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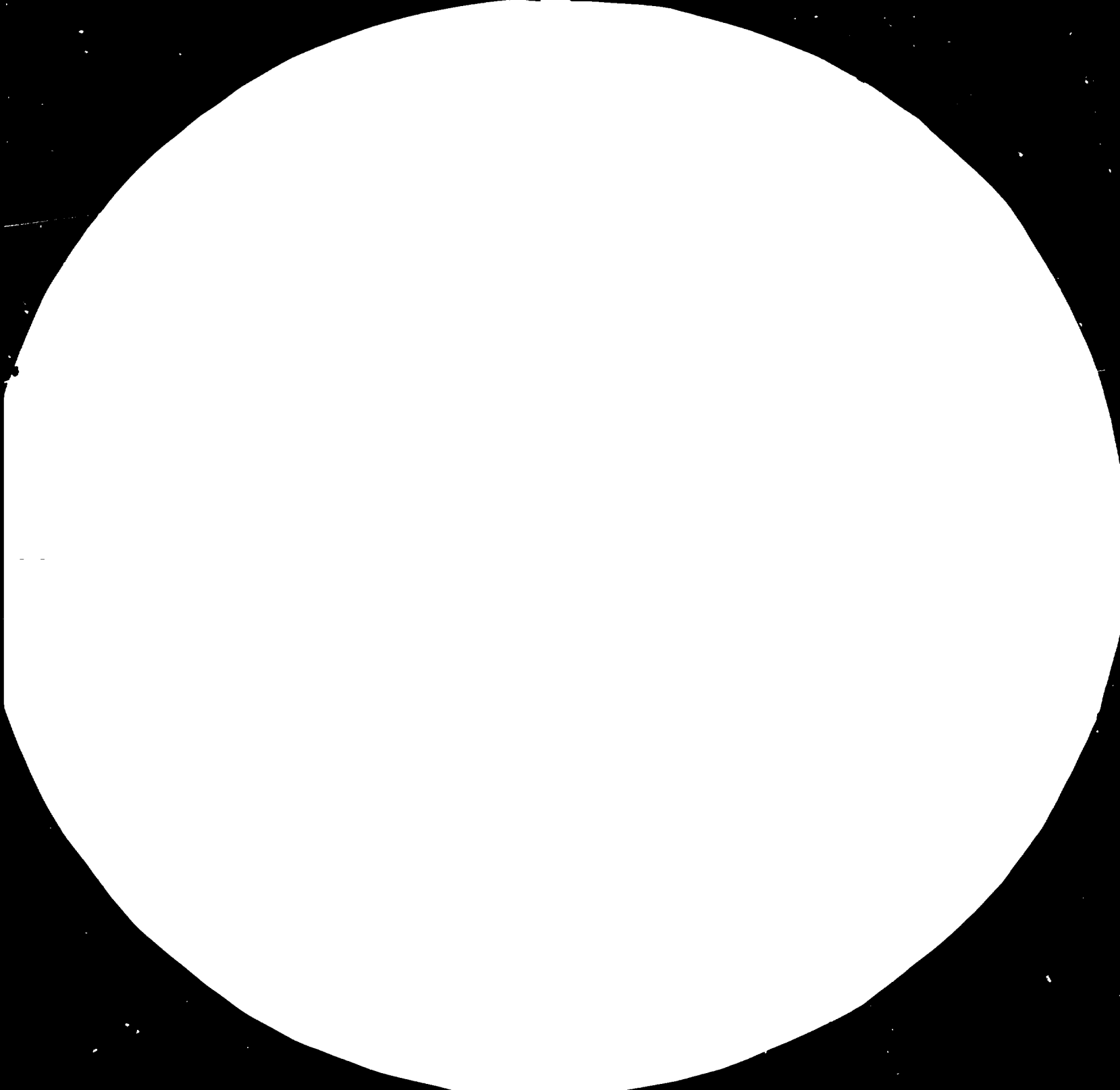

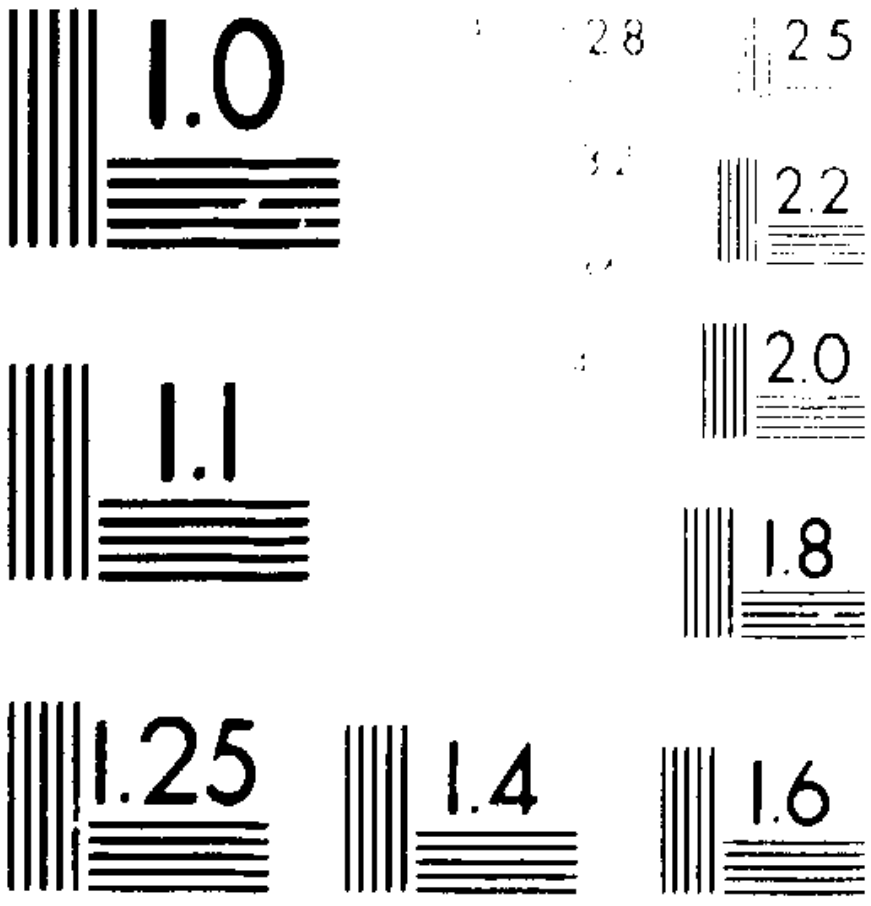

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COCONUT INDUSTRY DEVELOPMENT CONSULTANCY TO CARICOM

IO/RLA/84/112

Terminal Report

A review of the coconut industry in the Caribbean Region resulting in recommendations for development*

Based on the work of Pedro C. Catanaoan
Coconut Industry Specialist

*This document has been reproduced without formal editing.

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INTRODUCTION

In the meeting in January 1982, the Standing Committee of Ministers responsible for Agriculture in all CARICOM Member Countries agreed that -

(a) the rehabilitation of the coconut industry is to be given top priority and a funding programme for its development is to be established;

(b) the programme is to include the conduct of an investigation study of the problems affecting the coconut industry.

Based on this fact and on the special request of the CARICOM Secretariat, a three-month consultancy was provided by UNIDO within the framework of the project US/GLO/80.005. The UNIDO consultant visited all CARICOM Member Countries and outlined basic development programmes supported with figures and data and relevant pre-feasibility calculations. The result of the UNIDO services as laid down in the report UNIDO/IO.R.119 found approval of the CARICOM Secretariat and its full satisfaction.

The conclusions in the UNIDO report were as follows:

1. There is sufficient coconut production in the region to supply at least seventy percent of the region's edible oil requirements;

2. With a more aggressive and effective copra production programme, the region will narrow down its demand and supply gap in three years, and possibly achieve self-sufficiency in five years;

3. There are adequate and suitable facilities for processing all copra presently producible in the region into edible oils.

4. There is an urgent need to control the "coconut mites" in practically all the countries in the region;

5. Increasing the price of copra, alone, is not sufficiently effective in increasing copra production, "industrialisation"

of copra production has been proven to be effective in some of the countries.

6. Government and/or private enterprise should actively participate in coconut and copra production to enable the region to achieve self-sufficiency in supply of edible oils;

7. There is a region-wide need for a programme of rehabilitation of existing coconut plantations, replanting of old senile coconut farms, and expansion of coconut acreage.

I. PURPOSE OF THE PROJECT

To design, formulate, and techno-economically justify specific production and processing projects in the coconut industries sector and to outline and evaluate solutions to the techno-economic problems the coconut industry is faced within the CARICOM Countries.

The coconut industry specialist is expected to carry out the following duties:

1. To assist the CARICOM Secretariat in the evaluation of project proposals prepared by the EDF-financed coconut industry development study team.
2. To assist the CARICOM Secretariat and the CARICOM Member Countries Governments in the design and formulation of coconut industry development projects ready for financing.
3. To review and study the existing operational problems of the coconut industry at both the farm level and processing factory level and to assist in finding appropriate solutions to be laid down in short-term and long-term development plans.
4. Act as consultant to the CARICOM Secretariat and CARICOM Member Government authorities also on other relevant coconut industry development issues.
5. Prepare a final report setting out the results of the study and evaluation work and the recommendations made to relevant authorities on further action which might be taken.

II. RECOMMENDATIONS ON THE PROJECTS PROPOSED BY THE EDF-FINANCED STUDY TEAM

A. Projects Identified

	Project	Area Covered	Probable Funding
1.	Coconut Variety and Inter-cropping Trials Programme	Regional	Grant
2.	Establishment of Pest and Disease Monitoring System and Coconut Mite Control Project	Regional	Grant
3.	Coconut Rehabilitation Project	Guyana	Grant
4.	Integrated Coconut Rehabilitation Project	St. Christopher and Nevis	Soft loan
5.	Integrated Fibre Extraction and Coir Utilization Project	Jamaica	Commercial loan
6.	Integrated Fibre Extraction and Coir Utilisation Project	St. Vincent, Dominica, and Saint Lucia	Commercial loan
7.	Coconut Food Products Pilot Plant	Saint Lucia	Soft loan
8.	Integrated Charcoal Production and Activated Carbon Plant	Saint Lucia, Dominica, and St. Vincent	Commercial loan

B. Comments and Recommendations

1. Coconut Variety and Intercropping Trials Programme:
The coconut variety trial and evaluation study should take the following factors into consideration:

   (a) copra yields per acre, which is also an indicator of yields of other kernel-based products, except oil;

   (b) oil yield per acre, since oil will still be the primary product;

   (c) relation of size of nuts to the technology envisioned. If wet processing and desiccated coconut are contem-

plated, varieties with bigger nuts are more suitable.

(d) foreign exchange requirements for the development and maintenance of coconut farms, considering the foreign exchange problem in the Region;

(e) labour requirements, noting that labour supply for agriculture is diminishing and the cost of labour is high in the Region;

(f) pest and disease resistance;

(g) fruiting age and senility age.

2. Establishment of Pests and Diseases Monitoring System and Coconut Mite Control Project.

The following studies should be included:

(a) evaluation and quantification of the effects of field sanitation alone, including top cleaning, on various coconut pests;

(b) effects of operating copra dryers under the coconut trees on pests and diseases;

(c) the cumulative effects of chemicals used in pest and disease control on the environment and the food chain;

(d) foreign exchange requirements and economic feasibility of the various systems of pests and diseases control.

3. Coconut Rehabilitation Project for Guyana

(a) a more detailed study to identify the specific rehabilitation needs should be undertaken to reduce the project costs and improve the feasibility of the project. Manual (cutlass) clearing should be increased and mechanisation should be reduced to minimise external costs and increase internal economic benefits;

(b) a possible scheme of funding is to make the grant available to the Government (Ministry of Agriculture) which will be relent to the farmers as low-interest loans to finance specific rehabilitation projects.

The feasibility of the loan project should be evaluated prior to lending and the implementation of the project should be monitored by the Ministry of Agriculture. The interests earned shall be used to establish and maintain coconut seedlings farms and for salaries of additional personnel to supe-vise and administer the coconut rehabilitation project. The scheme will make the project self-perpetuating, if properly managed.

4. Integrated Coconut Rehabilitation Project for St. Christopher and Nevis.

(a) a coconut oil refinery should be included in the processing plant. Refining of the oil will increase the added-value and will make the project more viable. The refined oil shall be marketed locally and in the neighboring countries. Since the volume of the oil is small, it may not be feasible to export the product.

(b) the project should be split into two parts, for better funds management: the coconut farms rehabilitation part, and the processing plant part. The rehabilitation shall be funded by grant, while the cost of the processing plant shall be funded by soft loans;

(c) the animal feeds plant design should be simplified to reduce the project cost and to improve the project's viability. Since the plant is small, the pelleting machine and some of the conveyors can be eliminated.

(d) a steam boiler which can use coconut shells and husks should be used to reduce production costs;

(e) the existing oil mill equipment in Nevis may be integrated into the new project to reduce cost.

5. Integrated Fiber Extaction and Coir Utilisation Project for Jamaica.

(a) the market study for the project should include projections for future market. It should be realised that

there are many coconut fibre projects over the world which failed because of market problems;

(b) the use of rubberized coir cushions for car seats should be introduced to car manufacturers in the United States. When possible, joint-ventures should be entered into, for assurance of a long-term market for the products.

6. Integrated Fiber Extraction and Coir Utilisation Project for St. Vincent, Dominica, and Saint Lucia

(a) transport costs can be a problem, if extra-regional markets are considered. Regional markets will probably be more feasible, if foreign exchange problems can be overcome;

(b) regional markets can include car assemblers and furniture manufacturers. Furniture designs using rubberized coconut fibers should be developed and promoted.

7. Coconut Food Products Pilot Plant for Saint Lucia

(a) the Alfa-Laval process (which is similar to a Philippine process) aside from having a lower investment cost, has the advantage of producing a wide range of new coconut food products: coconut cream, skim milk, coconut flour, water-white coconut oil, protein concentrates, etc.

(b) to avoid the need for further modifications and additional investments, the pilot plant should be designed for commercial production. A weighbridge, nut storage for one week production, packaging and canning equipment, product storage, conveyors and transfer pumps for continuous operations should be included from the start.

(c) the steam boiler should be designed for coconut shells and coconut husks as fuel. A steam-turbine electric power plant will reduce production costs considerably.

8. Integrated Charcoal Production and Activated Carbon Plant for Saint Lucia, St. Vincent, and Dominica.

(a) Coconut shell activated carbon has some special qualities and has gained preference in gas-phase filtering systems. The markets for the product should be identified and quantified. Note that there is a decline in the production of refined cane sugar in the region which has been considered as a potential market for activated carbon.

(b) electricity is generally generated from power plants using diesel fuel and steam boilers in industrial plants use bunker or diesel fuel. Considering the high cost of petroleum fuels and the need for foreign exchange to import these fuels, the use of coconut shells and coconut husks for power generation and industrial fuels should be considered. At present prices of petroleum fuels and coconut shell charcoal, it is more profitable to use the shells as fuel. As supplementary source of fuel, ipil-ipil (leucaena leucocephala) can be planted in perpetual tree farms.

Due to time limitations, the consultant was not able to make a detailed techno-economic evaluation of the projects proposed in the report prepared by the Minster Agriculture Ltd. It is apparent that the report was not intended to be a pre-investment feasibility study. The report did not reveal the details of the technical information and did not include the market studies for the different products. Since these data and information are required in preparing the techno-economic evaluation, more time will be necessary to prepare a techno-economic feasibility analysis of the projects. The recommendations in this report may serve as guidelines in the final implementation of the projects and can be useful in the designing the final projects.

III. FIVE-YEAR COPRA DRYERS DEVELOPMENT PLAN

In 1983, the UNIDO Study identified the lack of copra drying facilities in many of the countries as one of the causes of low copra production. The study also concluded that, with a more aggressive and effective copra production programme, the region will be able to produce at least seventy percent of its edible oil needs. The reasons for the lack of copra dryers were as follows:

1. High cost of building copra dryers which, in many cases, is beyond the reach of many coconut farmers;
2. Copra making, as an industry, was not considered viable due to low copra prices and high cost of production;
3. Lack of incentive in investing in the coconut industry due to apparent uncertainties in the world market for coconut oil.

During the same year, the price of coconut oil started to rise and veer away from the prices of the other vegetable oils, soybean oil and corn oil, apparently due to the increasing demand for coconut oil as a raw material in the production of non-food products due to its high lauric acid content. During the second semester of 1984, the prices of coconut oil were about twice the prices of soybean oil and corn oil, and about equal the CARICOM controlled price. There are technical reason to believe that the demand and the relatively higher price of coconut oil will continue to prevail for some time. Should the significant price advantage of coconut oil over the other food oils prevail, this will provide the opportunity for exporting coconut oil to extra-regional markets and importing soybean oil and corn oil for regional consumption, which can result in net foreign exchange earnings for the region. If the price margins will change to make the exportation of coconut oil non-feasible, the local prices of imported edible oils will still make the production of edible coconut oil for the regional markets. It is estimated that the total coconut oil production potential of the region is only about 70% of the total demand for edible oils. Due to lack of foreign exchange and the traditional preference by most of the

Caribbean people, edible coconut oil is expected to dominate the regional market. Peoples in the coconut-producing countries all over the world still believe that coconut oil is a safe food oil.

At the Regional Coconut Meeting held in Saint Lucia on November 22-24, 1984, it was agreed that, in order to take advantage of high prices in the world market, there is a need to increase coconut oil production as quickly as possible. Considering that there are sufficient processing facilities now in existence in the region and that there is a potential for more copra production, the UNIDO consultant proposed a crash programme for the construction of copra dryers to facilitate copra production and draw more nuts into copra production. In this connection, the CARICOM Secretariat has requested the UNIDO consultant to draft a copra dryers development plan for the Region which can be used as a basis for a request for grant finds under the EDF-funded Regional Coconut Rehabilitation Project.

A. Outline of the Five-Year Copra Dryers Development Plan

To provide for developmental flexibility, the programme will be divided into three phases, with two cut-off evaluation periods.

1. Phase I: January 1985 - June 1986

   (a) Detailed designing and planning of copra dryers project by individual countries and the integration of the regional plan by the CARICOM Secretariat. Submission of the request for funding from the EDF;

   (b) Acquisition of funds;

   (c) Construction and operation of model copra dryers throughout the region.

2. Evaluation Period: July-December 1986

   (a) Evaluation of Phase I as to technical performance, acceptability of the system, and economic feasibility. Identification of needed improvements in the plan.

   (b) Analysis of the industry situation to decide whether there is a need to pursue the dryers programme in the

light of prevailing prices, markets, and economics.

(c) Detailed survey of coconut production and identifying areas where to construct new dryers and where expansion of existing dryers are necessary, due to excess nut supply;

(d) Identification of sources of funds for Phase II;

(e) Planning of Phase II based on (a)-(d).

3. Phase II: January-December 1987

Assuming Grant Funds are Available

(a) Setting up of new copra dryers in new areas identified, from grant funds;

(b) Setting up of commercially viable copra factories, where justified, to supplement grant-funded dryers;

(c) Expanding capacities of existing dryers where enough nuts supply can justify added capacity. The expansion can be funded by grants or from loans, depending on the viability situation of each project;

Assuming No Grants are Available

(a) Construction of additional dryers or expansion of existing ones, which may be limited to viable projects with funds coming from bank loans.

(b) Construction of new dryers which may be funded by oil mills as integral part of their operations, if such an arrangement is viable;

(c) Government levies from exports of coconut oils and imports of edible oils may be used to fund new projects, if exporting of coconut oils will be feasible.

4. Evaluation Period: January- June 1988

(a) Evaluation of performance during Phase II. Decision on needed improvements on the programme;

(b) Situation analysis and decision to pursue Phase III;

(c) Identification of further dryer needs, including those where standard dryer designs are not feasible;

(d) Planning sources of funds for Phase III;

(e) Planning of Phase III.

5. Phase III: July 1988 - December 1989

(a) Setting up of additional dryers which will be viable according to available funds;

(b) Setting up of non-viable copra dryers which may be funded by industry or government grants. (While these dryers may not be financially viable as isolated projects, they may improve the viability of the entire coconut industry of the country or their existence may be necessary for socio-political reasons;

(c) Reorganising or integrating of the entire copra dryers system to improve the performance and viability of the national enterprise.

This project can be the turning point in the development of the coconut industry in the region. It will set a direction and provide the initial thrust for the development of the industry. Effective management will be crucial for its success. It is therefore recommended that an effective mechanism for its successful implementation be created.

B. Details of Phase I

1. Brief Description of Project

The project shall consist of the establishment and operation of model copra drying stations (CDS) in all the major coconut producing countries. The criteria in the selection of dryer locations shall be as follows:

(a) Sufficiency in coconut supply to support viable operations;

(b) Inadequacy of copra drying facilities in the area.

The model CDS is designed to have a nominal production capacity of

180 metric tons of copra per year which is equivalent to one million nuts. This will require about 300 to 500 acres of normally-spaced fruit-bearing coconuts. The CDS is to be located in an area which can supply at least an average of 3,000 nuts per day. Preferably, the site should be located near the main road leading to the oil factory or to the shipping point, and should be connected by access roads to the sources of nuts.

The model CDS consists of a copra dryer, shed for the dryer and work space, a small office, a tractor with a nut trailer, and a yard for stacking the nuts. The proposed dryer is a twin-type, induced-draft dryer with two independent sections, each with a capacity of 3,000 nuts per loading or a total of 6,000 nuts for the dryer. The dryer design is based on an original design of the UNIDO consultant which was first built and successfully tested at the ICA El Mira Agricultural Station in Colombia, South America in 1983. When properly operated, the dryer can produce almost sootless copra even with coconut husks as fuel, and the drying can be completed in 16 hours. The copra making cycle can be completed in 24 hours but, allowing for operational delays, it is assumed that three dryings can be made or 18,000 nuts can be processed per week. To achieve continuous operation, a tractor with a trailer is required for hauling of nuts from the source to the drying station. A wheel-type tractor with 72-hp. diesel engine will be adequate for most areas and the trailer should be a heavy-duty type which can carry at least 3,000 nuts which will weigh about 5 tons.

The CDS will be manned regularly by two men: a CDS foreman, who shall be responsible for the maintenance of the CDS and the supervision of copra making operations, and a tractor operator who shall drive and maintain the tractor.

2. Management of the Project.

The funds and operations of the entire dryers project in each country shall be administered by the Ministry of Agriculture. It is recommended that a Copra Production Unit (CPU) be organized within the Ministry to take charge of the Project. The primary functions

of the CPU are as follows:

(a) To supervise and provide administrative services to all the CDSs;

(b) To monitor the operations of the CDS and make recommendations on how to improve the copra making systems;

(c) To identify areas where other dryers should be constructed.

To provide mobility for personnel of the CPU, it is further recommended that one government utility vehicle be assigned to the Unit.

Instead of the CPU, the Minister of Agriculture may assign the management of the project to existing coconut industry institutions or associations, such as the Coconut Industry Board in Jamaica, or the Coconut Growers' Association in Saint Lucia and Trinidad & Tobago.

3. Number of Copra Drying Stations

Based on estimates of coconut production in the Region, a total of 470 drying stations will be required, assuming that the model CDS will be adopted. It is recommended that fifty eight (58) CDSs be established during Phase I, which will be distributed as follows:

Antigua and Barbuda	- 1	Jamaica	- 10
Belize	- 5	St. Christopher and Nevis	- 2
Dominica	- 5	Saint Lucia	- 10
Grenada	- 2	St. Vincent & Grenadines	- 3
Guyana	- 10	Trinidad & Tobago	- 10

The model CDS shall serve as pilot or demonstration copra drying systems to test the actual feasibility, effectiveness, and acceptability of the CDS design in different countries and varying conditions, to provide a basis for the designing of subsequent phases of the project.

The tentative locations of the CDS as recommended by coconut industry authorities in each country are as follows:

Antigua and Barbuda

Barbuda - 1

Belize

Corozal - 1
Orange Walk - 1
Ladyville - 1
Dangriga - 1
Belmopan - 1

Dominica

Calabishi - 1
Melville Hall - 1
Marigot - 1
Castle Bruce - 1
Geneva - 1

Grenada

Hope - 1
Paradise - 1

Guyana

Region 2 - 2
Region 3 - 1
Region 4 - 2
Region 5 - 3
Region 6 - 2

Jamaica

Whitehall, St. Mary - 1
Drax Hall, St. Anne - 1
Fair Prospect, Portland - 1
Ebony Hill, St. Thomas - 1
Unity, St. Mary - 1
Paradise, Portland - 1
Agualta Vale, St. Mary - 1
Tryall, St. Mary - 1
Wales, Trelawny - 1
Hermitage, Portland - 1

St. Christopher and Nevis

Willets Estate (St. Kitts) - 1
Jessops (Nevis) - 1

Saint Lucia

Desrusseux - 1
Bexton - 1
Praslin - 1
Ferrand - 1
Vanard - 1
Mahaut - 1
Denrey - 1
Patience - 1
Marquis - 1
St. Joseph - 1

St. Vincent and the Grenadines

Richmond - 1
Spring - 1
Landers - 1

Trinidad & Tobago

Toco - 1
Manzanilla - 1
Guayaguayare - 2
Cedros - 1
Tobago - 4

4. Estimate of Project Cost

The estimated capital investment for one model CDS is US$ 60,000, detailed as follows:

Fixed Capital Investment	
Copra dryer	US$ 3,000
Dryer building	15,000
Office building	5,000
Tractor	14,500
Nut trailer	4,500
Miscellaneous tools and equipment	1,000
Fencing and driveway	6,000
Installation cost	3,500
Contingency	5,000
Total	57,500
Working Capital	2,500
Total Project Cost	US$ 60,000

The total investment for fifty eight (58) model copra drying stations will be US$ 3.48 million, which is assumed to be totally funded from grants. The foreign cost is estimated at 70 percent, while the local cost is 30 percent.

5. Schemes of Operation of the CDS

Scheme A - CDS serves as a service facility

The CDS foreman sets the schedule for each nut owner for the use of the dryer and sends the tractor to haul the nuts from roadside on schedule. The owner provides all the labour for hauling, dehusking, cracking, drying, deshelling, chopping, and bagging. The nut owner pays for hauling and the use of the dryer. All the shells are part of the dryer rental in addition to cash rent.

Scheme B - CDS buys the nuts and sells copra

The tractor gathers the nuts from roadside. The CDS provides all the labour for hauling, dehusking and copra making. Dehusking is done at the CDS yard under the supervision of the owner. The owner sells the dehusked nuts (including the husks) to the CDS.

One section of the dryer may be used under Scheme A and the other under Scheme B, if the situation demands.

6. Sources of Income for the CDS

To support the cost of operation and maintenance of the CDS, the following sources of income are proposed:

For Scheme A:

(a) Rental for the use of dryer: A rental of US$60.00 per ton of copra produced to be collected from the owner;

(b) Premium on quality copra: A premium of US$20.00 per ton of copra to be collected from the copra buyer or processor.

(c) Hauling charges: A hauling charge of US$60.00 per ton of copra produced to be collected from the nut owner;

(d) Sale of coconut shells: When possible, the coconut shells will be sold to the factory to be used as boiler fuel or to charcoal makers. The proposed price of coconut shells is US$80.00 per ton, at the source.

For Scheme B:

(a) Profits from copra making: The difference between the sales of copra, at basic price, and the cost of raw material and production;

(b) Premium on quality copra: Same as Scheme A - US$20.00 per ton of copra to be collected from the copra buyer;

(c) Sale of coconut shells: Same as Scheme A.

7. Operational Costs.

For Scheme A.

(a)	Salary of the CDS foreman -	US$300 per month
(b)	Salary of the tractor operator -	US$40 per week
(c)	Fuels and lubricants for tractor -	US100 per week
(d)	Repair and maintenance cost -	US$200 per month
(e)	Miscellaneous costs -	US$100 per month

(f) Overhead costs - US$2,400 per year

(g) Reserves for depreciation - US$5,000 per year

For Scheme B:

(a) All costs in Scheme A, plus

(b) Labour costs for hauling of nuts and copra making- US$80 per metric ton of copra produced.

8. Limitations of Financial and Economic Projections.

The costs and prices in the preparation of the financial viability and economic feasibility studies in this Report were based on values from the East Caribbean countries. For countries where the values used in this Report are not realistic, adjustments have to be made correspondingly.

9. Assumptions made in the Economic Feasibility Evaluations.

(a) The project cost is totally funded from grants;

(b) The operation of one CDS will result in the annual increase of copra production as follows: first year - 15 metric tons; second year - 30 metric tons; third to tenth year - 40 metric tons;

(c) The nuts used for the production of the increase in copra production are otherwise unharvested or wasted, thus the opportunity cost of these nuts is zero;

(d) The workers employed are transferees - thus the opportunity cost of labour is equal to the employment cost.

(e) The external cost of fuels and lubricants is 80 percent of acquisition cost;

(f) The external cost of repair and maintenance is 75 percent of total repair and maintenance cost;

(g) Depreciation cost and overhead expenses are internal costs, therefore they are not considered economic costs.

h) Copra making cost is reduced by 50 percent when using the CDS facilities;

(i) Hauling cost is reduced by 20 percent when using the tractor-trailer of the CDS.

(j) The premium in the price of copra is totally credited to the project;

(k) Fifty percent of the miscellaneous costs are for imports;

(l) By using coconut husks, the coconut shells are totally saved for sale. Since 50 percent of the shells are used in existing dryers, a saving of fifty percent is achieved. The opportunity cost of husks burned as fuel is zero;

(m) Seventy percent of the fixed capital investment is spent on imported equipment, 30 percent is local component;

(n) Twenty percent of working capital is spent for importing some of the supplies, 80 percent is local raw materials and supplies.

The economic gains from the project is calculated as the difference between the sales and the sum of external costs and opportunity costs.

10. Basis of Financial and Economic Studies

Production Data

Per dryer load:	Nuts - 6,000 (3,000 per section)
	Copra - 1.2 metric tons
	Shells - 1.0 metric tons
Per week:	Nuts - 18,000 (3 loadings)
	Copra - 3.6 metric tons
	Shells - 3.0 metric tons
Per year:	Nuts - 900,000 (50 weeks)
	Copra - 180 metric tons
	Shells - 150 metric tons

Production Schedule

Year	1	2	3	4	5
No. of weeks	25	50	50	50	50
Nuts processed, 000	300	600	600	600	600
Copra produced, mt	60	120	180	180	180
Shells, mt	50	100	150	150	150

11. Financial Viability Study - Scheme A
(Assuming Grant Funds)

Projected Income Statement (US Dollars)

Year	1	2	3	4	5
Revenues					
Dryer rentals	3,600	7,200	10,800	10,800	10,800
Copra premiums	1,200	2,400	3,600	3,600	3,600
Hauling charges	3,600	7,200	10,800	10,800	10,800
Totals	8,400	16,800	25,200	25,200	25,200
Costs					
Salaries & Wages	1,900	3,800	5,600	5,600	5,600
Fuels & Lubricants	1,700	3,400	5,000	5,000	5,000
Miscellaneous	400	800	1,200	1,200	1,200
Overhead	1,200	2,400	2,400	2,400	2,400
Depreciation	2,500	5,000	5,000	5,000	5,000
Totals	8,500	17,000	21,600	21,600	21,600
Profit (without tax)	(100)	(200)	3,600	3,600	3,600

Projected Cash Flow Statement

Sources of Income					
Net Income	(100)	(200)	3,600	3,600	3,600
Add back: Depreciation	2,500	5,000	5,000	5,000	5,000
Total Internal Resources	2,400	4,800	8,600	8,600	8,600
Grant Funds	60,000	-	-	-	-
Total Funds	62,400	4,800	8,600	8,600	8,600
Application of Funds					
Fixed Investment	57,500	-	-	-	-
Working Capital	2,500	-	-	-	-
Total Disbursements	60,000	0	0	0	0
Cash Inflow/Outflow	2,400	4,800	8,600	8,600	8,600
Cash: Beginning	0	2,400	7,200	15,800	24,400
Ending	2,400	7,200	15,800	24,400	33,000

12. Financial Viability Study - Scheme A
(Assuming bank loan funding)

Project Cost - US$60,000

Assume: Equity, 20% 12,000
Loan, 80% 48,000
Interest - 12% on outstanding balance
Repayment - 5 years with 1 year grace period
4 equal annual amortizations

Schedule of Amortization and Interest Payments

Year	Draw-down	Amortization	Interest	Principal	Balance
1	48,000	-	-	-	48,000
2	-	16,000	5,760	10,240	37,760
3	-	16,000	4,531	11,460	26,291
4	-	16,000	3,155	12,845	13,466
5	-	15,060	1,614	13,466	0

Projected Income Statement (refer to 11.)

Year	1	2	3	4	5
Revenues	8,400	16,800	25,200	25,200	25,200
Costs	8,500	17,000	21,600	21,600	21,600
Gross Profit (Loss)	(100)	(200)	3,600	3,600	3,600
Interests	-	5,760	4,531	3,155	1,614
Net Profit (Loss)	(100)	(5,960)	(931)	455	1,986

Projected Cash Flow Statement

Net Income	(100)	(5,960)	(931)	455	1,986
Add back: Depreciation	2,500	5,000	5,000	5,000	5,000
Interest	-	5,760	4,531	3,155	1,614
Total Internal Resources	2,400	4,800	8,600	8,600	8,600
Borrowings					
Loan	48,000	-	-	-	-
Equity	12,000	-	-	-	-
Total Borrowings	60,000	-	-	-	-
Total Funds	62,400	4,800	8,600	8,600	8,600

Application of Funds					
Establishment	57,500	-	-	-	-
Working Capital	2,500	-	-	-	-
Loan Amortization	-	16,000	16,000	16,000	16,000
Total Disbursement	60,000	16,000	16,000	16,000	16,000
Cash Inflow/Outflow	2,400	(11,200)	(7,400)	(7,400)	(7,400)

Project is not viable if funded from bank loan

13. Economic Feasibility Study- Scheme A
(Assuming Grant Funding)

Value of Increase in Copra Production Assuming a Price of $508

Year	1	2	3	4	5
Copra increase, m.t.	15	30	40	40	40
Price, US$ per m.t.	508	508	508	508	508
Value, US$	7,500	15,000	20,000	20,000	20,000

Economic Internal Rate of Return Analysis

Economic Benefits (refer to B.8)

Value of copra increase	7,500	15,000	20,000	20,000	20,000
Savings in drying cost	1,800	3,600	5,400	5,400	5,400
Copra premium	1,200	2,400	3,600	3,600	3,600
Savings in hauling costs	720	1,440	2,160	2,160	2,160
Total Benefits	11,250	22,400	31,160	31,160	31,160

Economic Costs (refer to B.8)

Fuels & Lubricants (80%)	1,360	2,720	4,000	4,000	4,000
Repair & Maintenance 75%	600	1,200	1,800	1,800	1,800
Miscellaneous (50%)	200	400	600	600	600
Salaries & Wages (100%)	1,900	3,800	5,600	5,600	5,600
Total Costs	4,660	9,320	13,200	13,200	13,200

Economic Internal Rate of Return (Plant life - 10 rears)

Year	Benefits	Fixed Assets	Working Capital	Costs	Salvage Value (WC)	Net Benefits	Discout Factor	Net Present Value (28%)
1	11,250	57,500	2,500	4,660	-	(53,410)	1.000	(53,410)
2	22,400	-	-	9,320	-	13,000	0.761	10,215
3	31,160	-	-	13,200	-	17,960	0.612	10,991
4	31,160	-	-	13,200	-	17,960	0.477	8,567
5	31,160	-	-	13,200	-	17,960	0.373	6,699
6	31,160	-	-	13,200	-	17,960	0.291	5,226
7	31,160	-	-	13,200		17,960	0.227	4,877
8	31,160	-	-	13,200	-	17,960	0.170	3,197
9	31,160	-	-	13,200	-	17,960	0.139	2,496
10	31,160	-	-	13,200	2,500	20,460	0.108	2,210
								+ 53,678

The internal economic rate of return over 10 years is about 28%

Accumulated Net Benefits (Exclusive of grant)

Year	1	2	3	4	5	6	7	8	9	10
Net Benefits	10,790	13,080	17,960	17,960	17,960	17,960	17,960	17,960	17,960	17,960
Beginning Total	0	10,790	23,870	41,830	59,790	77,750	95,710	113,670	131,630	149,590
Ending total	10,790	23,870	41,830	59,790	77,750	95,710	113,670	131,630	149,590	167,550

The accumulated net benfits for one (1) CDS in 10 years is about US$ 167,550

14. Financial Viability of the CDS if Operated According to Scheme B.

The financial viability of the CDS if operated according to Scheme B will depend upon the following factors, which may vary according to location:

(a) Price of nuts
(b) Number of nuts to make one ton of copra
(c) Price of copra
(d) Cost of labor
(e) Cost of fuel

If the CDS is operated according to schedules and prices used in this report, the approximate processing (copra making) per metric ton of copra is US$123.00 and the following formula may be used to determine the relation between the price of nuts and the price of copra:

$$Pc = \frac{(N \times Pn)}{100} + 123$$

where Pc = the price of copra in US dollars per metric ton
N = the number of nuts required to make one ton of copr.
Pn = the price of nuts in US cents per nut
123 = the processing cost in US dollars per metric ton copra

The formula can be reversed to determine the price of copra,

$$Pn = \frac{(Pc - 123) \times 100}{N}$$

Example: Price of copra = US$ 500
Number of nuts to a ton of copra

$$Pn = \frac{(500 - 123) \times 100}{6,000} = 6.45 \text{ US cents} \quad (17.4 \text{ EC cents})$$

The processing cost did not include depreciation.

Compared to the malayan dryer, or to the mechanical diesel-fired dryers, the CDS is a more economical dryer. The CDS dryer uses coconut husks (usually a waste), the malayan dryer uses shells which can be made to charcoal or sold, and the mechanical dryers use diesel fuel. Copra making cost with the CDS will be about 50% of the cost using mechanical dryers. Drying time for the CDS is 16 to 20 hours (same as the mechanical dryers).

15. Economic Feasibility of the CDS if operated according to Scheme B.

The economic benefits from the CDS if operated according to Scheme B will substantially be the same with Scheme A. The basic difference between the two schemes is the employment of copra makers by the CDS in Scheme B while in scheme A, the nut owner provides all the labour. The labour cost is an internal cost. Difference in external costs between the two schemes will be negligible.

16. Pre-Implementation Activities for Phase I.

(a) Preparation of a Regional Copra Dryers Development Plan which will be the basis for a request for grant-funding from the EDF under the Regional Coconut Rehabilitation Project - UNIDO Consultant

(b) Preparation and submission of the request for funding and evaluation of the the Plan - CARICOM Secretariat.

(c) Pre-evaluation of the plan and request, by EDF representatives or consultants. Changes and improvements, both on the plan and the request may be required.

(d) Detailed planning and costing of projects and submission of final request for funding - Applicant countries and the CARICOM Secretariat

(e) Final evaluation of plan and request for funding - by EDF representatives or consultants.

(f) Approval (or rejection) of the project. If approved,

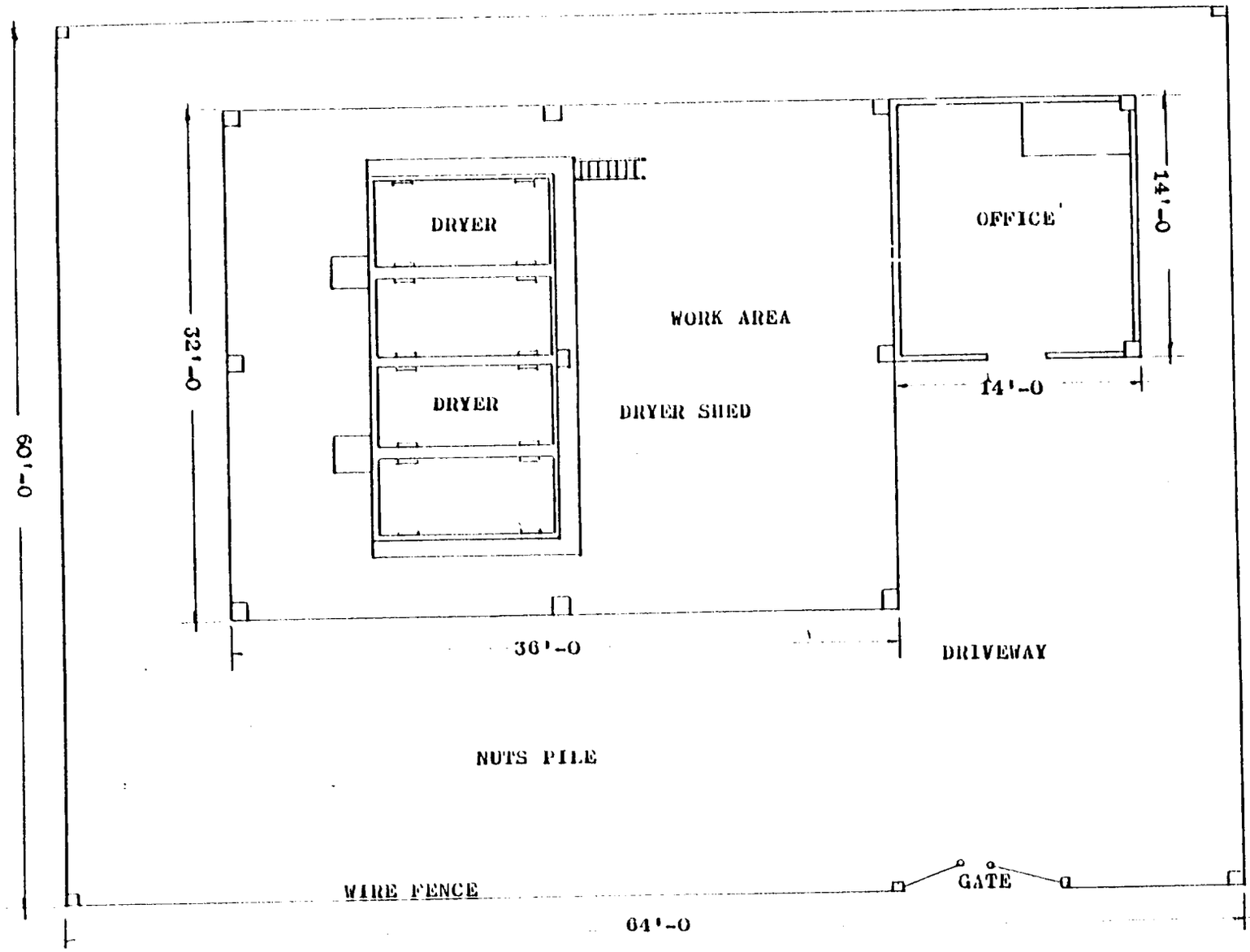
(g) Organisation of implementing agency, and implementation of the project.

C. CONCLUSION

The Copra Drying Station, as envisioned can be an economically feasible project. Phase I is expected to prove two things:

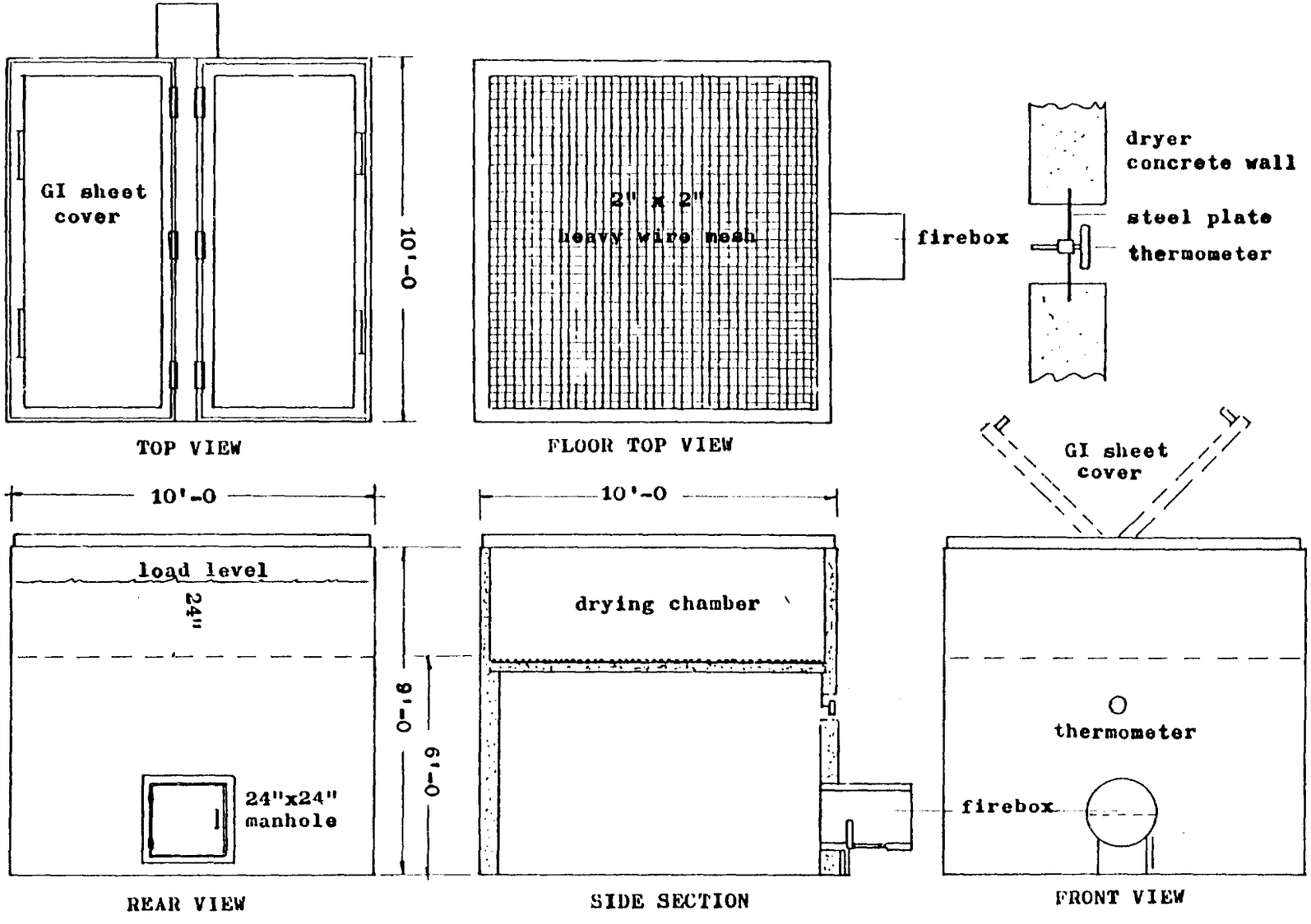
(a) that installation of copra dryers will increase copra production;

(b) that centralised copra making can be viable and acceptable.



COPRA DRYING STATION - LAYOUT PLAN
SCALE: ¼" = 1'-0

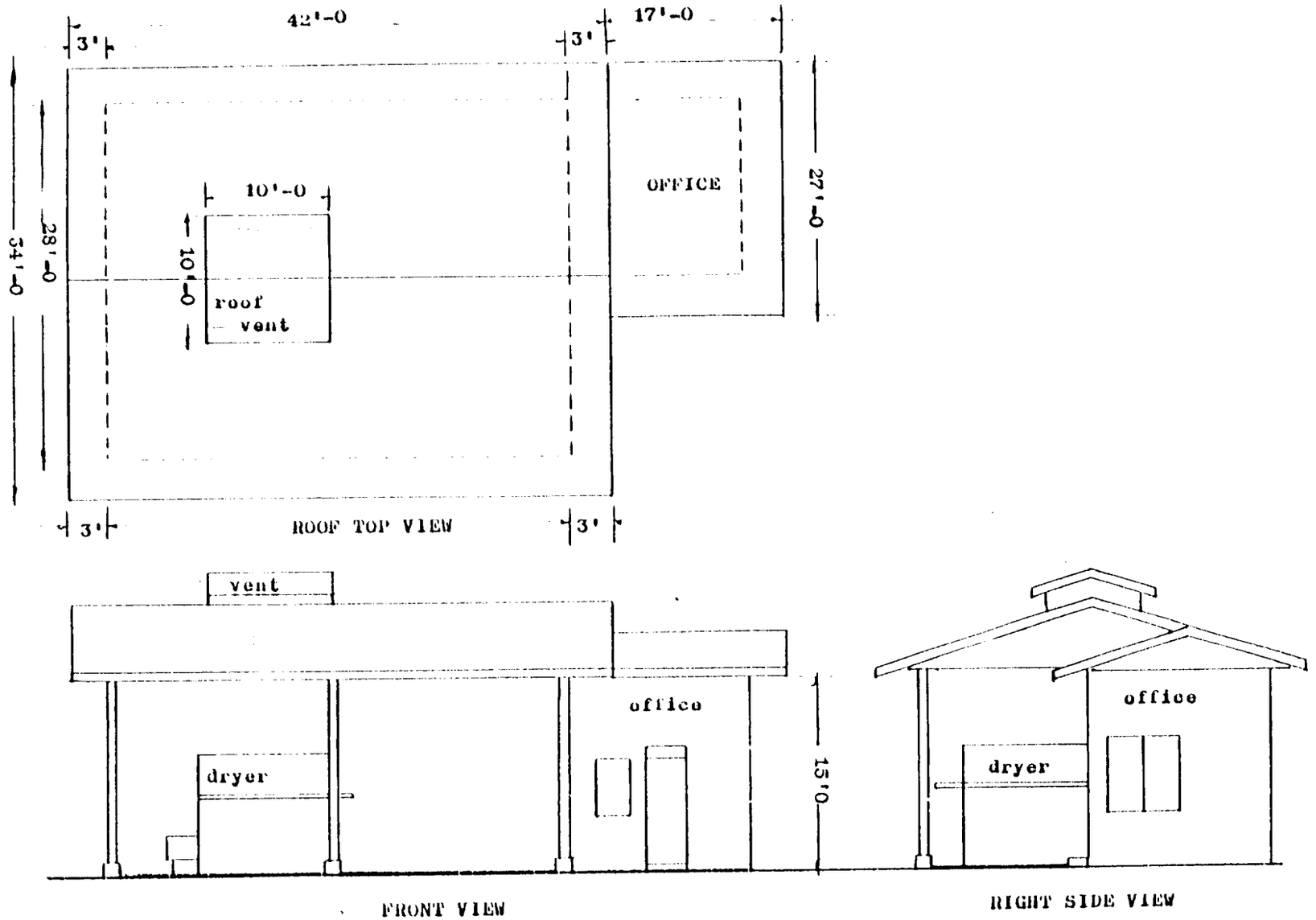
Designed by:
F.C. Catanican



PCC COPRA DRYER

Scale: ¼" = 1'-0"

Designed by:
P.C. Catanaoan



COPRA DRYING STATION - BUILDING PLAN

Scale: 3/32" - 1'-0

Designed by:
P.C. Catanaoan

IV. OTHER COCONUT PROJECTS RECOMMENDED

Interests have been indicated in three coconut projects: two for processing and one agricultural. Preliminary evaluation indicate that the projects can be feasible. Pre-feasibility studies of the projects are found in Annexes A, B, and C on pages 43 to 74.

A. Desiccated Coconut with a Small-scale Oil Mill and Refinery for Belize

Coconut production in Belize has been estimated at 18 million nuts per year. Due to lack of processing facilities, the nuts are not utilised on a commercial scale. It was suggested that copra from Belize can be processed in Jamaica, but the idea has been abandoned due to high cost of shipping. Foreign investors have indicated interest in setting up a desiccated coconut plant, provided that the coconut production can be confirmed.

The proposed plant will have a capacity of 50,000 nuts per day or about 10 million nuts per year. Production will be 1,600 tons of desiccated coconut, 380 tons of refined oil, and 320 tons of expeller cake. The desiccated coconut will be exported to the United States and Canada, while the refined oil and expeller cake will be for the local market. Probable sites of the plant are Orange Walk or Belize.

The total project cost is estimated at US$2.05 million, US$1.55 million will be fixed capital investment and US$500,000 as working capital. The project will likely be a joint-venture with foreign investors.

B. 3000-Acre Coconut Farm Development Project for Antigua

Antigua has an oil mill and refinery which has been idle for several years due to lack of raw materials. There had been suggestions to import copra from Nevis to be able to reoperate

the Plant, but the idea proved to be impractical, but nevertheless feasible. A pre-feasibility study for the reoperation of the plant that the venture will be viable. The Ministry of Agriculture has indicated interest in the development of coconut farms in Antigua, provided that the project can be funded, and feasible. Preliminary studies indicate that the project can be feasible if suitable funding can be available.

The Plant capacity is about 7.5 tons of copra per day or an annual capacity of 2,000 tons of copra per year. To be able to supply the copra requirements of the Plant, Antigua will have to develop about 5,000 acres of coconuts.

The proposed project consists of the development of 5,000 acres in coconuts over a period of three years or an average of 1,000 acres per year. Planting material will be from selected nuts of the best local tall variety. With similar variety from the other countries, the trees will start bearing fruits on the fifth year, with proper management and about one ton of copra can be produced per acre, per year. According to rough estimates the development cost will be about US$205 per acre and the maintenance cost will be US$95 per acre per year.

Funding of the project will probably be a mix of grants and long-term soft loans; possibly a grant for fertilizers and pesticides, and a 20 year soft loan with seven years grace period for other costs.

C. Coconut Cream Powder Plant for Trinidad

Due to high cost of labour in Trinidad, there is interest in a coconut processing plant which will produce higher-value products. For many years, copra production has been subsidised by government in order to be viable. Preliminary studies indicate that a coconut cream powder plant can viable in Trinidad. The products can be exported to the United States and to the Latin American countries.

The proposed plant will have a capacity of 40 metric tons of nuts (about 60,000) per day or about 12 million nuts per year. Annual production at full capacity will be 1,700 tons of coconut cream powder, 330 tons of coconut oil and 540 tons of expeller cake. Proposed site of Plant is Sangre Grande and will draw nuts from St. David, Manzilla, and Mayaro which have a combined production of about 30 million nuts per year.

The total project cost is estimated at US$2.06 million, US$1.8 million as fixed capital investment and US$250,000 as operating capital. The project is open to foreign investors on joint-venture.

PERSONS CONTACTED DURING THE MISSION

UNDP, Georgetown

Cecile I. G. Davis	-	Resident Representative
Raffaello Picci	-	Deputy Resident Representative
Horace Walks	-	Programme Officer

CARICOM Secritariat

Dr. Winston Phillips	-	Agricultural Planner, UNDP-CCS Institutional Support Project
Winston Smith	-	Commodities Specialist Caribbean Community Secretariat

ANTIGUA

Hon. Molwyn Joseph	-	Minister in the Ministry of Agriculture
Ernest Benjamin	-	Permanent Secretary of Agriculture
Clarence Eduards	-	Permanent Secretary, Ministry of Economic Development
Eric Challenger	-	Permanent Secretary of Foreign Affairs
George Goodwin	-	Executive Secretary, Industrial Development Board
Lawrence Wells	-	Chief, Sector Policy and Planning OECS Economic Affairs Secretariat
Wrenford Ferrance	-	Executive Director, Antigua Chamber of Commerce
Eden Weston	-	Ministry of Agriculture
Bernard Percival	-	Managing Director, Antigua and Barbuda Development Bank

BELIZE

Sandra Bedran	-	General Manager, The Belize Marketing Board
Frank Chan	-	Belize Marketing Board
Rodney Neel	-	Principal Agricultural Officer (Research)
Kent McField	-	Belize Chamber of Commerce
Evan Young	-	Belize Chamber of Commerce

DOMINICA

Wosley P. Louis	-	Permanent Secretary of Agriculture
Mona George Dill	-	Assistant Secretary, Ministry of Agriculture
Collin Bulley	-	Agricultural Development Adviser
Phillip M. Nassier	-	Chairman and Chief Executive Officer, Dominica Coconut Products
Ronald J. Harvey	-	Project Director, Dominica Coconut Rehabilitation and Expansion Project
Henzie Wilson	-	Project Manager, Dominica Coconut Rehabilitation and Expansion Project
Vans T. LeBlanc	-	Manager, Agricultural and Industrial Development Bank
Dermot Southwell	-	Dominica Industrial Development Corporation
Joseph Astaphan	-	Plant Manager, Dominica Coconut Products

GRENADA

Ruth Rahim	-	Permanent Secretary of Agriculture
Denis Noel	-	Chief Technical Officer, Ministry of Agriculture
Arnold Cruickshank	-	Adviser for Agriculture

Winston Bain	-	Projects Coordinator, Ministry of Agriculture
Ivan Archer	-	Manager, Tempe Manufacturing Plant
Aaron Moses	-	Grenada Development Bank
Charles Francis	-	Land-use Officer, Ministry of Agriculture

GUYANA

J.S.L. Browman	-	Permanent Secretary of Agriculture
Dr. Ulric Trotz	-	Director, Institute of Applied Science and Technology
Burton Gajadar	-	Economic Adviser, Office of the President
Dr. Leslie Chin	-	Technical Director, Guyana Pharmaceutical Products
Dr. Patrick McKenzie	-	Chief Agricultural Officer
Lionel Sears	-	General Manager, National Edible Oil Company
Norbert Wilson	-	Permanent Assistant Secretary Ministry of Agriculture
Prabao Sookraj	-	Chief Agricultural Planner
Clement Duncan	-	Executive Director, Guyana Manufacturing and Industrial Corporation

JAMAICA

Roy A. Williams	-	Manager, Coconut Industry Board
Keith Marr	-	Operations Manager, Coconut Industry Board
Winston Chevannes	-	Assistant Operations Manager, Coconut Indutry Board
Raymond E. Summons	-	Marketing Manager, SEPROD
Carol Miller	-	Ministry of Agriculture
Lawson E. Calderon	-	Managing Director, Caribbean Applied Technology Center (CATC)

Waldermar F. Scott	-	Consultant, CATC
Patrick R. Folkes	-	Consultant CATC
George A. Brown	-	Consultant, CATC

SAINT CHRISTOPHER

Hon. Fitzroy Jones	-	Minister of Industry
Eugene G. Petty	-	Permanent Secretary of Agriculture
Aubrey Hart	-	Permanent Secretary of Trade, Industry, and Development
Ken Martin	-	Chief Agricultural Officer
Auckland O. Hector	-	Manager, Development Bank of Saint Christopher and Nevis

NEVIS

Hon. Arthur Evelyn	-	Minister of Agriculture, Lands, Housing, Labour, and Tourism
Evan Nisbett	-	Superintendent of Agriculture
I.R. Gordon	-	Agricultural Adviser
Spencer Howel	-	President, Chamber of Commerce

SAINT LUCIA

Cosmos Richardson	-	Assistant Permanent Secretary, Ministry of Agriculture
Steve Fontenelle	-	Chief Agricultural Officer
Tjbbe Scheper	-	Managing Director, CHL Group of Companies
Leslie Clarke	-	Chairman, National Development Corporation
Leonard Robinson	-	Industry Officer
Simeon Sealy	-	Investments Promotion Officer
Clarence Michel	-	Research Officer, Union Agricultural Station, Ministry of Agriculture
Henry H. Lubin	-	Ministry of Agriculture

Dr. Moore	-	Ministry of Agriculture
Roline Fernand	-	Manager, Fond Estate

ST. VINCENT

Grafton Vanloo	-	Chief Agricultural Officer
Keneth Bonadie	-	Agricultural Officer
Victor Hadley	-	Owen, Union Estate
Brian Veira	-	Manager, Arnos Vale Oil Factory

TRINIDAD AND TOBAGO

Manuel Dookeran	-	Chief Technical Officer Ministry of Agriculture
Dr. Reginald Griffith	-	Director, Red Ring Research Division, Ministry of Agriculture
Mathew Lee	-	Agricultural Planning Division, Ministry of Agriculture
Samroo Dowlath	-	Economic Studies Planning Division, Trinidad and Tobago Industrial Development Corporation
Anne Bramble	-	Project Analyst, Caribbean Foods Corporation

MONSERRAT

Hon. J.B. Chalmers	-	Minister of Agriculture, Lands and Housing
Norman Ryan	-	Marketing Manager, International Agencies

OTHERS

Bas Van Helden	-	Agricultural Adviser, Delegation of the Commission of European Communities, Georgetown, Guyana
Charles Metcalfe	-	Carebbean Development Bank
Waldo W. Hooker	-	Sectoral Specialist, Inter-American Development Bank, Guyana

DETAILS OF TRAVEL - PEDRO CATANAOAN

October 8, 1984 to January 17, 1985

October 8, 1984	-	Depart Manila - 11:25
11	-	Arrive Georgetown - 20:45
12	-	Briefing at CARICOM Secretariat
13	-	Reading of Minsters Report
14 (Sunday)	-	" " "
15	-	Review of Minsters Report
16	-	Briefing at UNDP Georgetown with Resident Representative
17	-	Study of Minsters Report
18	-	" " "
19	-	Preparation for trip to the Islands
20	-	Depart Georgetown 08:30 Arrive Trinidad 08:30
20	-	Study of Minsters Report
21 (Sunday)	-	Depart Trinidad 11:30 Arrive Barbados 13:25
22	-	Attended UNIDO Investments Promotion Conference
23	-	" "
24	-	" "
25	-	" "
26	-	Contacted country representatives at conference
27	-	Depart Barbados 16:00 - Arrive Grenada 16:55
28 (Sunday	-	Study Minsters Report
29	-	Meeting at the Ministry of Agriculture
30	-	Visit to the Temple oil mill and refinery
31	-	Contacted Banks, materials supplier, shippers

November 1	-	Depart Grenada 17:05 Arrive Trinidad 17:50
2	-	Meetings at the Ministry of Agriculture (Red Ring)
3	-	Study of Minsters Report
4 (Sunday)	-	Travel to eastern coast coconut area
5	-	Meeting at the Ministry of Agriculture (Port-of-Spain)
	-	Meeting of the Industrial Development Corporation
	-	Meeting at the Caribbean Food Corporation
6	-	Depart Trinidad 07:05 Arrive Guyana 09:40
7	-	Meeting at the Institute of Applied Science and Technology - Dr. Ulric Trotz
	-	Meeting at the National Edible Oil Company
8	-	Visit to the coconut farms (Letter T Estate etc.)
9	-	Conference at the Ministry of Agriculture
10	-	Start working on Report
		Depart Guyana 21:45 Arrive Trinidad 21:45
11 (Sunday)	-	Depart Trinidad 07:00 Arrive Antigua 08:15
	-	Meeting at the OECS Headquarters (Lawrence Wells)
	-	Meeting at the Industrial Development Corporation (G. Goodwin)
12	-	Meeting at the Ministry of Agriculture
	-	Meeting at the Ministry of Development and Industry

November 13	-	Visit to Antigua Oil Factory
	-	Visit To Chamber of Commerce (Mr. W. Ferrance)
	-	Visit to the Antigua Development Bank
14	-	Depart Antigua 08:15 Arrive Montserrat 09:10
	-	Visit to the coconut farms (with Norman Ryan)
15	-	Meeting at the Ministry of Agriculture (Hon. J.B. Chalmers -Minister of Agriculture)
16	-	Depart Montserrat 07:17 Arrive Antigua 07:35
17	-	Worked on Report
18 (Sunday)	-	Depart Antigua 08:15 Arrive Saint Christopher 08:45
19	-	Meeting at the Ministry of Agriculture
	-	Meeting at the Ministry of Industry
	-	Meeting at the Development Bank
20	-	Visit to the coconut farms
	-	Depart Saint Christopher 17:25 Arrive Nevis 17:35
21	-	Meeting at the Ministry of Agriculture (Extension)
	-	Visit to the Coconut Oil Factory
	-	Visit to the Coconut Plantations
22	-	Meeting with the Minister of Agriculture
	-	Depart Nevis 13:25 Arrive Antigua 13:55
23	-	Depart Antigua 16:35 Arrive Saint Lucia 17:20
24	-	CARICOM Coconut Industry Conference

November	24	-	Visit to the coconut plantations (Fond Estate) with Martin Devaux meet with Mr. T. Scheper
	25	-	Rest
	26	-	Meeting at the Ministry of Agriculture
		-	Meeting at the Ministry of Trade
		-	Meeting at Coconut Grower's Association Office
	27	-	Visit to Union Research Station
		-	Meeting at the National Development Corporation
		-	Meeting at the Ministry of Agriculture
		-	Meeting at the Ministry of Finance
	28	-	Depart Saint Lucia 08:30 Arrive Dominica 09:35
		-	Meeting at the Ministry of Agriculture
		-	Meeting at the Dominica Coconut Products Factory
	29	-	Visit to a coconut estate and copra dryer
		-	Meeting at Coconut Rehabilitation Project Office
	30	-	Meeting at the Dominica Agricultural and Industrial Development Bank
		-	Meeting at the Dominica Chamber of Commerce
December	1	-	Meeting with Mr. J. Astaphan to discuss copra dryer construction
	2	-	Depart Dominica 07:10 Arrive Saint Vincent 09:05
	3	-	Meeting at the Ministry of Agriculture

December 4	-	Visit at Arnos Vale Oil Factory
	-	Visit to the coconut estates
	-	Depart Saint Vincent 21:50 Arrive Barbados 22:35
5	-	Depart Barbados 10:10 Arrive Kingston 13:15
6	-	Meeting at the Coconut Industry Board (Mr. R. Williams)
7	-	Meeting at Coconut Industry Board (Mr. K. Marr)
	-	Meeting at the Caribbean Applied Technology Center
8	-	Depart Kinston 08:30 Arrive Miami 12:00 (sick)
9(Sunday)	-	Rest (Had stomach problems)
10	-	Work on Report
11	-	Depart Miami 15:15 Arrive Belize 15:20
12	-	Meeting with Mr. Frank Chan at Marketing Board Office
	-	Meeting with Mr. K. McField and Mr. E. Young of the Chamber of Commerce
13	-	Meeting with Mrs. Sandra Bedran, General Manager, Belize Marketing Board (in-charge of coconut Projects) and Mr. Rodney Neel, representative of the Ministry of Agriculture
14	-	Depart Belize 10:20 Arrive Miami 14:15
	-	(National Election in Belize)
15	-	Start of leave of absence
25	-	End of leave of absence

December	26	-	Leave Miami 15:00 Arrive Trinidad 20:45
	27	-	(Tried to contact government office but was unsucessful). Typed report at the Red Ring Research Station
	28	-	Depart Trinidad 11:30 Arrive Guyana 13:25
	29	-	Work on Report
	30 (Sunday)	-	Rested
	31	-	Discussed result of field trip at the CARICOM Secretariat
January	1	-	Writing of preliminary report
	2	-	Typing of Preliminary report
	3	-	" " " "
	4	-	Discussion of Preliminary Report at UNDP
		-	Arrangements for final typing of Preliminary Report at the CARICOM Secretariat
		-	Arrangements for return trip
	5	-	Worked on final report draft
	6 (Sunday)	-	" " " " "
	7	-	" " " " "
	8	-	" " " " "
	9	-	" " " " "
	10	-	" " " " "
		-	Leave Guyana 21:45 Arrive Trinidad 21:45
	11	-	Meeting at the Ministry of Agriculture
		-	Meeting at the office of the Delegation of European Communities (Mr. Bas Van Helden)

January 12	-	Leave Trinidad 07:30 Arrive Miami 11:30
13	-	Leave Miami 13:50 Arrive New York 16:29
	-	Leave New York 19:30
14	-	Arrive Vienna 11:55
15	-	Debriefing at UNIDO
16	-	Debriefing
17	-	Depart Vienna
19	-	Arrive Manila

Annex A. Pre-Feasibility Study of a Desiccated Coconut Plant with a Small Oil Mill and Refinery for Belize

A. Product Schedule

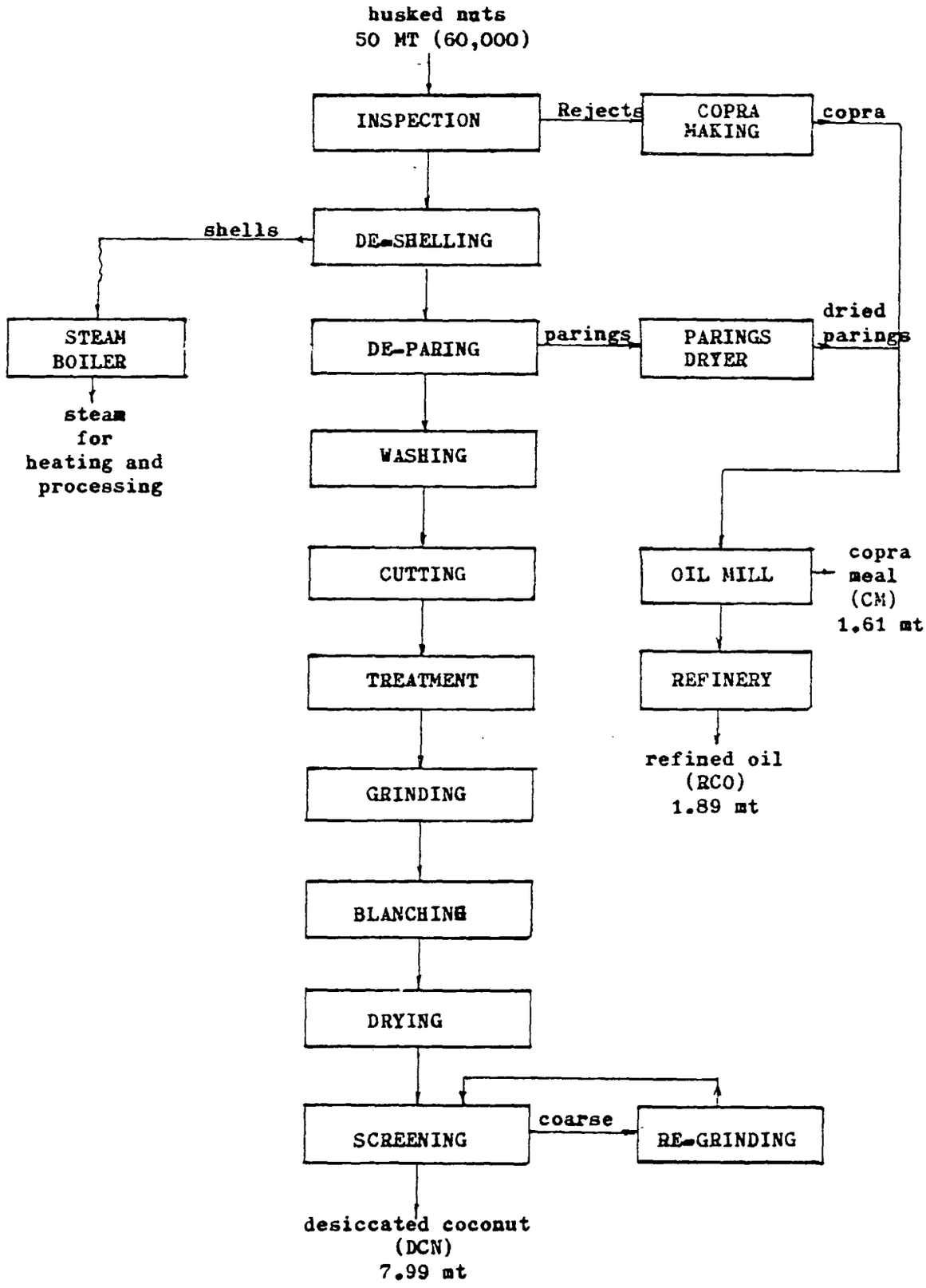
Daily - 24 hours 3 shifts
Weekly - 5 days
Yearly - 40 weeks 12 months

B. Product Capacities (metric tons)

	Daily	Weekly	Yearly
Nuts	50	250	10,000
Desiccated coconut (DCN)	7.99	39.95	1,598
Refined Oil (RCO)	1.89	9.45	378
Copra Meal (CM)	1.61	8.05	322

C. Estimate of Project Cost (US Dollors)

Fixed Capital Investment		
Machinery & Equipment		690,000
DCN Plant	320,000	
Oil Mill & Refinery	210,000	
Steam Boiler	100,000	
Miscellaneous	60,000	
Installation Cost		125,000
Engineering and Consultancy (10%)		50,000
Buildings		250,000
Installed plant cost		1,115,000
Site development		120,000
Transport vehicles		60,000
Office and general maintenance equipment		15,000
Contingencies		200,000
Total fixed capital investment		1,510,000



PROCESS FLOW DIAGRAM- DESICCATED COCONUT PRODUCTION

PCC/85

Working Capital	
Inventories	350,000
Cash reserves & receivables	150,000
Total working capital	500,00
Pre-Operating expenses	50,00
Total Project Cost	2,050,000

D. Investment Services

Loan (80%)	1,600,000
Equity (20%)	460,000

E. Project Schedule

Organization and planning	4 months
Construction and installation	11 months
Test runs and start-up	1 month
Start of commercial operations	17th month

F. Loan Terms

Interest rate 12 % per annum

Repayment period - 12 years with 2 years grace period
10 equal annual amortizations

G. Investment Plan (US$000)

	Equity	Loan	Total
Year 1			
Pre-operating expenses	50	0	50
Establishment cost	310	1,200	1,510
Total	360	1,200	1,560
Year 2			
Working capital	100	400	500
Totals	460	1,600	2,060

H. Schedule of Amortizations and Interests Payments

Year	Drawdown	Amortization	Interest	Principal	Balance
1	1,200	-	-	-	1,200
2	400	-	144	-	1,744
3	-	310	209	101	1,643
4	-	310	197	113	1,530
5	-	310	184	126	1,404
6	-	310	168	142	1,262
7	-	310	151	159	1,103
8	-	310	132	178	925
9	-	310	111	199	726
10	-	310	87	223	503
11	-	310	60	250	253
12	-	283	30	253	0

I. Annual Production Schedule

Year	1	2	3	4	5	6	7	8-up
Days	0	100	200	200	200	200	200	200
Nuts, m.t.	0	5,000	10,000	10,000	10,000	10,000	10,000	10,000
DCM m.t.	0	799	1,598	1,598	1,598	1,598	1,598	1,598
RCO m.t.	0	189	378	378	378	378	378	378
CM m.t.	0	161	322	322	322	322	322	322

J. Personnel - Salaries & Wages

Administration

Position	No.	Monthly Rate	Total Per Month
Manager	1	1,200	1,200
Production Head	1	800	800
Engineering Head	1	800	800
Administration Head	1	800	800
Chemist-Laboratory Head	1	800	800
Accountant	1	800	800
Medical Officer	1	800	800
Clerks	2	400	800
Laboratory Technicians	3	400	1,200
Engineering Aide	1	400	400
Weigher	1	400	400

Position	No.	Monthly Rate	Total per Month
Warehouseman	1	400	400
Utilityman	1	300	300
Total	16		9,500
			(2,850 per week)

Production

Position	No.	Weekly Rate	Total per week
Supervisor	3	80	240
Foreman	3	60	180
Nut receivers	2	42	84
Nut carriers	6	42	252
Checkers	3	42	126
Cleaners	3	42	126
Shellers	60	40	2,400
Parers	60	40	2,400
Operators	15	42	630
Drivers	2	42	84
Utility	17	38	646
Total	174		7,168
Maintenance			
Chief Mechanic	1	80	80
Shift Mechanics	3	50	150
Machinist	1	50	50
Auto-mechanic	1	50	50
Electricians	3	50	150
Welder-plumbers	2	50	100
Helpers	3	38	114
Total	14		618

K. Suppliers (US dollors)	Daily	Weekly
DCN Bags and accessories	190	950
Chemicals	65	325
Office supplies	5	25
Motor fuels and oil	50	250
Total		1,550

L. Electricity	KW	KWH/Day (80%)	KWH/Week
DCN Plant	70	1,344	6,720
Oil Plant	54	1,613	8,065
Boiler and Water	30	216	1,080
Lighting & Miscellaneous	15	114	720
Total	169	3,317	16,585

Cost of electricity per week @ $0.18 per KWH - $ 2,985

Annual electricity cost (40 weeks) - $ 119,400

M. Repair and Maintenance (Annual)	Percent of Cost	Annual Cost
Machinery & Equipment	5	34,500
Buildings	5	15,000
Site improvements	3	3,600
Motor vehicles	10	6,000
Miscellaneous equipment	10	1,500
Total		60,600

Cost of repair & maintenance per week - $ 1,515

N. Depreciation	Years	Yr 1-5	Yr 6-10	Yr 11-15
Plant equipment	15	46,000	46,000	46,000
Buildings	10	25,000	25,000	-
Site improvements	5	24,000	-	-
Vehicles	5	12,000	-	-
Misc. Equipment	5	3,000	-	-
Total		110,000	71,000	46,000
Weekly cost of depreciation		2,750	1,775	1,150

O. Overhead Cost - $ 50,000 per year $1,250 per week

P. Miscellaneous Costs - $ 10,000 per year $ 250 per week

Q. Insurance Premiums (1%) - $ 11,000 per year $ 275 per week

R. Prices - Ex-Factory

Desiccated coconut (DCN) - US $ 1,450 per metric ton

Refined coconut oil (RCO) - 1,200 per m.t. (without container)

Copra meal (CM) - 160 per m.t. (without container)

S. Product Schedule

Year	1	2	3	4	5 up
No. of weeks	0	20	40	40	40
No. of months	0	8	12	12	12

T. Weekly Sales

	Metric Tons	Price	Value
Desiccated coconut (DCN)	39.95	1,450	57,925
Refined Oil (RCO)	9.45	1,200	11,340
Copra meal (CM)	8.05	160	1,288
Total weekly sales			70,555

U. Annual Sales ($000)

Year	1	2	3	4	5 up
DCN	0	1,158	2,317	2,317	2,317
RCO	0	227	454	454	454
CM	0	26	52	52	52
Total	0	1,141	2,823	2,823	2,823

V. Summary of Costs ($000)

	Weekly (US $)	Year 2 (20 wks.)	Year 3-15 (40 wks.)
Indirect labor	2,850	114	114
Direct labor (Production)	7,168	143	286
Direct labor	618	14	28
Supplies	1,550	31	62
Electricity	2,985	60	120
Repair & Maintenance	1,515	61	61
Overhead	1,250	50	50
Miscellaneous	250	10	10
Insurance	275	11	11
Depreciation: Yr. 1-5		110	110
5-10		71	71
11-15		46	46
Cost of nuts	37,500	750	1,500
Sales	70,555	1,411	2,823

W. Projected Income Statement ($000)

Year	1	2	3	4	5	6	7	8	9	
Net Sales	0	1,411	2,823	2,823	2,823	2,823	2,823	2,823	2,823	1
Variable Costs										
Nuts	0	750	1,500	1,500	1,500	1,500	1,500	1,500	1,500	2
Direct Labor	0	143	286	286	286	286	286	286	286	3
Maintenance labor	0	14	28	28	28	28	28	28	28	4
Supplies	0	31	62	62	62	62	62	62	62	5
Electricity	0	60	120	120	120	120	120	120	120	6
Total	0	998	1,996	1,996	1,996	1,996	1,996	1,996	1,996	7
Fixed Costs										
Indirect labor	0	76	114	114	114	114	114	114	114	8
Depreciation	0	110	10	110	110	71	71	71	71	9
Insurance	0	11	11	11	11	11	11	11	11	10
Repair & Maintenance	0	30	60	60	60	60	60	60	60	11
Adm. Overhead	0	50	50	50	50	50	50	50	50	12
Miscellaneous	0	10	10	10	10	10	10	10	10	13
Total	0	287	355	355	355	316	316	316	316	14
Total Costs	0	1,285	2,351	2,351	2,351	2,312	2,312	2,312	2,312	15
Gross Profit	0	122	472	472	472	511	511	511	511	16
Interest	0	144	209	197	184	168	151	132	111	17
Profit before tax	0	(22)	263	275	288	343	360	379	400	18
Income tax	(Tax exempt until year 12)									19
Net Profit	0	(22)	263	275	288	343	360	379	400	20

Projected Income Statement (continued)

Year	10	11	12	13	14	15	16	17	18	19	20
1	2,823	2,823	2,823	2,823	2,823	2,823	2,823	2,823	2,823	2,823	2,823
2	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
3	286	286	286	286	286	286	286	286	286	286	286
4	28	28	28	28	28	28	28	28	28	28	28
5	62	62	62	62	62	62	62	62	62	62	62
6	120	120	120	120	120	120	120	120	120	120	120
7	1,996	1,996	1,996	1,996	1,996	1,996	1,996	1,996	1,996	1,996	1,996
8	114	114	114	114	114	114	114	114	114	114	114
9	46	46	46	46	46	46	0	0	0	0	0
10	11	11	11	11	11	11	11	11	11	11	11
11	60	60	60	60	60	60	60	60	60	60	60
12	50	50	50	50	50	50	50	50	50	50	50
13	10	10	10	10	10	10	10	10	10	10	10
14	316	291	291	291	291	291	245	245	245	245	245
15	2,312	2,287	2,287	2,287	2,287	2,287	2,245	2,245	2,245	2,245	2,245
16	511	536	536	536	536	536	582	582	582	582	582
17	87	60	30	0	0	0	0	0	0	0	0
18	424	476	506	536	536	536	582	582	582	582	582
19	0	0	0	241	241	241	262	262	262	262	262
20	424	476	506	295	295	295	320	320	320	320	320

X. Projected Cash Flow Statement ($000)

Year	1	2	3	4	5	6	7	8	9	
Sources of Income										
Net Income	0	(22)	263	275	288	343	360	379	400	1
Add back: Interest	0	144	209	197	184	168	151	132	111	2
Depreciation		110	110	110	110	71	71	71	71	3
Total Internal Resources	0	232	582	582	582	582	582	582	582	4
Borrowings										
Loans	1,200	400	0	0	0	0	0	0	0	5
Equity	300	100	0	0	0	0	0	0	0	6
Total Borrowings	1,560	500	0	0	0	0	0	0	0	7
Total Funds	1,560	732	582	582	582	582	582	582	582	8
Application of Funds										
Pre-Operating Cost	50	0	0	0	0	0	0	0	0	9
Establishment Cost	1,510	0	0	0	0	0	0	0	0	10
Working Capital	0	500	0	0	0	0	0	0	0	11
Amortization of Loans	0	0	310	310	310	310	310	310	310	12
Total Disbursement	1,560	500	310	310	310	310	310	310	310	13
Cash Inflow/Outflow	0	232	272	272	272	272	272	272	272	14
Cash: Beginning	0	0	232	504	776	1,048	1,320	1,592	1,864	15
Ending	0	232	504	776	1,048	1,320	1,592	1,864	2,136	16
Debt Service Ratio	-	-	1.87	1.87	1.87	1.87	1.87	1.87	1.87	17

Projected Cash Flow Statement (continued)

Year	10	11	12	13	14	15	16	17	18	19	20
1	424	476	506	295	320	320	320	320	320	320	320
2	87	60	30	0	0	0	0	0	0	0	0
3	71	46	46	46	46	46	0	0	0	0	0
4	582	582	582	341	366	366	320	320	320	320	320
5	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0
8	582	582	582	341	366	366	320	320	320	320	320
9	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0
12	310	310	283	0	0	0	0	0	0	0	0
13	310	310	283	0	0	0	0	0	0	0	0
14	272	272	299	341	366	366	320	320	320	320	320
15	2,136	2,408	2,680	2,979	3,320	3,686	4,052	4,372	4,692	5,012	5,332
16	2,408	2,680	2,979	3,320	3,686	4,052	4,372	4,692	5,012	5,332	5,652
17	1.87	1.87	1.87	-	-	-	-	-	-	-	-

Annex B. Pre-Feasibility Study of the Development of 3,000-Acre Coconut Farm Integrated With the Re-Operation of the Existing Oil Mill and Refinery in Antigua

A. Basic Assumptions

1. The Project is a government project. All management and administrative services will be provided by the Ministry of Agriculture.
2. The lands to be planted are government lands.
3. Cost of fertilizer and weedicide during the first seven (7) years (pre-production period) will be funded from grants.
4. A long-term, soft loan will be available for the project.

B. Development Schedule

0 - 6th months	-	Land clearing of 1,000 acres
	-	Preparation of seedlings for 1,000 acres
7th-12th months	-	Planting of 1,000 acres
	-	Land clearing of 1,000 acres
	-	Preparation of seedlings for 1,000 acres
13th-18th months	-	Planting of 1,000 acres
	-	Land clearing of 1,000 acres
	-	Preparation of seedlings for 1,000 acres
19th-24th months	-	Planting of 1,000 acres

C. Assumption of yields per acre per year

Tree Age	Nuts	Copra (MT)
1-4	0	0
5	500	0.125
6	800	0.20
7	2,000	0.50
8	3,000	0.75
9-40	4,000	1.00

D. Fertilizer Application - Lbs. per acre

During Planting	-	25	5th year	-	200
6th month	-	25	6th year	-	250
12th month	-	25	7th year	-	250
2nd year	-	100	8th year	-	250
3rd year	-	100	9th year	-	250
4th year	-	150	Rest of life	-	250 per year.

Weedicide Application - Pints per year per acre - 3

1.5 pints per acre after every six (6) months.

E. Project Management and Administration Personnel - To be supplied and paid by the Ministry of Agriculture.

Farm Manager	-	1
Agriculturist	-	1
Accountant	-	1
Support Personnel	-	6
Tractor Operators	-	2

F. Labor Requirements

Development work	-	32 man-days per acre
Maintenance	-	14 man-days per acre per year

G. Estimate of Project Cost (US Dollors)

Equipment:

2 - Tractors	-	29,000	
2 - Trailers	-	8,000	
1 - Utility vehicle	-	12,000	
50 - Sprayers	-	4,000	
Misc. Equipment	-	3,000	
Total	-	56,000	
Farm houses and sheds	-	25,000	
Yard improvements	-	11,000	
Total Fixed Investment			- 92,000

Working Capital			
Initial stock of fertilizer and weedicide	-	16,000	
Miscellaneous supplies inventory	-	1,000	
Cash reserves	-	5,000	
Total	-	22,000	
Total Initial Investment			- 114,000
Other Investments			
Year 5 - Construction of one (1) Copra Factory			- 135,000
Rehabilitation of oil factory			- 65,000
Total			200,000
Year 6 - Construction of 2 Copra factories			270,000
Additional operating capital			200,000
Total			470,000
Year 7 - Expansion of oil factory			260,000

Pre-production Capital Requirements

Year 1:		
Consultancy	10,000	
Development of 1,000 acres		
Labor: 1,000 x 32 x $6.00	192,000	
Seedlings: 1,000x50x$0.15	18,000	
Miscellaneous: 1,000 x $5.00	5,000	
Total	205,000	
Maintenance of 1,000 acres (6 months)		
Labor: 1,000 x 7 x $6.00	42,000	
Miscellaneous cost	5,000	
Total	47,000	
Total cost for Year 1		262,000
Year 2		
Development of 2,000 acres		
Labor: 2,000 x 32 x $6.00	384,000	
Seedlings:2,000x50x$0.15	16,000	
Misc. cost: 2,000 x $5.00	10,000	
Total	410,000	

Maintenance cost for 2,000 acres (6 months)		
Labor: 2,000 x 7 x $6.00	84,000	
Miscellaneous cost	10,000	
Total	94,000	
Maintenance of 1,000 acres (1 year)		
Labor: 1,000 x 14 x $6.00	84,000	
Miscellaneous	10,000	
Total	94,000	
Total cost for year 2		598,000
Years 3-5 (every year)		
Maintenance cost of 3,000 acres		
Labor: 3,000 x 14 x $6.00	252,000	
Miscellaneous cost	30,000	
Total for each year	282,000	
Total for 3 years		846,900
Total Projected Cost		2,750,000

H. Financial Plan

Year 1		
Fixed investment	92,000	
Working capital	22,000	
Pre-production cost	262,000	
Total		376,000
Year 2		
Pre-production cost	598,000	598,000
Year 3		
Pre-production cost	282,000	282,000
Year 4		
Pre-production cost	282,000	282,000
Year 5		
Pre-production cost	282,000	
Investment	200,000	
Total		482,000

Year 6		
Investment	270,000	
Working capital	200,000	
Total		470,000
Year 7		
Investment	260,000	260,000

I. Investment Services

From the Government	-	Cost of land
	-	Management and administrative costs
From Grants	-	Fertilizer and weedicide for the first seven (7) years
From Loans	-	Fixed capital investments
	-	Working capital
	-	Pre-production costs (except fertilizer and weedicide)

J. Loan Terms (Proposed)

Interest rate	-	4% per annum on outstanding balance
Repayment	-	25 years, 7 years grace period 18 equal annual amortizations

K. Schedule of Amortization and Interest Payments ($000)

Year	Drawdown	Amortization	Interest	Principal	Balance
1	376	-	-	-	376
2	598	-	15	-	989
3	282	-	40	-	1,311
4	282	-	52	-	1,645
5	482	-	66	-	2,193
6	470	-	88	-	2,751
7	260	-	110	-	3,121
8	-	248	125	123	2,998
9	-	248	120	128	2,870
10	-	248	115	133	2,737
11	-	248	109	139	2,598
12	-	248	104	144	2,454

Year	Drawdown	Amortization	Interest	Principal	Balance
13	-	248	98	150	2,304
14	-	248	92	156	2,148
15	-	248	86	162	1,986
16	-	248	79	169	1,817
17	-	248	73	175	1,642
18	-	248	66	182	1,460
19	-	248	58	190	1,270
20	-	248	51	197	1,073
21	-	248	43	205	868
22	-	248	35	213	655
23	-	248	26	222	433
24	-	248	17	231	202
25	-	248	8	202	0

L. Schedule of Fertilizer Requirements (000 lbs.)

Year	1	2	3	4	5	6	7	8	9-25
Development									
1,000 Acres	25								
2,000 Acres		50							
Maintenance									
1,000 Acres	50	100	100	150	200	250	250	250	250
2,000 Acres	-	100	200	200	300	400	500	500	500
Total	75	250	300	350	500	650	750	750	750
Cost ($000)	13.5	45	54	63	90	117	135	135	135

M. Schedule of Weedicide Requirements (000 Pints)

Year	1	2	3	4	5	6	7	8	9-25
1,000 Acres	3	3	3	3	3	3	3	3	3
2,000 Acres	-	6	6	6	6	6	6	6	6
Total	3	9	9	9	9	9	9	9	9
Cost ($000)	9	27	27	27	27	27	27	27	27

N. Schedule of Grants ($000)

Year	1	2	3	4	5	6	7
Fertilizer	13.5	45	54	63	90	117	135
Weedicide	9	27	27	27	27	27	27
Total	22.5	72	81	90	117	144	162

O. Schedule of Nut Production (000 Nuts)

Year	1-4	5	6	7	8	9	10-40
1,000	0	500	800	2,000	3,000	4,000	4,000
2,000	0	0	1,000	1,600	4,000	6,000	8,000
Total	0	500	1,800	3,600	7,000	10,000	12,000

P. Schedule of Copra, Oil, and Cake Production (metric tons)

Year	1-4	5	6	7	8	9	10-40
Copra	0	0	450	900	1,750	2,500	3,000
Oil	0	0	270	540	1,050	1,500	1,800
Cake	0	0	153	306	595	850	1,020

Q. Schedule of Sales ($000)

Year	1-4	5	6	7	8	9	10-40
Refined Oil	0	0	324	648	1,260	1,800	2,160
Copra Cake	0	0	23	46	89	127	153
Total	0	0	347	694	1,349	1,927	2,314

Assumed Prices: Refined coconut oil - US$1,200 per metric ton
Copra Cake - US$ 150 per metric ton
All prices are ex-factory, without containers

R. Schedule of Farm Cost $000

Year	1-5*	6	7	8	9	10-40
Labor	0	252	252	252	252	252
Miscellaneous	0	30	30	30	30	30
Fertilizers & Weedicides	0	0	0	162	162	162
Total	0	282	282	444	444	444

* All costs during years 1-5 are capitalized as pre-production costs. Fertilizer and weedicide costs during years 1-7 are funded by grants.

S. Depreciation Schedule $000

Year	Farm Bldgs. & Equipment (5 years)	Plant Rehabilitation (10 years)	1 Copra Factory (10 years)	2 Copra Factories (10 years)	Plant Expansion (15 years)	Totals
1	18	-	-	-	-	18
2	18	-	-	-	-	18
3	18	-	-	-	-	18
4	18	-	-	-	-	18
5	18	-	-	-	-	18
6	-	7	14	-	-	21
7	-	7	14	27	-	48
8	-	7	14	27	17	65
9	-	7	14	27	17	65
10	-	7	14	27	17	65
11	-	7	14	27	17	65
12	-	7	14	27	17	65
13	-	7	14	27	17	65
14	-	7	14	27	17	65
15	-	7	14	27	17	65
16	-	-	-	27	17	44
17	-	-	-	-	17	17
18	-	-	-	-	17	17
19	-	-	-	-	17	17
20	-	-	-	-	17	17
21	-	-	-	-	17	17
22	-	-	-	-	17	17

T. Schedule of Processing Costs ($000)

	1-5	6	7	8	9	10-25
Copra Making	0	72	144	280	400	480
Oil Processing	0	92	185	359	513	615

Basis:
Cost of copra making - $160 per metric ton copra
Oil processing cost - $205 per metric ton copra

U. Projected Income Statement ($000)

Year	1	2	3	4	5	6	7	8	9	10	11
Sales	0	0	0	0	0	347	694	1,349	1,927	2,313	2,313
Cost											
Nut Production	-	-	-	-	-	282	282	444	444	444	444
Copra Making	0	0	0	0	0	72	144	280	400	480	480
Oil Processing	0	0	0	0	0	92	185	359	513	615	615
Depreciation	-	-	-	-	-	21	48	65	65	65	65
Overhead	-	-	-	-	-	36	36	36	36	36	36
Total Costs	0	0	0	0	0	503	735	1,184	1,458	1,640	1,640
Gross Profit	0	0	0	0	0	(156)	(41)	165	529	673	673
Interests	-	-	-	-	-	88	110	125	120	115	109
Net Profit	0	0	0	0	0	(244)	(151)	40	409	558	564

12	13	14	15	16	17	18	19	20	21	22	23	24	25
2,313	2,313	2,313	2,313	2,313	2,313	2,313	2,313	2,313	2,313	2,313	2,313	2,313	2,313
444	444	444	444	444	444	444	444	444	444	444	444	444	444
480	480	480	480	480	480	480	480	480	480	480	480	480	480
615	615	615	615	615	615	615	615	615	615	615	615	615	615
65	65	65	65	65	44	17	17	17	17	17	0	0	0
36	36	36	36	36	36	36	36	36	36	36	36	36	36
1,640	1,640	1,640	1,640	1,640	1,619	1,592	1,592	1,592	1,592	1,592	1,575	1,575	1,575
673	673	673	673	694	721	721	721	721	721	721	738	738	738
104	98	92	86	79	73	66	58	51	43	35	26	17	8
569	575	581	587	615	648	655	663	670	678	686	712	721	730

- Cost capitalized

V. Projected Cash Flow Statement ($000)

Year	1	2	3	4	5	6	7	8	9
Sources of Income									
Net Income	0	0	0	0	0	(244)	(151)	40	409
Add back: Interest	-	-	-	-	-	88	110	125	120
Depreciation	-	-	-	-	-	21	48	65	65
Total Internal Resources	0	0	0	0	0	(135)	7	230	594
Loans	376	598	282	282	482	470	260	0	0
Total Funds	376	598	282	282	482	335	267	230	594
Application of Funds									
Establishment Cost	92				200	270	260		
Working Capital	22								
Pre-Production Cost	262	598	282	282	282				
Amortization of Loan	-	-	-	-	-	-	-	248	248
Total Disbursements	376	598	282	282	482	270	260	248	248
Net Cash Inflow/Outflow	0	0	0	0	0	65	7	(18)	346
Cash: Beginning	0	0	0	0	0	0	65	72	54
Ending	0	0	0	0	0	65	72	54	500
Debt Service Ratio	-	-	-	-	-	-	-	0.93	2.39

Discounted Cash Flow Internal Rate of Return = 15% over 30 years

Projected Cash Flow Statement (cont'd)

10	11	12	13	14	15	16	17	18	19	20	21
558	564	569	575	581	587	615	621	655	663	670	678
115	109	104	98	92	86	79	73	66	58	51	43
65	65	65	65	65	65	44	17	17	17	17	17
738	738	738	738	738	738	738	738	738	738	738	738
0	0	0	0	0	0	0	0	0	0	0	0
738	738	738	738	738	738	738	738	738	738	738	738
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
248	248	248	248	248	248	248	248	248	248	248	248
248	248	248	248	248	248	248	248	248	248	248	248
490	490	490	490	490	490	490	490	490	490	490	490
500	990	1,480	1,970	2,460	2,950	3,440	3,930	4,420	4,910	5,400	5,890
990	1,480	1,970	2,460	2,950	3,440	3,930	4,420	4,910	5,400	5,890	6,380
2.97	2.97	2.97	2.97	2.97	2.97	2.97	2.97	2.97	2.97	2.97	2.97

Projected Cash Flow Statement (cont'd)

22	23	24	25	26	27	28	29	30
686	712	721	730	738	738	738	738	738
35	26	17	8					
17	0	0	0	0	0	0	0	0
738	738	738	738	738	738	738	738	738
0	0	0	0	0	0	0	0	0
738	738	738	738	738	738	738	738	738
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
248	248	248	248	0	0	0	0	0
248	248	248	248	0	0	0	0	0
490	490	490	490	739	738	738	738	738
6,380	6,870	7,360	7,850	8,340	9,079	9,817	10,555	11,293
6,870	7,360	7,850	8,340	9,079	9,817	10,555	11,293	12,031
2.9	2.9	2.9	2.9	-	-	-	-	-

Annex C. Pre-Feasibility Study of a Coconut Cream Powder Plant for Trinidad & Tobago (US Dollar)

A. Plant capacity: 10,000 metric tons of husked nuts per year
40 metric tons of husked nuts per day.

B. Product output per day (24 hours - 3 shifts)

Coconut cream powder	-	7.08 metric tons
Refined coconut oil	-	1.34
Residue cake	-	2.18
Coconut shells	-	10 metric tons (for boiler fuel)

C. Assumed Prices (without container - ex-plant)

Coconut cream powder	-	$2.50 per kg.	$2,500 per m.t.
Refined coconut oil	-	1.35	1,350
Residue cake	-	0.15	150

D. Production Schedule

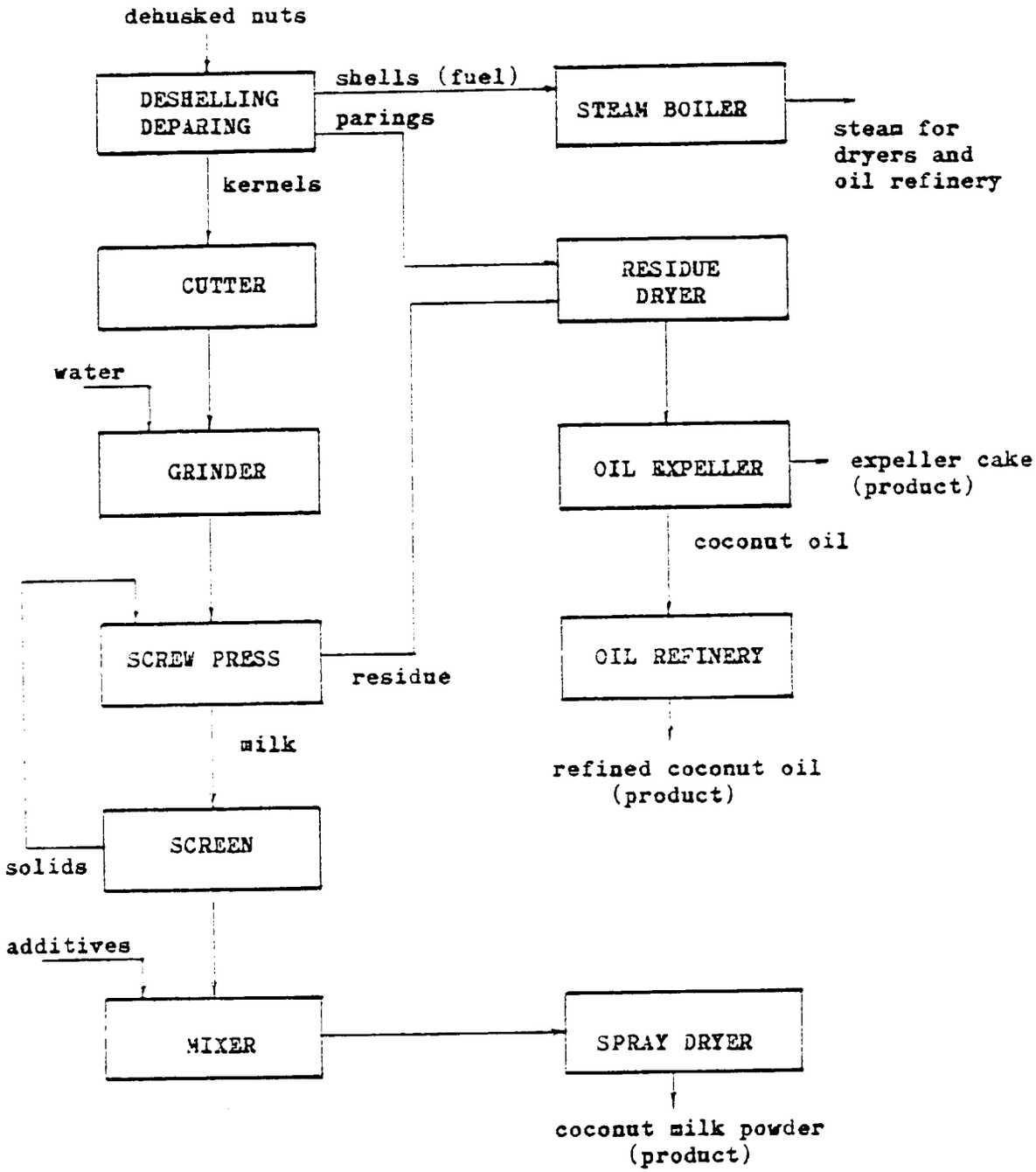
Year	1	2	3	4	5	6 UP
Days of operation	0	100	200	250	250	250
Nuts, m.t.	0	4,000	8,000	10,000	10,000	10,000
Coconut cream, m.t.	0	708	1,416	1,770	1,770	1,770
Refined oil, m.t.	0	134	268	335	335	335
Residue cake, m.t.	0	219	436	545	545	545

E. Raw Materials

Nuts, m.t.	0	4,000	8,000	10,000	10,000	10,000
Price, $/m.t.	-	250	250	250	250	250
Value, $000	0	1,000	2,000	2,500	2,500	2,500

F. Sales ($000)

Coconut cream	0	1,770	3,540	4,425	4,425	4,425
Refined oil	0	181	362	452	452	452
Residue cake	0	33	65	82	82	82
Total	0	1,984	3,967	4,959	4,959	4,959



PROCESS FLOW DIAGRAM - COCONUT MILK POWDER PRODUCTION

PCC/85

G. Estimate of Project Cost (US$ 000)

Fixed Capital Investment			
Machinery & Equipment, c.i.f. (duty-free)	-	950	
Engineering & Installation	-	120	
Installed Cost			1,070
Buildings			210
Site Improvements			250
Miscellaneous equipment			15
Transport Vehicles			40
Land			100
Contingencies			100
Total Fixed Capital Investment			1,785
Pre-operating expenses			25
Working Capital			250
Total Projected Cost			2,060

H. Investment Services (US$ 000)

Equity	(30%)	620
Loans	(70%)	1,440
Total		2,060

I. Loan Terms

Interest rate - 12% on outstanding balance

Repayment - 10 years with 3 years grace period
7 equal annual installments starting with year 4

J. Financial Plan

	Equity	Loan	Total
Year 1			
Pre-operating Cost	25		25
Plant Cost	520	1,265	1,785
Totals	545	1,265	1,810
Year 2			
Working Capital	75	175	250
Totals	620	1,440	2,060

K. Schedule of Amortization and Interest (US$000)

Year	Drawdown	Amortization	Interest	Principal	Balance
1	1,265	0	0	0	1,265
2	175	0	152	0	1,592
3	0	0	191	0	1,783
4	0	391	214	172	1,606
5	0	391	193	198	1,408
6	0	391	169	222	1,186
7	0	391	142	249	937
8	0	391	112	279	658
9	0	391	79	312	346
10	0	391	42	349	0

L. Power Requirements

Electrical load - 1200 Kw-hr.

Unit cost - $0.29 per kilowatt-hour

Cost of Electricity

Year	1	2	3	4	5 up
Energy (000 kw-hr)	0	230	460	575	575
Cost ($000)	0	67	134	167	167

M. Water Supply - to supplied by water pumping system

N. Chemicals & Supplies - $40,000 per year

O. Repair and Maintenance - $80,000 per year

P. Depreciation - 10% of fixed investment except land - $159,000

Q. Insurance - 1% - $16,000 per year

R. Administrative overhead - $120,000 per year

S. Personnel and Salaries

	No.	Rate	Total Salaries per Year			
			1	2	3	4 up
Indirect Labor						
Manager	1	2,000	0	12,000	24,000	24,000
Personnel Officer	1	1,500	0	9,000	18,000	18,000
Accountant	1	1,500	0	9,000	18,000	18,000

Production Head	1	1,500	0	9,000	18,000	18,000
Chemist	1	1,500	0	9,000	18,000	18,000
Plant Engineer	1	1,500	0	9,000	18,000	18,000
Warehouseman	1	1,000	0	6,000	12,000	12,000
Draughtsman	1	1,000	0	6,000	12,000	12,000
Clerks	4	900	0	21,600	43,200	43,200
Laboratory Technicians	3	900	0	16,200	32,400	32,200
Totals	12		0	106,800	213,600	213,600
Direct Labor						
Foreman	3	40	0	12,000	24,000	30,000
Nut receivers	2	20	0	4,000	8,000	10,000
Nut Carriers	6	20	0	12,000	24,000	30,000
Shellers	60	20	0	120,000	120,000	300,000
Parers	60	20	0	120,000	120,000	120,000
Cleaners	6	20	0	12,000	12,000	12,000
Operators	12	25	0	30,000	60,000	75,000
Baggers	6	20	0	12,000	24,000	30,000
Stackers	6	20	0	12,000	24,000	30,000
Utilities	6	20	0	12,000	24,000	30,000
Mechanics	2	35	0	7,000	14,000	17,500
Electrician	1	30	0	3,000	6,000	7,500
Plumber-welder	1	30	0	3,000	6,000	7,500
Machinist	1	30	0	3,000	6,000	7,500
Totals	172			362,000	724,000	905,000

T. Projected Income Statement (US$000)

Year	1	2	3	4	5	6	7	8	9	
Net Sales	0	1,984	3,967	4,959	4,959	4,959	4,959	4,959	4,959	1
Variable Costs										
Nuts	0	1,000	2,000	2,500	2,500	2,500	2,500	2,500	2,500	2
Direct Labor	0	362	724	905	905	905	905	905	905	3
Electricity	0	67	134	167	167	167	167	167	167	4
Supplies	0	20	40	50	50	50	50	50	50	5
Totals	0	1,449	2,898	3,622	3,622	3,622	3,622	3,622	3,622	6
Fixed Costs										
Indirect Labor	0	127	214	214	214	214	214	214	214	7
Depreciation	0	159	159	159	159	159	159	159	159	8
Insurance	0	16	16	16	16	16	16	16	16	9
Repair and Maintenace	0	80	80	80	80	80	80	80	80	10
Adm. Overhead	0	60	120	120	120	120	120	120	120	11
Total	0	422	589	589	589	589	589	589	589	12
Total Costs	0	1,871	3,487	4,211	4,211	4,211	4,211	4,211	4,211	13
Gross Profit	0	113	480	748	748	748	748	748	748	14
Interests	0	152	191	214	193	169	142	112	79	15
Profit before tax	0	(39)	289	534	555	579	606	636	669	16
Income tax (45%)		(Tax exempt for 10 years)								17
Net Profit	0	(39)	289	534	555	579	606	636	669	18

Projected Income Statement (continued)

Year	10	11	12	13	14	15
1	4,959	4,959	4,959	4,959	4,959	4,959
2	2,500	2,500	2,500	2,500	2,500	2,500
3	905	905	905	905	905	905
4	167	167	167	167	167	167
5	50	50	50	50	50	50
6	3,622	3,622	3,622	3,622	3,622	3,622
7	214	214	214	214	214	214
8	159	0	0	0	0	0
9	16	16	16	16	16	16
10	80	80	80	80	80	80
11	120	120	120	120	120	120
12	589	430	430	430	430	430
13	4,211	4,054	4,052	4,052	4,052	4,052
14	748	907	907	907	907	907
17	0	408	408	408	408	408
18	706	499	499	499	499	499

U. Projected Cash Flow Statement (US$000)

Year	1	2	3	4	5	6	7	8	9	
Sources of Income										
Net Income	0	(39)	289	534	565	579	606	636	669	1
Add back: Interest	0	152	191	214	193	169	142	112	179	2
Depreciation	0	159	159	159	159	159	159	159	159	3
Total Internal Resources	0	272	639	907	907	907	907	907	907	4
Borrowings										
Loans	1,625	175	0	0	0	0	0	0	0	5
Equity	545	75	0	0	0	0	0	0	0	6
Total Borrowings	1,810	250	0	0	0	0	0	0	0	7
Total Funds	1,810	522	637	907	907	907	907	907	907	8
Application of Funds										
Pre-operating cost	25	0	0	0	0	0	0	0	0	9
Establishment cost	1,785	0	0	0	0	0	0	0	0	10
Working Capital	0	250	0	0	0	0	0	0	0	11
Amortization of loans	0	0	0	391	391	391	391	391	391	12
Total Disbursements	1,810	250	0	391	391	391	391	391	391	13
Net Cash Inflow/Outflow	0	272	639	516	516	516	516	516	516	14
Cash: Beginning	0	0	272	911	1,427	1,943	2,459	2,975	3,491	15
Ending	0	272	911	1,427	1,943	2,459	2,975	3,491	4,007	16
Debt Service Ratio	-	-	-	2.32	2.32	2.32	2.32	2.32	2.32	17

Projected Cash Flow Statement (continued)

Year	10	11	12	13	14	15
1	706	499	499	499	499	499
2	42	0	0	0	0	0
3	159	0	0	0	0	0
4	907	499	499	499	499	499
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	907	499	499	499	499	499
9	0	0	0	0	0	0
10	0	0	0	0	0	0
11	0	0	0	0	0	0
12	391	0	0	0	0	0
13	391	0	0	0	0	0
14	516	499	499	499	499	499
15	4,007	4,523	5,022	5,521	6,020	6,519
16	4,523	5,022	5,521	6,020	6,519	7,018
17	2.32	-	-	-	-	-