unit, Ministry of Finance, Trade and Industry

7. Balance of payments and exchange rate:

GRENADA: BALANCE OF PAYMENTS

(In millions of E.C. dollars)

	1975	1976	1977	1978	1979	
Goods and services	- 8.9	- 11.3	- 15.1	- 25.9	- 60.2	
Trade balance	- 32.1	- 33.2	- 46.2	- 50.5	- 91.5	
Exports, f.o.b.	(33.2)	(35.1)	(38.6)	(45.9)	(58.3)	1)
Imports, c.i.f.	(-65.3)	(-68.3)	(-84.8)	(-96.4)	(-149.8)	1)
Travel receipts	23.8	21.3	30.5	37.5	41.8	
Travel payments	..	..	- 3.2	- 10.8	- 10.5	
Interest on public debt	- 0.5	- 0.5	- 0.8	- 0.8	- 1.1	
ECCA profits	..	1.1	0.8	0.8	1.1	
Other services (net)	..	..	3.8	- 2.2	-	
Unrequited transfers	3.5	3.5	17.5	13.0	78.8	
Private (net)	..	..	15.7	11.3	44.5	1)
Central government grants	3.5	3.5	1.9	1.6	34.3	1)
Capital account	- 14.0	- 9.7	4.9	3.2	2.4	
Central government net borrowing	1.3	1.3	3.8	-	4.9	
Other public sector net borrowing	1.3	1.1	0.3	-	0.5	
Commercial banks	- 16.7	- 12.1	1.1	- 0.5	- 7.3	
Direct investment (private)	..	..	- 0.3	3.8	4.3	
Residual	16.2	14.0	- 7.0	5.7	- 25.4	
IMF transactions	-	-	-	0.5	2.2	
SDR allocation	-	-	-	-	1.1	
Profits (2)	-	-	-	0.5	1.1	

GRENADA: BALANCE OF PAYMENTS continued

	1975	1976	1977	1978	1979
Overall surplus or deficit	- 3.2	- 3.5	0.3	- 3.5	- 2.2
Financing	3.2	3.5	0.3	3.5	2.2
Net IMF borrowing	2.7	1.3	0.5	2.2	1.3
Net ECCA borrowing	1.3	1.3	-	0.5	1.1
Government foreign assets (increase -)	- 0.8	0.8	- 0.8	0.8	- 0.3

Notes: 1) Includes E.C.$ 27 million of equipment for airport construction in 1979 as imports and counterpart grants from Cuba.

2) Consists of profit distribution from IMF gold sales and gold restitution profits.

Source: International Monetary Fund.

FOREIGN EXCHANGE TRANSACTIONS

BY COMMERCIAL BANKS

	SALES		
	1977	1978	1979
1. Travel Allowance	3,229.2	10,854.6	8,943.2
2. Traded Goods	53,177.4	64,496.7	101,595.5
3. Migrants' Transfers	250.4	943.6	386.2
4. Personal Remittances	2,434.8	6,874.2	4,336.4
5. Insurance Payments	757.2	1,361.7	1,027.8
6. Remittances of Investment Income etc.	367.0	1,430.4	7,811.6
7. Airline and Shipping Co. Earnings	356.0	1,443.4	3,134.6
8. Other Current Transactions	3,806.4	7,640.5	7,041.7
9. Government Current Transactions	1,016.1	2,982.0	7,072.2
10. Private Capital Transactions	489.0	3,972.6	513.5
11. Government Capital Transactions	-	-	215.6
Total	65,883.6	101,999.8	142,087.3

Source: Ministry of Finance

(EC $'000)

	PURCHASES		
	1977	1978	1979
	18,257.2	19,692.8	22,596.1
	20,080.2	21,696.4	34.605.0
	1,781.3	2,810.4	9,092.7
	14,614.2	14,018.7	37,777.8
	207.9	286.7	70.6
	2,441.9	1,010.3	12,101.6
	357.8	212.1	555.5
	6,000.1	8,058.4	8,782.1
	1,509.2	929.3	8,592.9
	100.4	2,494.8	6,309.6
	-	-	-
	65,350.3	71,210.0	140,483.9

EXCHANGE RATES

End of period	E. C. $ per UNIT		
	S.D.R.	U.S.$	£ Sterling
1970	2.00	2.00	4.81
1971	2.04	1.88	4.81
1972	2.22	2.04	4.81
1973	2.49	2.07	4.81
1974 March	2.42	2.01	4.81
June	2.42	2.01	4.81
Sept.	2.44	2.29	4.81
Dec.	2.50	2.04	4.81
1975 March	2.49	1.99	4.81
June	2.70	2.35	4.81
Sept.	2.74	2.35	4.81
Dec.	2.78	2.37	4.81
1976 March	2.90	2.51	4.81
June	3.09	2.69	4.81
Sept.	3.12	2.70	4.52
Dec.	3.13	2.70	4.59
1977 March	3.13	2.70	4.65
June	3.15	2.70	4.65
Sept.	3.14	2.70	4.72
Dec.	3.28	2.70	5.15
1978 March	3.34	2.70	5.02
June	3.35	2.70	5.02
Sept.	3.46	2.70	5.32
Dec.	3.52	2.70	5.49
1979 March	3.47	2.70	5.59
June	3.49	2.70	5.85
Sept.	3.56	2.70	5.93
Dec.	3.56	2.70	6.00

Source: I.M.F. - International Financial Statistics

8. Government:

The following tables give some ideas of government revenue and expenditure.

(a) Revenue

	Actual 1974	Actual 1975	Actual 1976	Actual 1977
Customs and Excise	6,998,750	9,777,427	12,153,435	15,538,431
of which: Import duty	3,817,881	4,908,406	5,893,455 [1]	8,159,802
Export duty	1,803,476	3,040,622	3,743,324 [1]	4,549,131
Consumption duty [2]	837,148	1,174,793	1,961,720	2.276,539
Taxes	4,648,156	5,146,715	11,137,028	13,348,242
of which: on Individuals	2,139,694	2,322,460	4,023,784	4,036,779
on Companies	1,199,800	1,185,356	1,053,081	3,178,655
Licences	515,347	518,043	1,192,837	631,866
of which: Motor vehicles	237,789	251,558	243,956	251,246
Port Dues	162,890	212,759	253,248	283,682
Airport Dues	126,358	169,226	174,918	216,727
Fees of Court and Earnings of Govt. Departments	770,829	1,410,714	1,952,272	1,605,150
of which: Currency profits	300,000	778,000	1,190,920	723,580
Radio Grenada	41,481	147,015	115,604	147,454
Examination fees	68,381	93,767	115,763	151,892
Hospital fees	58,098	58,275	67,355	68,412
Repayments and Reimbursements	51,654	1,963	231,629	370,325
Miscellaneous	119,456	75,388	77,783	158,671
Post Office	1,631,577	1,339,110	1,195,277	2,035,744
of which: stamps to Foreign Dealers	1,116,737	792,267	585,435	1,303,797
Stamp Sales	449,158	500,182	570,002	693,349
Rent, Interest etc.	151,455	90,613	96,938	208,640
Sales of Government property	42,865	55,786	85,426	67,007
TOTAL LOCAL REVENUE	15,219,337	18,797,744	28,550,841	34,615,393

Notes: 1) excludes nutmeg special duty

2) excludes beer.

Source: 1974-1976 Government estimates
1977-1979 Ministry of Finance

GOVERNMENT RECURRENT REVENUE

(ECS)

	Actual 1976	Actual 1977	Actual 1978	Actual 1979
Customs and Excise	12,153,435	15,538,431	18,803,049	23,681,000
of which: Import duty	5,893,455	8,159,802	9,827,270	12,834,000
Export duty	3,743,324 [1]	4,549,131	5,774,391	7,441,000
Consumption duty [2]	1,961,720	2,276,539	2,585,594	2,777,000
Taxes	11,137,028	13,348,242	21,268,890	24,562,000
of which: On Individuals	4,023,784	4,036,779	5,617,436	7,000,000
On Companies	1,053,081	3,178,655	3,694,571	5,300,000
Licences	1,192,837	631,866	852,790	878,200
of which: Motor Vehicles	243,956	251,246	387,105	430,000
Port Dues	253,248	283,682	285,950	1,288,000
Airport Dues	174,918	216,727	278,600	241,000
Fees of Court and Earnings of Govt. Departments	1,952,272	1,605,150	1,006,052	2,873,100
of which: Currency profits	1,190,920	723,580	..	..
Radio Grenada	115,604	147,454	170,065	250,000
Examination fees	115,763	151,892	144,240	150,000
Hospital fees	67,355	68,412	70,951	70,000
Repayments and Reimbursements	231,629	370,325	153,881	542,100
Miscellaneous	77,783	158,671	111,553	132,500
Post Office	1,195,277	2,035,744	2,491,479	2,339,900
of which: Stamps to Foreign Dealers	585,435	1,303,797	1,443,647	1,025,000
Stamp Sales	570,002	693,349	993,209	790,000
Rent, Interest etc.	96,938	208,640	87,286	63,200
Sales of Government property	85,426	67,007	62,601	191,500
TOTAL LOCAL REVENUE	28,550,841	34,615,393	45,392,205	56,340,600

Notes: 1) excludes nutmeg special duty
2) excludes beer

Source: 1974-1976 Government estimates
1977-1979 Ministry of Finance

b) Expenditure: CENTRAL GOVERNMENT EXPENDITURE+

FUNCTIONAL ANALYSIS	1974	1975	1976	1977
1. General Public Services	1.91	1.86	2.78	2.13
2. Defence	2.86	3.40	4.39	5.43
3. Education	4.66	5.02	6.21	6.36
4. Health	3.21	3.57	4.37	5.41
5. Social Security and Welfare	1.20	1.30	1.32	1.75
6. Housing and Community Amenities	0.41	0.43	0.41	0.43
7. Other Community and Social Services	0.20	0.23	0.38	0.23
8. Economic Services	7.34	7.77	10.54	11.82
a) General Administration, Regulation and Research	1.92	1.99	2.28	2.81
b) Agriculture, Forestry and Fishery	1.05	1.62	2.07	1.74
c) Mining, Manufacturing, and Construction	3.63	3.04	4.55	4.21
d) Roads	0.74	1.12	1.64	3.06
9. Other purposes	1.00	0.94	4.03	1.21
TOTAL	22.79	24.52	34.43	34.77

(ECS)

ECONOMIC ANALYSIS	1974	1975	1976	1977
1. Expenditure on Goods and Services	16.98	19.62	29.04	26.98
a) Wages and Salaries	11.20	11.90	18.00	15.74
b) Other purchases of Goods and Services	5.78	7.72	11.04	11.24
2. Interest payments	1.00	0.94	0.89	1.20
3. Subsidies and other current transfers	1.40	2.20	3.32	2.94
a) Transfers to Households	1.10	1.30	1.32	1.76
b) Transfers abroad	0.30	0.90	2.00	1.18
4. Capital Expenditure	3.41	1.76	1.18	3.65
TOTAL	22.79	24.52	34.43	34.77

Notes: + Recurrent Budget only

Source: Ministry of Finance: I.M.F. Government Financial Statistics Yearbook

Table 8.2 GOVERNMENT RECURRENT EXPENDITURE

(EC$)

	Actual 1974	Actual 1975	Actual 1976	Actual 1977	Actual 1978	Provisional 1979
Governor General	68,495	64,821	93,091	76,628	143,162	130,000
Parliament	99,441	124,139	134,117	159,827	203,491	128,000
National Secretariat [1]	-	-	-	-	67,379	171,000
Judiciary	231,911	261,318	277,406	352,751	428,958	a) 228,000 b) 240,000
Legal	78,220	65,112	110,159	104,583	116,040	138,000
Dept. of Public Prosecutions	15,852	-	-	-	..	..
Audit	54,227	49,383	65,372	68,965	85,793	87,000
Public Service Commission	46,360	47,430	61,982	69,176	83,209	96,000
Prime Minister	753,610	796,845	1,161,318	1,136,316	1,706,410	1,916,000
Overseas Representation	-	351,926	636,119	..	..	1,300,000
Police	2,511,788	2,564,390	3,430,302	4,230,447	4,752,809	4,685,000
Grenada Military Force [2]	339,392	512,437	463,512	..	795,545	3,367,000
Prisons	248,412	287,608	376,845	390,092	510,210	625,000
Radio Grenada	177,190	191,605	233,075	219,050	262,627	444,000
Ministry of Finance Trade and Industry	1,658,516	1,895,773	2,233,097	2,175,718	2,688,811	3,053,000
Ministry of Communications, Works, and Labour [3]	1,398,020	1,982,082	5,821,643	3,262,298	6,643,358	8,736,000

9. Employment:

The following tables show employment figure for 1970 and 1979 respectively by industry. The figures for 1970 comprise the total work force, while figure for 1979 include salary and wages arrears only.

EMPLOYMENT BY INDUSTRY

(1970)

INDUSTRY	Male	Female	Total
Agriculture, Forestry, and Fishing	5,504	3,097	8,601
Mining and Quarrying	16	14	30
Manufacturing	1,405	653	2,058
Construction	3,448	666	4,114
Electricity, Gas, Water and Sanitary Services	219	21	240
Commerce	1,273	1,208	2,481
Transport, Storage and Communication	1,254	77	1,331
Services	2,213	3,545	5,758
Not stated or not elsewhere classified	754	432	1,186
TOTAL WORKING	16,086	9,713	25,799
All Adults not attending school	19,409	24,800	44,209
Rate of Economic Activity	82.9%	39.2%	58.4%

Source: Population Census 1970

NUMBER OF EMPLOYEES (APPROXIMATE)

(1979)

I.S.I.C.	Industry	Private	Public	Total
110	Agriculture	427	49	476
112	Agricultural Services ..	3	54	57
120	Forestry " "	-	66	66
1	Agric.,Forestry + Fishing	430	169	619
310	Manu.-Food, Bev. + Tobacco	267	-	267
320	Manu.-Textiles + Clothing	138	-	138
330	Manu.-Wood + Wood Products	11	-	11
340	Manu.-Paper +Paper Products	51	-	51
360	Manu.-Non-metallic min.products	-	-	-
380	Manu.-Metal products	31	-	31
3	Manufacturing	498	-	498
410	Electricity Services	123	-	123
420	Water Services	-	381	381
4	Electricity, gas and water	123	381	504
500	Construction	368	1297	1665
5	Construction	368	1297	1665
610/20	Retail + Wholesale Trade	2144	250	2394
631	Restaurants,cafes and bars	118	-	118
632	Hotels, etc. " "	558	-	558
6	Distribution,Restaurants + Hotels	2820	250	3070
711	Land Transport	28	-	28
712	Water Transport	72	29	101
713	Air Transport	33	10	43
719	Storage + Trans.allied Services	369	-	369
720	Communications	131	166	297
7	Transport,storage + communications	633	205	838
810	Financial Institutions	246	-	246
820	Insurance	119	-	119
831	Real Estate	79	-	79
832	Other Business services	244	-	244
8	Financial + business serv.	688	-	688
911	General Public Services	-	1324	1324
913	General Admin.-Econ.serv.	-	204	204
914	General Admin.-Housing serv.	-	321	321
916	General Admin.-Housing + Communic.	-	203	203
931	Education	1004	689	1693
932	Research Services	-	2	2
933	Medical Services	74	462	538
934	Welfare Institutions	10	242	252
935	Busin.,Prof.+Lab. Assns.	41	-	41
939	Other Social + Comm. Services	35	38	73
941	Entertainment Services	11	-	11
942	Libraries,Museums,Zoos	-	41	41
949	Other Amus. + Recr. Serv.	13	-	13
951	Repair Services n.e.s.	45	-	45
952	Laundries, etc.	1	-	1
953	Domestic Services	15	-	15
959	Other pers. + H/H Services	4	-	4
9	Community,Soc. + Pers.Serv.	1253	5528	4781
	TOTAL	6813	5830	12643

Source: Income Tax Records

10. Gross domestic product:

GROSS DOMESTIC PRODUCT AT FACTOR COST (ECS '000)

(CURRENT PRICES)

	1961[1]	1962[1]	1963[2]	1964	1965	1966	1967
Export Agriculture	5,501	5,200	6,084	5,400	8,210	7,110	7,370
Domestic Agricult.	5,661	5,831	4,176	4,800	5,200	5,280	5,300
Manufacturing	620	651	1,454	1,140	1,122	1,140	1,195
Construction	2,320	2,961	2,082	2,930	3,070	2,850	3,222
Transportation	800	824	1,063	1,116	1,172	1,230	1,292
Rent of Dwellings	2,107	2,170	2,355	2,449	2,547	2,674	2,807
Distribution Hotels	3,950+	3,970+	4,119	4,280	4,370	4,850	5,200
Services	2,010	2,111	2,347	1,600	1,680	1,764	1,852
Finance and Insurance	..	..	1,362	1,416	1,473	1,532	1,593
Government	5,245	5,430	4,439	4,550	4,650	5,870	6,090
TOTAL	28,714	29,168	29,481	30,486	34,544	35,731	38,012

Notes: 1) Estimates by Karleen O'Laughlin

2) Estimates by Keith Padmore

1964-67 Estimates by B.D.D.

\+ Includes Finance and Insurance

Source: Grenada - Economic Survey and Projections: B.D.D. September 1967

INDUSTRIAL ORIGIN OF GROSS DOMESTIC PRODUCT

(ECS '000)

Industry	1970	1971	1972
(1)	(2)	(3)	(4)
1. Agriculture - field crops	8893	8070	8841
2. Livestock	2534	2696	2710
3. Forestry and Logging	120	99	96
4. Fishing	430	497	1506
5. Mining and quarring	124	120	110
6. Manufacturing	2676	2473	2622
6.1 Companies	1956	1753	1722
6.2 Cottage industries	720	720	900
7. Construction	8506	5817	6019
8. Electricity and water supply	588	809	806
8.1 Electricity	451	672	632
8.2 Water supply	137	137	174
9. Transport and Communication	5558	6118	5817
9.1 Transport by road	3929	4415	3936
9.2 Transport by sea	500	541	543
9.3 Transport by air	224	234	242
9.4 Post Office	317	317	394
9.5 Telephone and Cable and Wireless	588	611	562
9.6 Broadcasting	-	-	140
10. Trade	9543	9784	11661
11. Hotels and Restaurants	1387	2142	1327
12. Banking and Insurance	1922	2447	3388
12.1 Banking	1196	1424	1969
12.2 Insurance	726	1023	1419
13. Ownership of Dwellings	5409	5464	5518
14. Public Admin. and Defence	6017	6647	6678
15. Other Services	6180	6443	7065
15.1 Education and Health	3978	4105	4590
15.2 Rest	2202	2338	2475
Total gross domestic product	60013	59730	64164

INDUSTRIAL ORIGIN OF GROSS DOMESTIC PRODUCT

(ECS '000)

Industry	1973	1974	1975
(1)	(5)	(6)	(7)
1. Agriculture-field crops	8132	11399	16364
2. Livestock	2540	3047	3161
3. Forestry and Logging	89	42	79
4. Fishing	1974	1858	3518
5. Mining and quarring	82	182	89
6. Manufacturing	3165	2987	3614
6.1 Companies	2265	1907	2534
6.2 Cottage industries	900	1080	1080
7. Construction	5478	2871	5713
8. Electricity and water supply	1133	1161	1363
8.1 Electricity	865	941	1160
8.2 Water supply	268	220	203
9. Transport and Communication	7191	7154	7771
9.1 Transport by road	5124	5456	5481
9.2 Transport by sea	559	619	599
9.3 Transport by air	194	225	235
9.4 Post office	343	340	385
9.5 Telephone and Cables and Wireless	829	374	929
9.6 Broadcasting	142	140	142
10. Trade	12268	10279	12706
11. Hotels and Restaurants	1668	1253	1870
12. Banking and Insurance	2558	3018	3325
12.1 Banking	1117	1543	1316
12.2 Insurance	1441	1475	2009
13. Ownership of Dwellings	5573	5629	5685
14. Public Admin. and Defence	6515	6792	7207
15. Other Services	7449	7693	7999
15.1 Education and Health	4837	4945	5113
15.2 Rest	2612	2748	2886
Total Gross domestic product	65815	65365	80464

11. Grenada and the ECCM Countries: within the ECCM Grenada comes third as far as its population is concerned but it has the second smallest GDP per capita.

SOME COMPARATIVE STATISTICAL INDICATORS IN ECCM COUNTRIES - 1976

1976	ANTIGUA	DOMINICA	MONTSERRAT	ST. KITTS	ST. LUCIA	ST. VINCENT	GRENADA
Population (mid-year)	71,420	81,753	12,362	49,150	113,600	105,000[1]	106,764
G.D.P. per capita (EC$)	1,684[2]	904	1,367	1,536	1,342	495[1]	754[2]
Birth Rate	21.7	21.1	16.7	26.9	34.5	34.5	25.4
Infant Mortality Rate	27.7	23.9	48.5	33.3	26.8	55.2	27.6
Death Rate	6.9	6.5	10.4	9.7	7.8	7.2	6.3
Hospital Beds per thous.pop.	5.4[2]	3.4	4.6	5.0	5.0	2.0[2]	3.0
Doctors per thous.pop.	0.3[2]	0.1	0.4	0.3	0.3	0.16[2]	0.2
Primary schools per thous.pop.	0.7	0.7	1.3	0.6	0.6	0.6	0.6
Primary schools teachers per thous.pop.	5.7	8.1	8.6	6.2	8.4	n.a.	7.4
Secondary schools per 10,000 pop.	2.5	0.9	2.4	1.2	1.0	1.6	1.6
Secondary schools teachers per 10,000 pop.	4.1	1.3	2.8	5.0	2.0	2.2	2.0[3]
Visitors per thous.pop.	1,254	187[2]	907	363	1,105	303	1,232
Hotel beds per thous.p.	15.8	4.2[2]	10.7	11.9	24.8	7.4[2]	9.0[3]
Registered motor vehicles per thous.pop.	114	39[4]	105	60	50	51	59
Private cars per thous. pop.	71	27[4]	69	33	27	24	32

SOME COMPARATIVE STATISTICAL INDICATORS IN ECCM COUNTRIES - 1976 continued

1976	ANTIGUA	DOMINICA	MONTSERRAT	ST. KITTS	ST. LUCIA	ST. VINCENT	GRENADA
Bank deposits per capita	1.37	0.50	1.72	1.02	0.75	0.48	0.62
Government Expenditure per capita	06	315	779	594	432	255	337
Income Tax Revenue per capita	72.2	62.3	183.4	69.2	103.3	53.3	47.5
Imports per capita	1,285	609	1,683	891	1,107	591	620
Domestic Exports per capita	594[2)]	343	63	628	402	225	308

Latest year for which comparative data available

1) Estimate 2) 1975 3) 1977 4) 1973

Source: E.C.C.M. Statistical Digest 1976/77; Grenada Stistical Abstract 1978; United Nations monthly bulletin Statistics

Annex 4.5:

DOCUMENTS ABOUT GRENADA

a) General

The Grenada Investment Code (Draft 1982);

Central Statistics Office, Grenada: Abstract of Statistics 1979;

Caribbean Community: Ministerial Summary of the Regional Industrial Planners Report on Criteria for Distribution of Industrial Activities and Strategies for Implementation of the Regional Industrial Programme, November 1981.

CEPAL/CARIB: Industrial Development Strategies in Caribbean Countries, 11th May 1981;

Government of Grenada: Draft terms of reference for industrial survey, 1980;

BOATSWAIN, ANTHONY: Industrial Development Strategies in Caribbean Countries (CEPAL) 1981.

Documents

b) World Bank:

Report 2043 CRB: Industrial Development and Development Finance companies in the caribbean 1978.

5660: Caribbean Regional Study: Industry 1975.

2949: GRD: Economic Memorandum of Grenada

2501 CRB: Industrial Investment Incentives in the 1980 Caribbean 1979.

2501 CRB: Economic survey of the East Caribbean Common Market Countries 1979

2434 GRD: Current Economic position and prospects of Grenada 1979.

c) International Finance Corporation
Measures to promote the role of the private sector in Caribbean Development. Washington, 1980.

d) UNIDO: Tetsuo Yamada. A check list for preparation of feasibility studies industries projects (for St. Vincent Development Corporation) 1978.

Shigeo Katsu: Project for assistance to improve the Cocoa Industry of Grenada, 1978.

e) Others: CEGIR: A study on regional industrial programming in the CARICOM Countries 1980.

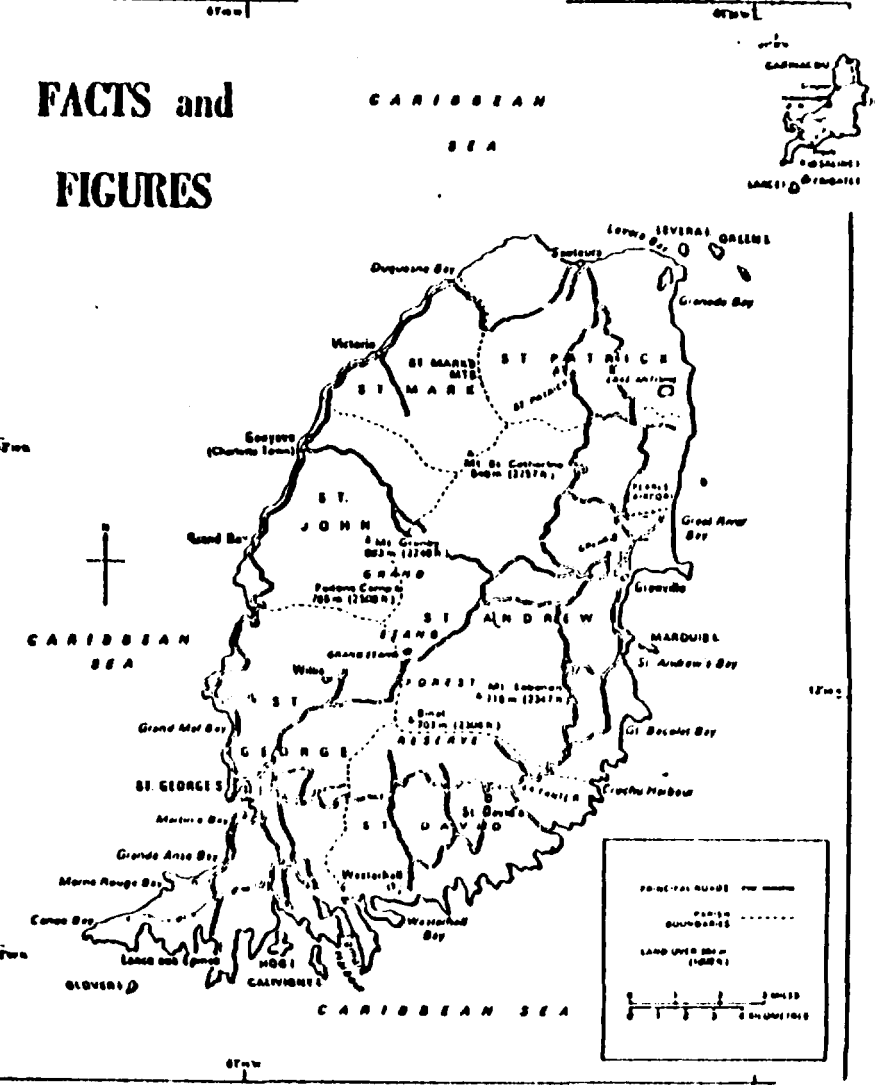
Annex 4.6:

HISTORY

1498	Columbus first sighted the island
1609	First settlement (English) attempted - ejected by the Carib Indians
1626/7	Both France and England claimed title
1638	First French settlement attempted - fought off by Caribs
1650	Island bought by Frenchman (du Parquet) and settlement established
1651	Caribs defeated by the French, culminating in "Caribs Leap" at Sauteurs
1664	French West India Company took over island
1674	French colony
1700	First census: 257 whites; 525 slaves; 53 free coloured
1705-10	Fort Royal (now Fort Rupert) constructed
1714	Coffee and cocoa introduced
1738	First hospital
1763	Island ceded to Britain (Anglo-French 7-years war)
1779	Captured by the French
1780-83	Fort Frederick constructed
1783	Restored to Britain under Treaty of Versailles
1784	First newspaper - "Grenada Chronicle"
1795	Rebellion against the British, led by Fedon
1838	Slaves freed
1843	Nutmegs introduced, as sugar declined
1857	First East Indian immigrants
1871	Telegraph connected
1872	First secondary school - St. Joseph's Convent
1877	British colony
1911	First Government secondary school
1925	Whaling station established on Glover Island
1928	Electricity installed in St. George's
1943	Pearls Airport opened
1955	Hurricane Janet
1958	West Indies Federation
1962	Dissolution of West Indies Federation
1967	Associated Statehood with Britain
1974	Independence
1979	March 13th People's Revolution

GRENADA

FACTS and FIGURES



The boundries shown on the map do not imply official enclosement or acceptance by the United Nations.

POPULATION: 109,200
(Dec. 1980)

Under 15 yrs. old - 47%
15 - 64 yrs. old - 47%
65 yrs and over - 6%

POPULATION DENSITY:
221 per sq. mile
(117 per sq. km)

BIRTH RATE: 33.6 per thousand population (1980)

DEATH RATE: 6.6 per thousand population (1980)

EDUCATION:
(1980)

	Primary	Secondary
Number of schools	68	11
Number of teachers	784	384
Number of students	33 063	6 120

ADULT LITERACY RATE: 85%

HEALTH:
(1980)

Hospitals - 3 (125 beds)
Dentists - 6
Doctors - 39
Nurses - 225

Population per doctor - 2 800

TOURISM:
(1980)

Hotels - 18 (975 beds) Guest Houses - 6 (110 beds)
Stay over visitors : 29 618

U.S.A.	33.0%
W. Germany	11.7%
U.K.	11.3%
Canada	6.8%

Cruise ship passengers: 143 596
Number of cruise ships: 236
No. of yacht calling : 1 005

AIRCRAFT ARRIVALS:
(1980)

Commercial: 2,890
Private: 602

ENERGY CONSUMPTION:
(1980)

Gasoline	3.1 m. gals.	(11.5 m. litres)
Diesel	1.9 m. gals.	(8.6 m. litres)
Kerosene	0.3 m. gals.	(1.4 m. litres)
L.P. gas	2.7 m. gals.	(1.2 m. litres)
Electricity	20.9 m. Kwh.	

LIVESTOCK:
(1975)

Cattle - 3 907	Pigs - 6 334	Mules - 36
Sheep - 8 313	Horses - 13	Asses - 1 430
Goats - 6 192	Poultry - 143 600	

AGRICULTURAL PRODUCTION:
(1980)

Bananas	(Export)	11,232 tons (11,420 m tons)
Nutmegs	(Equiv. shelled)	2,321 tons (2,358 m tons)
Cocoa		2,143 tons (2,177 m tons)
Mace	(Equiv. cured)	368 tons (377 m tons)
Sugar cane		11,874 tons (12,013 m tons)

FISHING: Estimated catch - 3 million lbs(3,125 tons
(1980) (3,175 m. tons)

EXPORTS:
(1980)

Commodities: Cocoa 40%; Nutmeg 19%; Banana 16%; Mace 4%

Destinations: U.K. 43%; Germany 8%; Holland 9%; Belgium 19%

IMPORTS:
(1980)

U.K. 18%; Trinidad 10%; Canada 6%; U.S.A. 19%; Japan 5%; Cuba 2%

Food	20.8%	Chemicals	11.0%
Manuf. goods	15.6%	Mineral fuels	12.7%
Machinery & Transp. Equip.	13.9%	Others	7.2%

BALANCE OF TRADE:
(1980)

Imports: E.C.$135 893 267 (U.S.$50 330 840)
Exports: E.C.$ 45 813 836 (U.S.$16 960 087)
Deficit: E.C.$ 90 079 431 (U.S.$33 369 753)

COMMERCIAL BANKS' DEPOSITS:
(1980)

E.C.$134.2 million (U.S.$57.6 million)

GOVERNMENT REVENUE:
(1980)

E.C.$ 39.0 million

Sources:

Import duty	30.4%	Stamp duty	12.5%
Income Tax(personal)	15.8%	Foreign exchange tax	9.1%
Company tax	13.6%	Export duty	7.7%

GROSS DOMESTIC PRODUCT:

E.C.$135.5 million (U.S.$50.2 million)

Per capita: E.C.$1,241 (U.S.$ 459)

Agriculture, Forestry and Fishing	30.0%	Electricity & Water	1.0%
		Construction	3.5%
Manufacturing	2.9%	Transport & Communic.	6.6%
Wholesale & retail trade	13.6%	Hotels & Restaurants	9.2%
Government services	26.1%	General Services	15.6%

LOCATION: 12° 07' North 61° 40' West

AREA: Grenada - 120 sq. miles (311 sq.km.)
Carriacou & Petit Martinique-13 sq.miles (34sq.km.)
Highest point-Mount St.Catherine-2,757 ft.(840 m.)

TEMPERATURE. (Pearls Airport)

(Average mean Maximum Temperature 1976-80)

	°F	°C		°F	°C		°F	°C
Jan.	83.4	(28.6)	May	84.5	(29.3)	Sept.	86.6	(30.3)
Feb	83.9	(28.8)	Jun.	83.6	(29.0)	Oct.	86.3	(30.4)
Mar.	84.2	(29.0)	Jul.	83.5	(29.2)	Nov.	85.3	(29.3)
Apr.	83.2	(29.6)	Aug.	84.1	(30.1)	Dec.	84.3	(29.1)

Highest temperature - 90.0 (32.2) October 1978
Lowest temperature - 61.0 (16.1) January 1979

RAINFALL: Rainy Season : July to November

(Average 1976-80)

St. George's 70.5 in. (1792 mm)
Maran (Carriacou) 101.0 in. (2566 mm)
Mt. Hesse 85.1 in. (2162 mm)
L'Anse aux Epines 53.3 in (1331 mm)
(1976-1979)

RELATIVE HUMIDITY:
(Average 1976-80)

6.00 a.m. - 81% 3:00 p.m. - 76%
(range 76-86%) (range 67-81%)

GUANA: (1980) 476 miles (766 km.)

MILEAGES: St.George's Gouyave Victoria Grenville Soutouko

Birchgrove	9.3	7.7	19.5	4.7	13.9
Gouyave	11.7	---	3.2	10.7	10.2
Grand Anse	3.7	15.4	18.6	16.4	23.6
Grenville	14.0	10.7	13.6	--	10.6
L'Anse aux Epines	3.2	16.9	20.1	17.9	23.1
Pearls Airport	15.0	12.5	16.5	3.1	9.5
Point Salines	6.0	17.7	20.9	18.7	27.9
Soutouko	13.9	10.1	3.0	10.5	---
St George's	--	11.7	14.9	14.0	21.9
Victoria	14.9	3.2	--	17.6	7.0

MAIN TOWNS:

St. George's - 7,100 (est) Grenville - 3,100 (est)
Gouyave - 2,900 (est) Victoria - 2,000 (est)

NEAREST ISLANDS: (Nearest points)

Trinidad - 88 miles
Barbados - 160 miles
St. Vincent - 33 miles

OFFICIAL PORTS OF ENTRY/EXIT:

Air: Pearls, Lauriston (Carriacou)

Sea: St. George's, L'Anse aux Epines, Grenville, Hillsborough (Carriacou)

ETHNIC ORIGIN:

Negro/Black - 84% E. Indian - 3%
Mixed - 11% White - Less than 1%

RELIGION:

Roman Catholic - 64% Anglican - 23%
Methodist - 3% 7th Day Adventist - 3%

LANGUAGE: English

ELECTRICITY: 230 volts 50 cycle and
400 volts 3 phase

TIME:

Atlantic Standard Time (year round) -G.M.T minus 4hrs.

CURRENCY:

East Caribbean Dollar (E.C.$): U.S.$1=E.C.$2.7

BANKS:

Barclays; Royal Bank of Canada, Scotiabank; National Commercial; Cooperative

Hours: 9 a.m.-12 noon & Friday 2.30/3.00-4.30/5.00

TELEPHONES (1980) : 3,139

ACCESS TO ELECTRICITY : 33%

ACCESS TO PIPED WATER : 30%

REGISTERED MOTOR VEHICLES (1980) : 7,702
= 70.3 per thousand population

AIRPORTS:

Pearls - 5,000 ft.

Point Salines- 9,000 ft. (under construction)

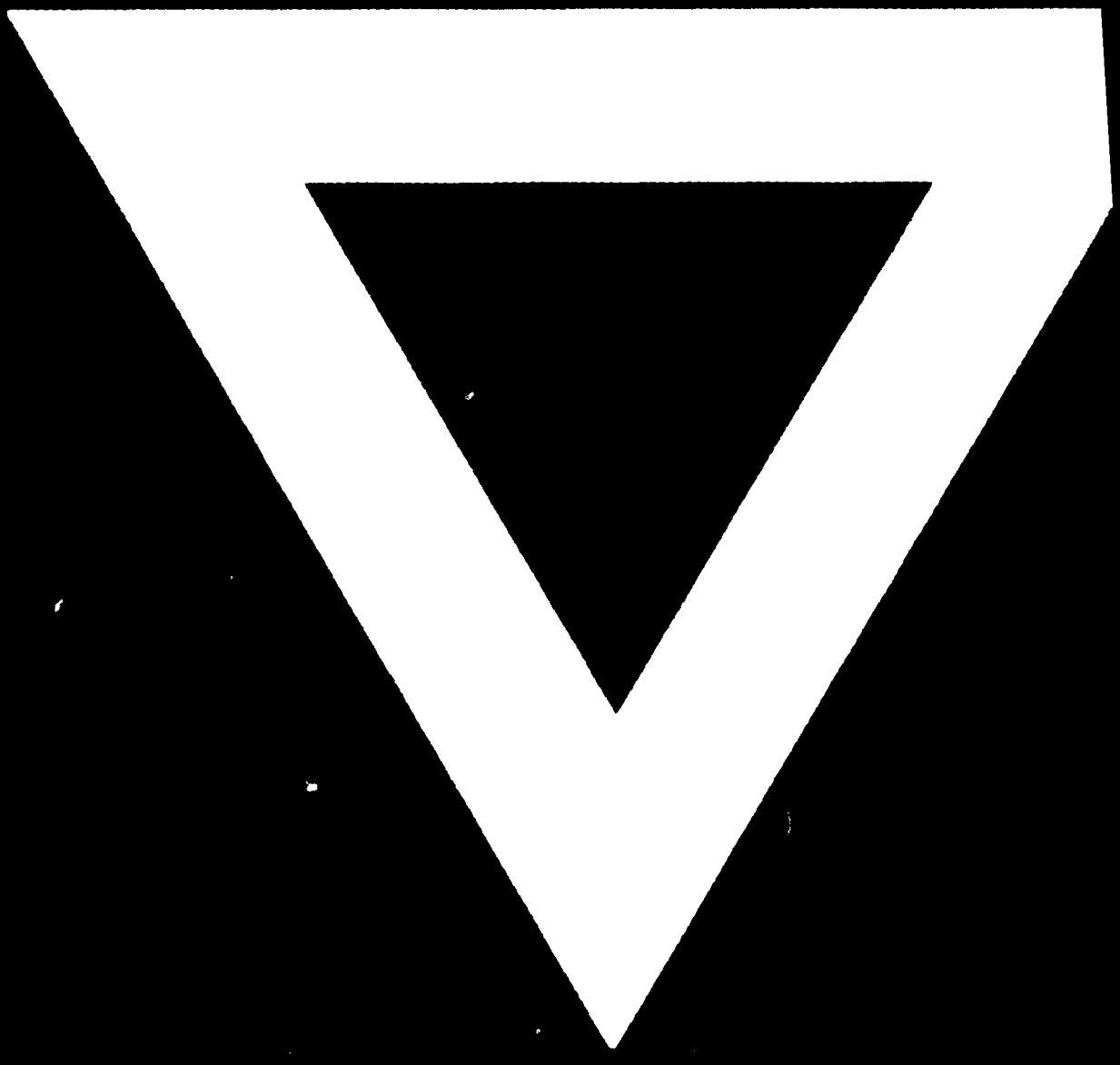
AIRPORT TAX:

E.C.$5.00 per person on departure

AIRLINES SERVING GRENADA:

L.I.A.T., Air Cubana, B.W.I.

B-208



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