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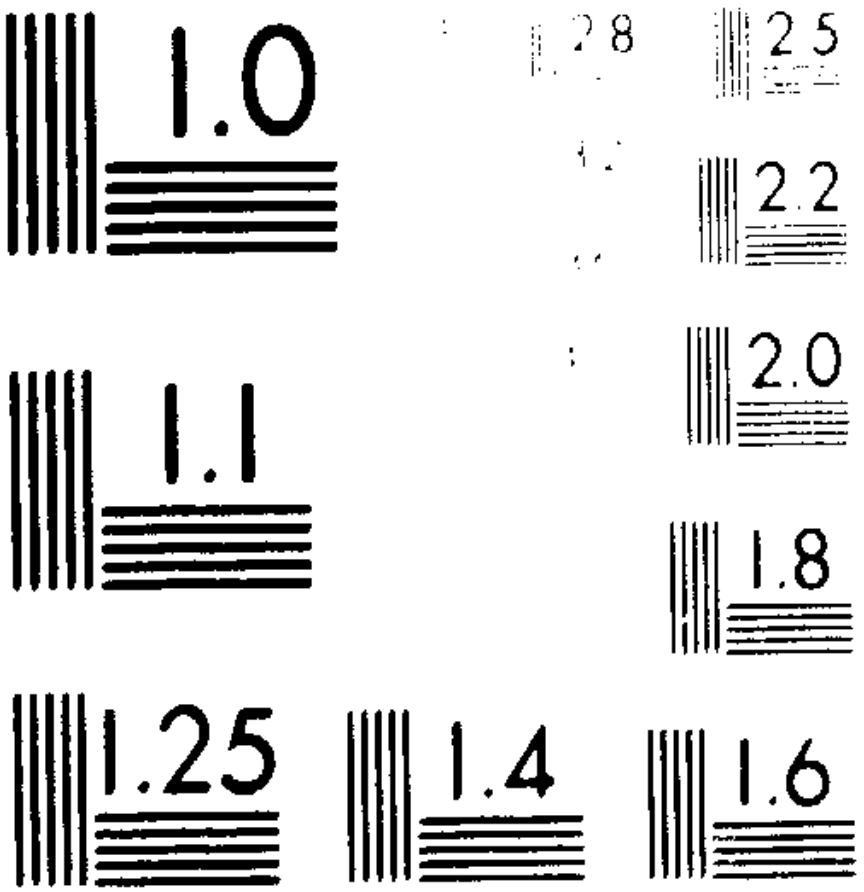
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DP/ID/SER.A/263
31 October 1980
English

FOOD PROCESSING

DP/STV/76/001

ST. VINCENT

Technical report: Feasibility study for a fruit puree processing plant*

Prepared for the Government of St. Vincent
by the United Nations Industrial Development Organization,
executing agency for the United Nations Development Programme

Based on the work of Conrado D. Resurreccion, food technologist

United Nations Industrial Development Organization
Vienna

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Explanatory notes

The monetary unit in St. Vincent is the East Caribbean dollar ($EC). During the period covered by the report, the value of the East Caribbean dollar in relation to the United States dollar was $US 1 = $EC 2.70.

A full stop (.) is used to indicate decimals.

A comma (,) is used to distinguish thousands and millions.

References to tons (t) are to metric tons.

BDD refers to the British Development Division.

The following forms have been used in tables:

Three dots (...) indicate that data are not available.

A dash (-) indicates that the amount is nil or negligible.

ABSTRACT

The project entitled "Food processing" (DP/STV/76/001) arose from a request submitted in November 1976 by the Government of St. Vincent to the United Nations Development Programme (UNDP) for assistance in the establishment of a small commercial food-processing industry which would increase the value of the country's exports and generate employment opportunities. The request was approved in November 1977 and the United Nations Industrial Development Organization (UNIDO) was designated as executing agency.

As a first step an expert in food technology was sent in September 1978 on a mission of six months to St. Vincent in order to assess the food processing operations of AGROLAB, a government-owned produce laboratory for research and development. In his report [1] the expert recommended, among others, the establishment of a small- to medium-scale fruit puree processing plant.

The objective of his present mission which took place from 8 September 1979 to 7 June 1980 was to carry out a feasibility study for the proposed fruit puree plant which would use banana rejects as a main raw material and other locally-available tropical fruits as supporting raw material for the production of puree, juices and nectars. Based on an assessment of the available quantity of raw materials and the future markets for the proposed range of products, the expert determined the suitable plant capacity as well as the required manpower, equipment and machinery. From his financial and economic evaluation can be concluded that the project would be viable and profitable. He recommends that the possibility of producing banana catsup should be seriously considered and that prior to the actual implementation of the project the following should be undertaken: research on alternatives of packaging banana puree; establish formulations for test packaging of banana puree and catsup and develop standards of quality; prepare different samples of the products for the purpose of conducting a marketing study; request assistance from UNDP in managing and supervising these developmental activities

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1/ See document DP/ID/SER.B/196.

at AGROLAB as well as in organizing a training programme for skilled workers in food processing.

Instead of the originally intended establishment of a small can-making plant, the expert now recommends to import collapsed cans and to reform them at the plant.

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Annexes (Cont'd)

INTRODUCTION

The expert, on a nine months assignment with the Government of St. Vincent, W.I., under the UNIDO as executing agency of the UNDP for the promotion of the food processing industry in developing countries undertook the preparation of a feasibility study for the establishment of a fruit puree processing plant in St. Vincent. The proposed plant is primarily intended to process banana rejects into puree for base material in the manufacture of different kinds of food preparations, and secondarily for possible export as canned banana puree. In addition, to process simultaneously seasonal and limited fruits into purees for use in the manufacture of fruit juices, nectars, jams, jellies, and fruit concentrates.

One of the major agricultural crops of St. Vincent is banana which enjoys an established market in the United Kingdom. Incidental to this fresh fruit trading, there exist considerable quantities of rejects discarded and left-out at the various banana boxing stations in the island. These rejects, however, although of satisfactory eating quality do not satisfy the required specifications, hence their unacceptability for export. The seasonal quantity of tropical fruits like mango, guava, soursop, and papaya are limited and therefore it is difficult to fill up the requirements necessary to achieve an economical processing. Under this situation, it is practical to consider the possibility of processing the reject bananas in view of the stabilized position of the industry. It is estimated that 10 to 12 million pounds of rejects are available per annum. This quantity can easily support the raw materials needed by the plant at a rated capcity of 5 to 10 tons per day. Under this situation the continuity of operation is secured and goes further with the expected availability of the seasonal fruits. The feasibility study, therefore, intends to establish the viability of the proposed fruit puree processing project.

Banana puree and/or pulp is produced from ripe fruits by different methods of pulping and ultimately preserving it for use in the various sectors of food manufacturing. It is largely utilized in the manufacture of baby foods, limited use in the flavouring for ice cream, and in bakery products. The United States is the largest consumer of banana puree and it is estimated that the american market consumes approximately 17,850 tons per annum. Since supporting statistics are not readily available there is difficulty in obtaining such data. Commercial concerns seems reluctant to give particulars relating to the trade and their breakdown usuage in the manufacture of various food products. The other international markets for banana puree although limited is confined to the countries of Western Europe and the United Kingdom.

Lately, banana puree is being utilized as a base for the manufacture of banana catsup in the Philippines. It is gaining acceptance and the demand is increasing from both domestic and foreign markets. This may lead eventually to the maximum utilization of the large quantities of reject bananas coming from the fresh banana exports of the Philippines to Japan. Under such situation, it can be possible that such usuage of rejects can be of economic importance to St. Vincent and the other Caribbean islands presently producing large quantities of bananas for the fresh fruit market.

The estimates of banana rejection as reported from four (4) islands in the Eastern Carribbean are indicative for large quantities which can be significant to industrial processing.(1)

Grenada	15 - 30% (Boxing Plant)
St. Vincent	10 - 20% (Boxing Plant)
St. Lucia	15 - 25% (Boxing Plant)
Dominica	20 - 40% (Boxing Plant)

(1) R536 Report on a Visit to the Windward and Leeward Islands (Table 2 p.25) by M.R. Adams, Tropical Products Institute, London

RECOMMENDATIONS

1. Since the cost of cans of size no. 10 foreseen for the packing of the banana puree is very high, a study should be undertaken in order to establish whether the use of bigger containers with a capacity of 50 kg would be more economical. Information would be needed on the type of packing being used for banana puree which is exported from Latin American countries to the United States and to certain European countries. Such information should include the following:

(a) Size, capacity and weight of containers at present used for export purposes;

(b) Coating material of the containers;

(c) Types of fillers used by manufacturers of banana puree;

(d) Bids from container manufacturers giving specification, availability and cost of larger containers and indicating the minimum quantity for an initial order;

(e) Other economic considerations;

(f) Present trends and developments in the packing of banana puree for export.

2. In view of the high packing cost for banana puree, it is recommended to manufacture banana catsup. While the export of banana puree packed in no. 10 cans would give a net profit of only 12.92%, the profit which could be achieved by the export of banana catsup in standard-size bottles would be 25.52%.

3. AGROLAB, a government-owned produce laboratory for research and development, should undertake developmental activities with a view to establishing the formulations needed in test packaging of banana puree and banana catsup. Standards of quality should be established to meet the requirements of marketing operations. These activities need to be programmed and carried out prior to the implementation of the proposed commercial processing of banana puree.

4. Since AGROLAB lacks trained personnel that could manage and supervise the above-mentioned developmental activities the Government should submit a request to UNDP for technical assistance so that work could be started.

5. AGROLAB should also prepare periodically different samples of banana puree and banana catsup for the purpose of conducting a marketing study.

6. Since managerial as well as technical skill in food processing are lacking in St. Vincent, recruitment of personnel with the proper academic background should be started as early as possible in order to prepare the ground for further training and to ensure an efficient and effective management.

7. In the interim period, i.e. while developmental work will be done at AGROLAB prior to the actual implementation of the feasibility study, a training programme for skilled workers in food processing should be organized to secure the necessary manpower for the fruit puree processing plant. There again UNDP should be requested for assistance, i.e. to provide an expert in manpower training with special emphasis on food processing, who would organize and supervise such a training programme.

8. Due to the fact that the sources of financing for the proposed fruit puree processing plant are still being negotiated, it was not possible to consider in the present feasibility study the cost of such financing. Since factors such as basic interest rate, currency of repayment, amount of financing, repayment period, fees and expenses, tax exemptions, time involved in getting the financing, time for paying the interest and required deposit cannot be neglected in determining the viability and profitability of the project it is recommended that the financial arrangements be agreed upon as soon as possible.

I. PROJECT SUMMARY

PROJECT BACKGROUND & HISTORY:

The project sponsor is St. Vincent Government in the West Indies. The feasibility study being submitted was a consequence of a request of the Government in 1976 to UNDP for a technical assistance in the establishment of a small commercial food processing industry. An assessment study was conducted in 1978 to determine what agricultural crops of St. Vincent can be related to food processing. The study recommended the establishment of a medium size processing plant utilizing reject bananas which are available the year round and incorporating the processing of fruits that are seasonal and limited.

MARKET & PLANT CAPACITY:

The US is the largest consumer of banana puree. Approximately, between 75 and 80% of the banana puree consummed in US is utilized by baby food manufacturers and the remaining is used in the baking industry, flavouring, and for ice cream. The price of banana puree is normally negotiated on an individual contractual basis between the puree manufacturers and the baby food processors. It is highly dependent upon the quantities purchased and the quality specifications of the user. Outside the US, the demand of banana puree is limited and is confined almost entirely to the countries of Western Europe which utilizes it in the preparation of baby foods. In the light of current market situation where demand is limited, it can be envisaged that with the expanding consumption of canned and bottled baby foods there can always be a market to absorb it. As population is constantly increasing, an increased demand for baby foods can be anticipated.

The total output of the plant is estimated at o32,970 kilos and/or o32.97 tons/annum operating 257 working days a year and producing 15 product items.

For the banana puree and banana catsup, the output is approximately 570,804 kilos and/or 570.9 tons which represents about 90% of the total output of the proposed plant. The principal raw materials for these products are reject bananas.

MATERIALS & INPUTS:

The estimated inputs for processed and semi-processes items for 257 working days/shift is 72,412 kilos and/or 72.42 tons. This quantity has an approximate costs of EC$ 199,452.00 based current market prices. On the other hand, the estimated inputs for raw materials is 975,866 kilos and/or 975.8 tons with an approximate cost of EC$ 116,467.00. Most of the inputs are procurable locally. Can containers of different sizes are to be imported in collapsed form and reformed at the plant while cartoons and/or cases can be supplied locally. Electricity, water, and fuel are available in St. Vincent. The rates for water and electrical consumption are reasonable although increases are anticipated due to the increasing costs of fuel.

LOCATION AND SITE:

The proposed processing plant is to be located at Campden Park, Kingstown, St. Vincent. The site is an industrial area where important factories are situated. The site is proximate to the sources of raw materials (banana boxing stations) and accessible to all means of transportation. The area has an ample supply of potable water, sufficient electrical power for operating blowers, motors, and lighting equipment. Unskilled labour can easily be recruited. The total area is adequate for initial needs and expansion including storage. Banana is an established industry and reject bananas are always available from the fresh fruit trading. The site is proximate to banking facilities, telegraph, and telephone service located in Kingstown, the capital of the state of St. vincent.

PROJECT ENGINEERING:

The processing of reject bananas into puree covers two distinct stages namely: (1) Ripening of the green bananas and (2) Processing the riped yellow bananas.

The ripening of bananas consists of progressive physical and chemical changes. The control of temperature and humidity are essential in the ripening process. It could exert influence in the shortening and/or lengthning the biochemical changes to suite processing requirements.

The process adopted for the puree production is the acidification method followed by normal canning (Ayer and Erickson). The various operations involved are as follows: sorting & grading, washing, peeling, blanching, pulping, finishing, heating, filling, sealing, cooling, drying & labeling, and storage.

The production process utilizes manual labor and semi-automatic equipment.

The estimate costs of equipment is EC$ 1,135,095.00 with an annual depreciation of EC$ 100,718.00.

The estimate costs of land and buildings is EC$ 1,505,244.00.

The overall production rated capacity of the proposed plant was determined by the capacity of the basic equipment. The equipment requirements were based upon the production process, considering the raw materials to be used and the products to be made. The equipment layout has been arranged in conformity with the process flow. The equipment layout for reforming collapsed cans has also been arranged to achieve efficiency in relation to the needs of processing.

The civil engineering aspect covered the ground layout, land developments, buildings, and provision for expansion. The total land area is a little over 44,000 sq. ft. There is sufficient space for future expansion.

The office, laboratory, and canteen has an area of 2,413 sq. ft., can making and can reforming sheds have an area of 5,475 sq. ft., ripening and production has an area of 6,834 sq. ft., and the storage shed has an area of 3,402 sq. ft.

PLANT ORGANIZATION & OVERHEAD COSTS - COST CENTRES:

The proposed plant will have two cost centres namely:

1. Production Cost Centres - Major industrial operations
2. Service Cost Centres - Supplementary Services

Estimated Factory Expenses annually - EC$ 21,600.00

Estimated Administrative Expenses annually - EC$ 66,480.00

Estimated Costs of Fuel & Power annually - EC$ 38,221.00

MANPOWER:

The manpower requirement of the plant is classified into direct, indirect and/or superintendence, and the managerial staff. In St. Vincent there is no skilled labour or workers with experience in commercial food processing. The only possible source of semi-skilled labour in food processing are those persons that had worked directly and/or indirectly with the Produce Laboratory (AGROLAB) of the Government.

NO. OF WORKERS

Manager	1
Administrative Staff	10
Indirect Labour	8
Direct Labour	14
Reforming & Casing Labour	7
Labelling Labour	4
Total	44

Estimated Cost of Indirect Labour/annum	EC$	44,424.00
Estimated Cost of Administrative/annum		56,280.00
Estimated Cost of Direct Labour/annum		41,120.00
Estimated Cost of Reforming & Casing Labour/annum (103 Working Days)		8,476.00
Estimated Cost of Labelling		7,710.00
Total Costs for Manpower -	EC$	158,010.00

FINANCIAL EVALUATION:

1. The project is viable.
2. The total net profit is estimated at EC$ 229,854.30
3. The net profit is approximately 17.18%
4. The Break-Even Point - Sales Volume (BEPSV) is estimated at EC$ 526,579.17 at which the project does not gain or loss. The projected sales volume and/or selling price for the multiple products is estimated at EC$ 1,337,557.90 and therefore higher than the BEPSV the project is expected to gain.
5. The Break-Even Point - Selling Price (BEPSP) per unit of the multiple products has been estimated. For details refer to Exhibit 3-8.
6. The size and costs of the can containers for Banana Puree packing is exhorbitant which reduced the net profit by approximately 50%. Although the procurement cost of reject bananas will be low, as long as the costs of containers remain high, the expected profit will be controlled and pegged to marginal profitability. The comparative analysis on this important point is discussed in the supplementary feature with particular reference to Exhibit 3-7.

ECONOMIC EVALUATION:

1. The proposed project will create a market for banana rejects arising from the fresh fruit trading exports and consequently will help increase the income of banana growers of St. Vincent.
2. The project will generate employment.
3. The project will contribute to the exports of St. Vincent and minimize importation of food items which can be locally manufactured and thus conserve the dollar earnings.
4. The project will help catalyze the development of other food processing activities and will serve to develop interests of prospective entrepeneurs to invest in similar projects related to food processing.
5. The project will eventually help in the development of manpower skills in food processing and increase the pool of skilled labour needed in the food industries.
6. The project can contribute in improving nutritional deficiences through the utilization of locally processed foods which can be procured at lower prices and at the same time technically processed to conserve essential nutrients for health.
7. The project can serve as incentive to increase production of agricultural crops for food processing.

II. PROJECT BACKGROUND & HISTORY

The Government of St. Vincent in November 1976 submitted a request to the United Nations Development Programme (UNDP) for assistance in the establishment of small commercial food processing industry that would increase the value of the country's export and generate employment opportunities. The request was approved in November 1977 and a preparatory activity was undertaken in September 1978. The purpose of such activity was for the determination and assessment of crops produced in St. Vincent for processing.

Prior to the above, the Government in 1972 with the assistance of the British Development Division (BDD) established a produce laboratory for research and development on agricultural crops. In its early inception the activities undertaken were on food processing and development. It had developed and produced on a limited scale different products utilizing locally grown fruits and vegetables. However, due to limitations in marketing, inadequate capacities of processing equipment, limited supply of raw materials, deficient packaging, the viability of the operations was not established. Although the sales realized for three years had shown commercial significance yet profitability was not shown. Later activities expanded into a semi-commercial scale producing various products like fruit jellies, jams, juices and/or drinks including other salable food items. The value of production was estimated at US$3,000 monthly. Most of the products sold were handled on the basis of ad-hoc contracts since there was no formal marketing organization to handle them. It is estimated that fifty percent (50%) of the production were sold in St. Vincent and the rest in Barbados and Canada. All of these expanded operations did not establish if profits were realized.

The production capacity of the produce laboratory was very limited and the equipment used for its production is intended for experimental and development purposes instead for commercial activities. Its working area is limited and the location for commercial operations is not suitable. The supply of raw materials in terms of tropical fruits are highly seasonal and limited with the exception of bananas. Most of the fruits and vegetables are grown in scattered areas and offers difficulty in the collection system. The transportation facilities are inadequate to load crops for the market. Further, the situation is compounded by poor conditions of roads throughout the agricultural areas thus contributing to low production. Storage facilities for fruits and vegetables are not available at the designated buying stations and prices offered to growers are not attractive to stimulate incentive to increase production.

In a recent assessment study made from the past activities of the produce laboratory, it was established that any commercial food processing in St. Vincent will depend largely on the availability of raw materials. The only crop that can be considered for an economical processing is banana. The existence of an enormous quantities of rejects coming from the fresh fruit trading is estimated at 10 to 12 million pounds per annum. Under such situation, the St. Vincent Banana Growers Association can be the most logical organization to supply the processing plant with the reject bananas. The procurement of available fruits at a given season can be made through the St. Vincent Marketing Corporation, the entity that handles mostly the agricultural produce of St. Vincent for the export markets.

The proposed fruit puree plant with all available facilities can insure the economic operation for the production of the different food items contemplated in the study.

In the production of bananas for the fresh fruit trade there are usually considerable quantities of reject fruits which, though having satisfactory eating qualities, are not acceptable for exports. The utilization of banana rejects has been a serious problem in most of the banana producing countries for many years. It has been generally found that processing could only be profitably carried on if there was an assurance of supply of fruit within close proximity to a processing unit. The processing of reject bananas into puree has become of increasing importance to the food manufacturing industries, chiefly in the production of baby foods, ice cream flavouring, and bakery products. Lately, the Philippines is utilizing banana puree in the production of banana catsup for domestic and foreign markets. With the high cost of tomato catsup, the potential of banana catsup can be most promising. Although it was reported that banana puree has limited markets, its application in the production of baby foods cannot be discounted. Approximately seventy percent (70%) of the 13.7 million kilos imported into the US annually is used in the manufacture of baby foods which can increase in proportion to the population increase. It can be assumed that banana catsup can be highly competitive with other fruit sauces because banana rejects are procurable at very much lower prices than tomatoes coupled with the fact that bananas do not have a specific season in the tropics but are grown on a sustained and continuous basis. The banana catsup has all the essential attributes of tomato catsup and processing techniques

and formulations have made possible closer similarities. The principal countries exporting banana puree are the Dominican Republic, Honduras, Mexico, and Panama. Quick-frozen banana is exported from Mexico while the others are exporting it as canned banana puree.

The banana puree to be processed in St. Vincent is principally intended for the production of banana catsup and secondarily for export item as canned banana puree if and when situation may demand. The other purees which are obtainable from the limited tropical fruits at a given season such as mangoes, soursop, papayas, and guavas are for the production of fruit juices, nectars, drinks, concentrates, jams, and jellies.

St. Vincent's development strategy envisages industrial development on agricultural diversification and expansion. The Government plans and programmes placed special emphasis on (1) providing jobs for the unemployed and new entrants to the labour force (2) expansion and diversification of export oriented activities (3) development of limited import substitution possibilities and (4) supply the basic needs of the population. The proposed fruit puree processing plant is within the context of the program for economic development.

Some of the important development opportunities in St. Vincent which can be related to the food processing industry are (1) crop diversification and expansion (2) planned investments in milk processing, sugar refinery, additional arrowroot processing plant, and a factory to produce boxes and bags (3) can making facilities and packaging to complement agro-industrial processing projects.

As a member state within the Caribbean Community (CARICOM), St. Vincent participates in the regional effort to encourage development. To encourage economic development the Government offers incentives like tax holidays, customs duty rebate, depreciation allowances, carry forward losses, dividents, double taxation agreements, company law, land-holding regulations, exchange control, industrial sites and buildings, joint ventures, and work permits. The proposed project can take advantage of these incentives.

III. MARKET AND PLANT CAPACITY

A. Banana Puree

Most banana puree is exported from Honduras and Panama in aseptically canned form, although small quantities of frozen puree are produced in Mexico and the United States. Exports are largely used in the processing of baby foods. The US takes almost two-thirds of all imports, while the German Democratic Republic and the Federal Republic of Germany each take over 1,000 tons per annum. Other Western European countries, Canada and Japan import approximately 2,000 tons.(1) The value of imports into the Federal Republic of Germany in 1973 was US$394 per ton, which was representative of most markets. The 1978 US imports of puree from Panama, Honduras, Mexico, Costa Rica, and Brazil amounted to 12,200,196 kilograms with a total value of US$3,187,160. On the other hand the 1977 US imports from the same countries amounted to 13,791,504 kilograms with a total value of US$2,999,726. (2)

B. Fruit juices, jams, jellies, marmalades, fruit sauces, tomato catsup and tomato sauce

Some Eastern Caribbean Islands - Imports (3)

	Year	Quantity	Value EC$
St. Lucia	1974	771,417 kilos	$ 578,793
Greneda	1973	229,314 kilos	192,055
Antigua	1974	192,250 kilos	355,061
Barbados	1977	2,355,354 kilos	4,270,447
Trinidad & Tobago	1977	1,536,493 kilos	6,880,303
St. Vincent	1977	141,619 kilos	850,254

Source: (1) The international market for banana products for food use - T 103 Roger J. Wilson TPI
(2) USDA January 1980
(3) Statistical Centere, St. Vincent Government

Based on the established capacity of the plant and availability of raw materials in St. Vincent, a projected market sharing of approximately 10% of the total importations of Barbados and Trinidad & Tobago is conservative and feasible.
The total output of the processing plant is estimated at 632,970 kilos and/or 632.970 tons per annum based on one (1) shift/8 hours/day.

The Fruit Puree Processing Plant has a rated capacity for various products operating on a total of 257 days per annum.

Product	Packing	Wt. in kg
Banana Puree	165,393 #10 cans	545,787
Banana Catsup	64,125 Btls. 14 Oz.	25,137
Mango Juice	14,640 Cans 12 Oz.	4,919
Mango Jam	25,200 Jars 12 Oz.	8,921
Soursop Juice	29,568 Cans 12 Oz.	9,935
Papaya Juice	22,080 Cans 12 Oz.	7,419
Guava Juice	5,856 Cans 12 Oz.	1,968
Guava Jelly	8,640 Jars 12 Oz.	2,903
Guava Jam	15,140 Jars 12 Oz.	5,087
Sorrel Juice	22,620 Cans 12 Oz.	7,600
Sorrel Jelly	2,400 Jars 12 Oz.	806
Sorrel Syrup	4,284 Btls. 750 Ml.	3,213
Pina Colada	3,100 Btls. 750 Ml.	2,325
Gravy Browning	18,200 Btls. 5 Oz.	2,548
Salted Peanuts	52,400 Cans 6 Oz.	4,402
	Total	632,970 kg
		632.970 Tons

Exhibit A-1

DEMAND & MARKET OF BANANA PUREE

EXPORTS

Tons

	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
Dominican Republic	4169	3934	7152	-	-	-	-	-	-	-
Honduras	-	-	-	1112	7002	10295	11953	...	...	...
Mexico	...	...	1100	...	...	173	208	183	924	...
Panama	-	-	-	-	-	-	-	-	-	1455

IMPORTS

Tons

	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
USA	...	...	...	...	...	6642	5280	6315	7246	8125	7570
Canada	204	294	128	328	591	535	540	536	517	419	430
Fed. Republic of Germany	41	212	323	448	434	543	1383	990	931	1408	1280
United Kingdom	94	17	228	-	131	500	461	295	243	378	430
France	...	48	67	43	76	83	56	56	218	292	235
Italy	4	52	-	26	31	64	112	200	327	219	...
Netherlands	-	69	57	16	12	15	-	57	50	138	112
Belgium-Luxemburg	...	...	...	...	...	5	4	16	12	7	...
Austria	-	-	-	1	-	41	35	66	44	40	53
Spain	-	-	-	-	9	7	19	4	51	63	8
Switzerland	-	-	29	30	24	135	63	260	171	229	317
Sweden	40	11	36	15	30	26	125	23	134	167	60
German Dem. Republic	...	...	...	...	...	...	...	...	...	1300 a/	...
Japan	-	15	31	32	49	28	65	89	181	273	158
Australia ('000 litres)	-	-	-	-	-	-	-	-	5	79	...

a/ Estimate.

Source: Wilson, R.J. (1975) The international market for banana products for food use. Rep. Trop. Prod. Inst., G103, vi+41.

Exhibit A-1a

PRICES OF BANANA PUREE

The prices of banana puree to users are negotiated on an individual basis and depend on the type of puree, type of packing and other commercial considerations. The unit values of imports had indicated very little change in prices over the decade up to 1973, however, with the high cost of oil prices have increased correspondingly.

Value of Imports into Federal Republic of Germany

Table A — US$ per ton, cif

1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
332	313	320	340	313	343	336	341	375	323	394

Value of Imports of banana puree into USA

Table B — US$ per ton, cif

	1968	1969	1970	1971
Quick Frozen (Mexico)	202	197	202	188
Aseptic (Honduras)	169	155	145	141

For comparison with the import value data the unit value of exports from the Dominican Republic and Honduras are shown in Table C. These values are, of course, on an f.o.b. basis compared with the cif. of imports and figures for Honduras may include exports of some other fruits

Value of Exports of banana puree

Table C — US$ per ton, fob

	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Dominican Republic	187	188	192	-	-	-	-	-	-	-	-
Honduras	-	-	-	193	197	200	195	...	...	...	...

Source: Tables A,B & C - Wilson, R. J. (1975) The international market for banana products for food use. Rep. Trop. Prod., Inst., G103, vi+41.

Exhibit A-1b

PROJECTED DEMAND BASED ON PAST DEMAND - WORLD
COMMODITY : BANANA PUREE

TOTAL IMPORT STATISTICES - 1963 to 1973

YEAR	QUANTITY (Tons)	PERCENT INCREASE/YR
1963	383	
1964	718	54.00
1965	899	20.13
1966	939	4.25
1967	1387	32.29
1968	8624	37.69
1969	8043	6.73 a/
1970	8907	9.70
1971	10030	11.19
1972	13037	23.06
1973	10653	18.26 a/

a/ Decrease.

Source: Wilson, R. J. (1975) The international market for banana products for food use. Rep. Prod. Inst., G103, vi+41.

PROJECTED DEMAND - WORLD
(In Tons)

Imports in 1973 ———	10,653
Imports in 1963 ———	333
Increase in 10 years ———	10,270
Ave. annual increase ———	1,027

1974	11680
1975	12707
1976	13734
1977	14761
1978	15788
1979	16815
1980	17842
1981	18869
1982	19896
1983	20923
1984	21950
1985	22977

NOTE: The US has been by far the largest importer and consumer of banana puree. It is however, difficult to obtain information concerning quantities of banana puree being consumed since domestic processors have been an important source of supply in addition to imports.

Exhibit A-1c

US IMPORTS OF BANANA PUREE

Banana and plantain pulp/paste imports, USA, 1977 & 1978
By Country of Origin

COUNTRY	1977 QUANTITY (kg)	1977 VALUE ($US)	1978 QUANTITY (kg)	1978 VALUE ($US)
Italy	1,134	2,722	-	-
Brazil	175,227	77,363	873	338
Costa Rica	6,887	2,519	1,647,820	615,193
Honduras	4,868,962	1,100,362	2,922,175	749,533
Mexico	1,241,058	455,886	2,322,379	874,507
Panama	7,481,197	1,353,773	5,306,949	947,589
Philippines	17,039	7,101	-	-
TOTAL	13,791,504	12,200,196	12,999,726	3,187,160

Source: USDA, January 1980

Note: If these figures are used to calculate the unit value of imports from each country it can be seen that the only paste which is included (distinguishable by the higher unit cost) is from Italy, a total of 0.0082% of the total import figure and in 1978 there are no imports of paste. It is assumed therefore that the above data relates only to banana puree(pulp).

The imports of US in 1971 & 1978 increased approximately by 44.25% or 6.76% per annum.

The imports of US in 1971 & 1977 increased approximately by 47.46% or 6.78% per annum.

Exhibit A-2

PRODUCTION CALENDAR BASED ON AVAILABLE RAW MATERIALS

Basis: 257 Working Days - One(1) Working Shift/day

JAN.	FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	NO. of Days
Banana Puree(11)	Banana Puree(10)	Banana Puree(10)	Banana Puree(10)	Banana Puree(6)	Banana Puree(4)	Banana Puree(5)	Banana Puree(7)	Banana Puree(6)	Banana Puree(10)	Banana Puree(6)	Banana Puree(6)	91
Banana Catsup(5)	Banana Catsup(5)	Banana Catsup(5)	Banana Catsup(5)	Banana Catsup(5)	Banana Catsup(3)	Banana Catsup(4)	Banana Catsup(5)	Banana Catsup(4)	Banana Catsup(5)	Banana Catsup(6)	Banana Catsup(5)	57
-	-	-	Soursop Juice(5)	Soursop Juice(6)	Soursop Juice(5)	-	-	-	-	-	-	16
-	-	-	-	Papaya Juice(5)	Papaya Juice(4)	Papaya Juice(3)	-	-	-	-	-	12
-	-	-	-	-	Mango Juice(5)	Mango Juice(5)	Mango Jam(5)	-	-	-	-	15
-	-	-	-	-	-	Guava Juice(4)	Guava Jam(5)	Guava Jelly(10)	-	-	-	19
-	Sorrel Drink(10)	Sorrel Syrup(3)	-	-	-	-	-	Sorrel Jelly(2)	-	-	-	15
Pina Colada(5)	-	-	-	-	-	-	-	-	-	-	-	5
-	-	-	-	-	-	-	-	-	-	Salted Peanuts(10)	Salted Peanuts(10)	20
-	-	-	-	-	-	-	-	-	Gravy Browning (7)	-	-	7
(21) Days	(20) Days	(23) Days	(20) Days	(22) Days	(21) Days	(21) Days	(22) Days	(23) Days	(22) Days	(22) Days	(21) Days	257
Holiday 2	-	-	Holiday 2	Holiday 1	Holiday 1	Holiday 2	Holiday 1	-	Holiday 1	-	Holiday 2	12

Exhibit A - 2a

ESTIMATE OF PRODUCTION FOR FIVE (5) YEAR PROGRAMME

PRODUCT	First Year	Second Year	Third Year	Fourth Year	Fifth Year
Banana Puree	545,788 kilos	573,077	600,366	627,656	654,945
Banana Catsup	64,125 bottles	67,331	70,537	73,743	76,950
Soursop Juice	29,568 cans	31,046	32,524	34,003	35,481
Papaya Juice	22,080 cans	23,184	24,288	25,392	26,496
Mango Juice	14,640 cans	15,372	16,104	16,836	17,568
Mango Jam	25,200 glass jars	26,460	27,720	28,980	30,240
Guava Jam	15,140 glass jars	15,897	16,654	17,411	18,168
Guava Jelly	2,400 glass jars	2,520	2,640	2,760	2,880
Sorrel Juice	22,620 cans	23,751	24,882	26,013	27,144
Sorrel Syrup	4,284 bottles	4,498	4,712	4,926	5,140
Sorrel Jelly	2,400 glass jars	2,520	2,640	2,760	2,880
Pina Colada	3,100 bottles	3,255	3,410	3,565	3,720
Gravy Browning	18,200 bottles	19,110	20,020	20,930	21,840
Salted Peanuts	26,256 cans	27,568	28,881	30,194	31,507

Exhibit A-3

ESTIMATE OF WORKING DAYS BASED ON PRODUCTION PROGRAMME

PRODUCT	OPERATING DAYS	TOTAL WORKING HRS.	PERCENT OF OPERATING DAYS
Banana Puree	91	728	35.40
Banana Catsup	57	456	22.18
Soursop Juice	16	128	6.23
Papaya Juice	12	96	4.67
Mango Juice	10	80	3.89
Mango Jam	5	40	1.95
Guava Juice	4	32	1.56
Guava Jam	5	40	1.95
Guava Jelly	10	80	3.89
Sorrel Juice	10	80	3.89
Sorrel Syrup	3	24	1.17
Sorrel Jelly	2	16	0.78
Pina Colada	5	40	1.95
Salted Peanuts	20	160	7.79
Gravy Browning	7	56	2.72
TOTAL	257	2,056	100.00

Exhibit A-4

ESTIMATE OPERATION OF PLANT

BASIS: Raw Materials availability
One (1) Working Shift/day

PRODUCT	PACK	OPERATING DAYS	PERCENT OF DAY
Canned			
Banana Puree	13,824 doz. # 10	91	100.0
Mango Juice	1,220 doz. 12 oz.	10	100.0
Soursop Juice	2,464 doz. 12 oz.	16	100.0
Papaya Juice	1,340 doz. 12 oz.	12	100.0
Guava Juice	488 doz. 12 oz.	4	100.0
Sorrel Juice	1,885 doz. 12 oz.	10	100.0
Salted Peanuts	2,183 doz. 6 oz.	20	100.0
Packed in Glass			
Banana Catsup	5,343 doz. 14 oz.	57	100.0
Guava Jelly	720 doz. 12 oz.	10	100.0
Guava Jam	1,261 doz. 12 oz.	5	100.0
Sorrel Syrup	357 doz. 26 oz.	3	100.0
Sorrel Jelly	200 doz. 12 oz.	2	100.0
Mango Jam	2,100 doz. 12 oz.	5	100.0
Pina Colada	258 doz. 26 oz.	5	100.0
Gravy Browning	1,516 doz. 5 oz.	7	100.0
TOTAL	34,274 dozens	257	100.0

Exhibit A-5

ESTIMATE OF SALES

First Year Operation

Value in EC$

PRODUCT	QUANTITY	PRICE/UNIT	TOTAL SALES
Banana Puree	545,738 kilos	1.50	818,682.00
Banana Catsup	64,125 bottles	2.30	147,487.00
Mango Juice	14,640 cans	1.75	25,620.00
Mango Jam	25,200 cans	1.85	46,620.00
Soursop Juice	29,568 cans	1.65	48,787.10
Papaya Juice	22,080 cans	1.65	36,432.00
Guava Juice	5,356 cans	1.65	9,882.00
Guava Jelly	8,640 jars	2.65	22,896.00
Guava Jam	15,140 jars	1.70	25,738.00
Sorrel Juice	22,620 cans	1.35	30,537.00
Sorrel Jelly	2,400 jars	2.55	6,120.00
Sorrel Syrup	4,284 bottles	2.45	10,495.80
Pina Colada	3,100 bottles	7.00	21,700.00
Gravy Browning	18,200 bottles	1.60	29,120.00
Salted Peanuts	26,256 cans	2.20	57,763.00
	TOTAL		1,337,557.90

Exhibit A-3a

ESTIMATED PRICES FOR PROCESSED PRODUCTS

Picked-up plant - Value in EC$

COMMODITY	CONTAINER SIZE	PER DOZEN	PER CASE
Canned			
Banana Puree	6/10	-	29.61
Mango Juice	24/12	15.60	42.00
Soursop Juice	24/12	19.80	39.60
Papaya Juice	24/12	19.80	39.60
Guava Juice	24/12	19.80	39.60
Sorrel Juice	24/12	16.20	32.40
Salted Peanuts	48/6	26.40	105.60
Packed in Glass			
Banana Catsup	24/14	27.60	55.20
Guava Jelly	24/12	31.80	63.60
Guava Jam	24/12	20.40	40.80
Sorrel Jelly	24/12	30.00	61.20
Sorrel Syrup	12/26	29.40	29.40
Mango Jam	24/12	22.20	44.40
Pina Colada	12/26	34.00	34.00
Gravy Browning	48/5	19.20	76.80

Exhibit A-5b

SALES PROJECTION FOR FIVE YEARS PROGRAMME

Value in EC$

PRODUCT	1st Yr.	2nd Yr.	3rd Yr.	4th Yr.	5th Yr.
Projected Increase	-	5%	10%	15%	20%
Banana Puree	818,682	859,616	900,500	941,434	982,413
Banana Catsup	147,487	154,861	162,235	169,610	176,984
Mango Juice	25,620	26,901	28,182	29,463	30,744
Mango Jam	46,620	48,951	51,282	53,613	55,944
Soursop Juice	48,787	51,226	53,666	56,105	58,544
Papaya Juice	36,432	38,254	40,075	41,896	43,718
Guava Juice	9,662	10,145	10,628	11,111	11,594
Guava Jelly	22,896	24,041	25,186	26,330	27,475
Guava Jam	25,738	27,025	28,312	29,599	30,886
Sorrel Juice	30,537	32,063	33,590	35,117	36,664
Sorrel Jelly	6,120	6,426	6,732	7,038	7,344
Sorrel Syrup	10,495	11,019	11,534	12,069	12,594
Pina Colada	21,700	22,785	23,870	24,955	26,040
Gravy Browning	29,120	30,576	32,032	33,488	34,944
Salted Peanuts	57,763	60,651	63,539	66,427	69,316
TOTAL	1,337,557	1,404,435	1,471,313	1,538,190	1,605,507

Exhibit A-6

ESTIMATE OF OUTPUT

One(1) Working Shift/day

PRODUCT	OUTPUT/DAY	OPERATING DAYS	TOTAL OUTPUT
Banana Puree	1,823 cans	91	165,893 cans
Banana Catsup	1,125 bottles	57	64,125 bottles
Mango Juice	1,464 cans	10	14,640 cans
Mango Jam	5,040 glass jars	5	25,200 bottles
Soursop Juice	1,848 cans	16	29,568 cans
Papaya Juice	1,840 cans	12	22,080 cans
Guava Juice	1,464 cans	4	5,856 cans
Guava Jelly	864 glass jars	10	8,640 jars
Guava Jam	3,026 glass jars	5	15,132 jars
Sorrel Juice	2,262 cans	10	22,620 cans
Sorrel Jelly	1,200 glass jars	2	2,400 jars
Sorrel Syrup	1,426 bottles	3	4,284 bottles
Pina Colada	619 bottles	5	3,096 bottles
Gravy Browning	2,599 bottles	7	18,192 bottles
Salted Peanuts	1,309 cans	20	26,196 cans
Total		257	

Exhibit A-7

ESTIMATE OF PRODUCTION COST

Value in EC$

PRODUCT	COST/DAY	WORKING DAYS	TOTAL COST
Banana Puree	7,828.13	91	712,359.83
Banana Catsup	1,927.00	57	109,839.00
Mango Juice	2,042.98	10	20,429.80
Mango Jam	6,037.99	5	30,189.95
Soursop Juice	2,253.62	16	36,058.98
Papaya Juice	2,364.27	12	28,372.48
Guava Juice	2,060.95	4	8,243.81
Guava Jelly	2,028.75	10	20,287.50
Guava Jam	4,057.57	5	20,287.85
Sorrel Juice	2,427.73	10	24,277.89
Sorrel Jelly	2,405.39	2	4,911.79
Sorrel Syrup	2,755.34	3	8,266.03
Pina Colada	3,213.13	5	16,065.91
Gravy Browning	3,286.47	7	22,963.19
Salted Peanuts	2,250.52	20	45,010.41
	Total	257	1,107,703.60

Exhibit A-8

Value in EC$

ESTIMATE OF DAILY COST OF PRODUCTION PER PRODUCT

Banana Puree	7,828.13
Banana Catsup	1,927.00
Mango Juice	2,042.98
Mango Jam	6,037.99
Soursop Juice	2,253.68
Papaya Juice	2,364.00
Guava Juice	2,060.95
Guava Jelly	2,042.65
Guava Jam	4,057.57
Sorrel Juice	2,427.79
Sorrel Jelly	2,455.39
Sorrel Syrup	2,755.34
Pina Colada	3,213.13
Gravy Browning	3,280.45
Salted Peanuts	2,250.52

IV. MATERIALS AND INPUTS

The agricultural crops involved in the feasibility study are bananas, mangoes, guavas, soursops, papayas (paw-paw), sorrel, and peanuts. The only crop that can be reconsidered as having marketable surplus is banana. All the rest are seasonal and limited which accounts for the fact that no private entrepreneur has been interested to venture in commercial processing. The fresh fruit banana trading to UK represents a substantial volume of production from the different agricultural areas in St. Vincent. The average banana exports for the last three years (1976 to 1978) to UK represent approximately 66.025 million pounds and/or 66,025 tons valued at EC$16.273 million per annum. The estimated rejects from the export trading annually is estimated at 10 to 20% and there has not been any established price offered for these wastes. The potential quantity of available rejects that can be utilized for commercial processing is estimated at 12 million pounds a year and/or 5.45 million kilogrammes/annum.

The estimated inputs for processed and semi-processed for a total working days of 257 is 72,421 kilograms or 72.42 tons with approximate costs of EC$199,452.00 based on current prices. Majority of the inputs are locally procurable and if not available can be ordered from outside sources like Barbados, Trinidad, UK and Florida which have established communication net work and existing transport facilities.

Can containers of various sizes are to be imported in collapsed form and reformed at the plant. Bottles and glass jars are available locally; additional ones could easily be ordered from foreign sources in Trinidad, UK, and Florida, US.

The cartons and/or cases can now be supplied locally by the St. Vincent Containers Corporation which is in full operation at Campden Park, Kingstown, St. Vincent.

The various auxiliary materials and factory supplies are procurable locally and abroad. There are local distributors in St. Vincent that represents foreign suppliers and manufacturers which can facilitate the procurement for such auxiliary materials.

Electricity, water, and fuel including compressed cooking gas are available in St. Vincent. The water supply is sufficient and no recyling of waste water from the plant operations is presently intended. The rates for water supply are reasonable which includes the rate for electrical consumption. However, rates are going up due to the increasing cost of fuel.

Exhibit B-1

ESTIMATE OF RAW MATERIAL REQUIREMENTS

PRODUCT	CROP	DAILY REQUIREMENT (in kg)	OPERATING DAYS	TOTAL QUANTITY (in kg)
Banana Puree	Banana	10,000	91	910,000
Banana Catsup	Banana	630	57	35,910
Mango Juice	Mango	177	10	1,770
Mango Jam	Mango	1,000	5	5,000
Soursop Juice	Soursop	71	16	1,136
Papaya Juice	Papaya	433	13	5,796
Guava Juice	Guava	224	4	974
Guava Jelly	Guava	342	10	3,420
Guava Jam	Guava	1,000	5	5,000
Sorrel Juice	Sorrel	10.8	10	108
Sorrel Jelly	Sorrel	64	2	128
Sorrel Syrup	Sorrel	30	3	90
Pina Colada	Coconut	770 nuts	5	3,850 nuts
Gravy Browning	Caramel	220	7	1,400
Salted Peanuts	Peanut(Shelled)	227.7	20	4,454

Exhibit B-2

ESTIMATE OF PRODUCTION COST: INPUTS

COMMODITY	QUANTITY (in kg)		Value in EC$ COST/UNIT	TOTAL COST
Citric Acid	8,258		11.00	90,838.00
Sugar	22,426		1.65	37.002.90
Salt	37,350		0.66	24,651.00
Onion	681		2.20	1,498.00
Garlic	27.69		7.91	219.23
Cinnamon	40.90		17.79	728.00
Mace	5.59		10.00	55.90
Cloves	25.00		26.78	669.50
Allspice	24.00		17.80	427.20
Cayenne	6.00		10.00	60.00
Pectin Powder	40.00		20.00	800.00
Sodium Bicarbonate	0.168		5.50	0.924
Sodium Benzoate	2.66		6.00	17.56
Span 60	4.74		21.00	99.54
Tween 60	0.948		21.00	19.91
Propyl Gallate	0.270		93.59	25.27
Caramel	1,400		2.98	4,172.00
Arrowroot Starch	116.4		13.66	1,590.30
Vinegar	77.9	Litres	3.20	249.28
Pineapple Juice	900	Litres	33.87	30,484.30
Rum	750	Litres	7.50	5,625.00
Vegetable Oil	285	Litres	5.58	1,590.30
				199,452.43

Exhibit 3-3

ESTIMATE OF PRODUCTION COST: Raw Materials

COMMODITY	QUANTITY (in Kg)	Value in EC$ COST/UNIT	TOTAL COST
Bananas	945,910	0.10	94,591.00
Mangoes	5,000	0.66	3,300.00
Soursop	1,136	0.55	624.80
Papaya	5,796	0.33	1,912.68
Guava	9,394	0.55	5,166.70
Sorrel	326	1.25	408.30
Coconut	3,850 (nuts)	0.30	1,155.00
Peanuts	4,454	2.09	9,308.86

Exhibit 3-4

ESTIMATE OF LABEL COSTS

PRODUCT	QTY/PRODUCT (label)	QTY IN CASES (label)	TOTAL	COST(ECS)
Canned				
Banana Puree	165,393	27,573	193,466	29,019.00
Mango Juice	14,640	610	15,250	2,287.50
Soursop Juice	29,568	1,232	30,800	3,080.00
Papaya Juice	22,080	920	23,000	2,300.00
Guava Juice	5,356	244	6,100	610.00
Sorrel Juice	22,620	942	23,562	2,356.20
Salted Peanuts	26,200	545	26,745	4,011.75
Packed in Glass				
Banana Catsup	64,296	2,679	66,975	10,046.25
Guava Jelly	8,640	360	9,000	900.00
Guava Jam	15,140	630	15,770	1,577.00
Sorrel Syrup	4,284	357	4,641	696.15
Sorrel Jelly	2,400	100	2,500	250.00
Mango Jam	25,200	1,050	26,250	2,625.00
Pina Colada	3,100	258	3,355	503.70
Gravy Browning	18,200	379	18,579	2,786.70
TOTAL	428,114	37,379	465,993	63,050.15

Exhibit B-5

ESTIMATED COST OF LABOR FOR LABELLING

Cost of labor involved in labelling each product both for canned and glass packed. All works are manual and labelling machine is involved and computed as follows:

Daily:

	ECS
2 - Laborers applying label @ $8.00	16.00
1 - Laborer gluing & stenciling cases	8.00
1 - Laborer stacking cases of finished goods	6.00
	30.00

PRODUCT	LABELS PASTED/DAY	OPERATING DAYS	ECS TOTAL COST
Banana Puree	2,126	91	2,730.00
Banana Catsup	1,175	57	1,710.00
Mango Juice	1,525	10	300.00
Mango Jam	5,250	5	150.00
Soursop Juice	1,925	16	480.00
Papaya Juice	1,912	12	360.00
Guava Juice	1,525	4	120.00
Guava Jelly	900	10	300.00
Guava Jam	3,154	5	150.00
Sorrel Juice	2,293	10	300.00
Sorrel Jelly	1,250	2	60.00
Sorrel Syrup	1,546	3	90.00
Pina Colada	671	5	150.00
Gravy Browning	2,654	7	210.00
Salted Peanuts	1,337	20	600.00
TOTAL		257	7,710.00

Exhibit B-6

ESTIMATE COSTS OF CANS, GLASS CONTAINERS & CASES

Value in ECS

PRODUCT	QUANTITY	COST OF CAN/GLASS	COST OF CASE
Canned			
Banana Puree	165,393	161,745.00	(Included in cans)
Mango Juice	14,640	2,196.00	793.00
Soursop Juice	29,568	4,435.00	1,601.60
Papaya Juice	22,080	8,653.15	1,196.00
Guava Juice	5,856	2,294.96	317.00
Sorrel Juice	22,620	8,864.77	1,224.60
Salted Peanuts	26,200	4,076.72	763.00
Packed in Glass			
Banana Catsup	64,296	25,008.75	3,408.60
Guava Jelly	8,640	3,456.00	468.00
Guava Jam	15,140	6,056.00	819.00
Sorrel Syrup	4,284	1,449.00	535.00
Sorrel Jelly	2	960.00	130.00
Mango Jam	25,200	10,080.00	1,365.00
Pina Colada	3,100	1,085.00	1,935.00
Gravy Browning	18,200	6,370.00	497.40
TOTAL		246,730.35	15,053.20

V. LOCATION AND SITE

The proposed puree processing plant is to be located at Campden Park, an established industrial site and where most of the industrial plants of St. Vincent are situated. The site is approximately 8 miles from Kingstown, the capital of St. Vincent. The following factors were considered in the choice of the site.

Raw Materials :- The site is close to and easily accessible from the different agricultural areas in St. Vincent where mostly all raw materials (fruits and vegetables) can be obtained within a radius of approximately 10 to 15 kilometers. It is also proximate to the different packing stations for the fresh fruit trading wherefrom all the reject bananas emanate. Likewise, seasonal fruits when available are not too far from the plant site.

Transportation Facilities:- The site is along an established and developed road of the industrial site which connects to the national road leading to all the different towns and agricultural areas and estates in St. Vincent. There are available cargo trucks, buses, jeepneys, taxis, cars, and other minor means of transport.

Site Availability:- An approximately one (1) acre was made available by the Development Corporation of St. Vincent, a government enterprise which is managing the development of the industrial site. The present cost of land in the site is approximately EC$1.25/sq. ft. The total area of the land is approximately 44,070 sq. ft. or 0.9105 acres. The site is adequate to accomodate future expansion and sufficient for the rated capacity of the processing plant.

Labor:- The rank-and-file of the work force needed in the plant can be recruited easily in Kingstown and the neighbouring towns where unemployment problem exists. Hence, there shall be no housing, personnel transportation, and other relocation problem. The proposed key personnel of the plant is not too far away from the plant site.

Utilities:- Electrical power is available for both the initial requirements and for any subsequent expansion programs. The rate charged for electrical consumption is reasonable. The electrical power charges are based on the following:

40 units	EC$ 0.20/unit
Over 4,000 units	EC$ 0.17/unit

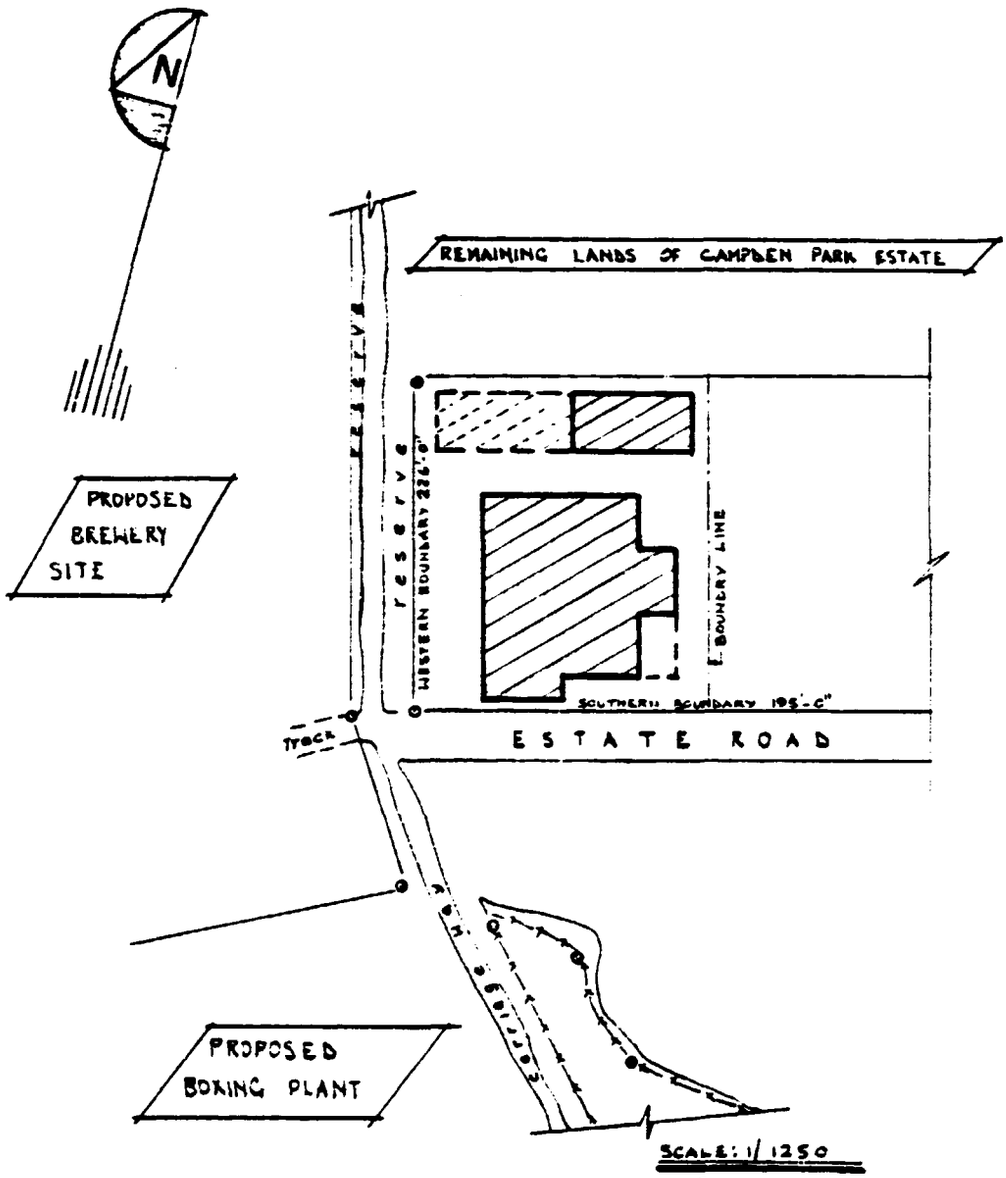
Fuel surcharge = Amount of unit charge x fuel surcharge

Service charge = $\frac{\text{Floor Area}}{50}$ x EC$ 0.30

Bunker fuel oil is available but its price has increased due to price increases imposed by distributors. The water rate is reasonable but is being affected by the price increase in oil. There is no apparent need for a deepwell inasmuch as water can be supplied from the natural water system throughout the year.

Market and Other Facilities:- The business sector of the capital town is barely approximately 3 miles from Kingstown. It takes about 10 to 15 minutes from the site to reach business establishments, banks, government offices, and residential areas which are located nearby. The proposed plant is adjacent to the St. Vincent Containers Corporation that can supply the future needs of the plant in terms of its packaging requirements. Telephone and wireless telegraph services are available. The industrial plants located at the industrial site will stand to benefit from future operations of the processing plant. There are also harbor facilities adjacent to the industrial site which is of importance to future export activities.

Exhibit C-1



ST. VINCENT FOOD-PROCESSING CENTRE

SITE PLAN

VI. PROJECT IMPLEMENTATION

The processing of banana rejects into puree as proposed in the study is divided into two distinct stages namely: (1) Ripening Process (2) Processing the riped banana rejects. The stages involved are taken into account and the corresponding facilities necessary to implement same has been identified. A ripening area with an approximately 5 to 10 tons capacity was proposed to be able to furnish the daily requirements of processing into banana puree based on an established ripening schedule.

A. Ripening

Ripening of bananas is a process during which, through physical and chemical changes, the banana becomes yellow in color and at the same time tastes sweeter and more pleasant. The starch originally present in the unriped stage is nearly all converted into sugar when it ripens. During the process, the characteristic aroma of the ripe fruit develops and other numerous changes take place. The ripening process is usually accomplished at temperatures ranging from 58°F to 68°F pulp temperature with a relative humidity of 90 to 95%. Ripening temperatures between 58°to 64°F are best only when ethylene gas is used. The ripening characteristics of different lots of bananas vary with country, variety, season of the year, maturity when harvested and other factors. There is also a need for air-circulating fans operating continously in order to achieve a uniform pulp temperature throughout the ripening period. Under average conditions, the banana variety like the lakatan grown in St. Vincent for the export markets cannot be ripened in less than 5 to 6 days nor extended beyond 10 to 12 days. As ripening advances bananas become progressively softer and need careful handling in order to avoid bruising. However, in the case of rejects, it is not that delicate as the ultimate purpose is

pulping the fruit by mechanical reduction of the fruit. By the control of such factors like temperature and humidity the ripening time of green bananas can be shortened or lengthened to suit processing requirements.

3. Processing

The banana puree production as proposed adopts the acidification followed by normal canning method. (Buyer & Erickson) After reaching full ripeness, the fruits are mechanically conveyed from the ripening room or area and washed to remove dirt and spray residues. It is next peeled with all peel rag and decayed portions removed. The peeled fruits are then subjected to blanching in steam or boiling water or combination of both until a center temperature of 190°F is attained. Usually, a medium size peeled banana requires about 6 to 8 minutes to attain this temperature. The fruit is then comminuted through a pulping machine equipped with the specific sieve size screen made of stainless steel. Either during the communition process or after it, the computed amounts of sugar and citric acid are added to bring about the pH at the range of between 4.1 to 4.3 and the sugar concentration between 30 to 35%. The sugar at this concentration is to mask the citric acid which was previously added. The determination of acidity and sugar concentration is accurately established with the aid of a pH meter and the sugar by refractometer. Attaining such conditions, the comminuted pulp is heated to approximately 200°F or 99°C and filled without delay into enameled containers, sealed by a mechanical sealer and immediately inverted and held at this position for 5 minutes.

This is followed by water cooling to 100°F. The entire operation from peeling to filling into the cans is carried out as fast as possible to insure a high quality product.

The browning discoloration of the banana puree is attributed to a very active oxidative enzyme system which is eliminated by inactiviting the enzyme with hot water or steam blanching before pulping. Canned acidified banana puree may also undergo pink discoloration which can intensify due to the presence of peel rag and either tin or zinc in the puree. (Guyer & Erickson) This reported discoloration could be held to a minimum if the temperature of the banana was rapidly raised to 135°F during the blanching process.

EQUIPMENT AND OPERATIONS

The various pieces of equipment for the proposed plant are briefly described. It is assumed that banana rejects are first subjected to ripening before they can be utilized for processing into banana puree. (Refer to Exhibit D-4 for the Process Flow Diagram) The sorting, grading, cutting, washing, weighing, and peeling operations are manually performed and accomplished outside the processing area proper. The cleaned, graded, selected, and washed bananas are conveyed mechanically to the processing area proper where they undergo the various operations. The first operation is blanching and this is accomplished through the blancher. The blanched bananas are then mechanically conveyed to the pulper, then pumped to the finisher. Passing the finisher the pulp is conveyed by pump to a holding tank, a stainless steel container with steam jacketed construction and a built-in mechanical stirrer. All of these are electrically operated. The acidity and sugar concentration are checked at the holding tank where all the necessary adjustments are done. At the holding tank, the pulp is heated

by steam at a given temperature. After completion of the heating, it is finally conveyed by pump to the filler (semi-automatic), thence to the sealer (semi-automatic) and finally to the cooling tank. The cans are finally dried, labelled, cased, and stored.

In the case of the banana catsup and the other seasonal fruits for conversion likewise into purees and eventually to juices and/or nectars follow the same unit operations adopted for the banana puree. However, with one exception and that is all juices, nectars, and drinks after passing the blending operations at the holding tank are subjected to the pasteurizer and/or steam heat exchanger before being conveyed to the filler for sealing.

The proposed equipment layout is not only intended for banana puree processing but is also applicable to most of the other tropical fruits which are processed first into puree before conversion into fruit drinks, juices, and nectars. The unit operations involved in the various manufacturing stages for all the proposed food items have been distributed in such a way that there is maximum application and utilization of equipment. While there exists a high percentage of unemployment in St. Vincent, the proposed project can contribute to generate possible employment and build-up of skilled labor in food processing needed badly for the industrial food development of the island.

Exhibit D-1

ESTIMATE COSTS OF EQUIPMENT

	Value in EC$
Electrical System:	
Electrical system to supply power to all equipment, conduit, wire, and other supplies based on present costing of materials and labor, and similar constructed plant reasonably of comparable size, estimated	36,036.00
Installation Costs:	
Installing processing equipment and accessories mobilizing services of Mechanical Engineer and and local help	72,000.00
Boilers, Burners, Controls and Pump:	
50 KVA, Columbia Boilers complete with burners, automatic controls and pumps, crated and delivered dockside (smoke stack made in plant), f.o.b., Indianapolis, USA	91,000.00
Trimming & Slicing Knives - 3 Doz.	
Knives for fruit trimming and slicing, stainless steel, @ EC$ 520/doz. f.o.b., New York, USA	1,560.00
Bins - 24:	
Empty Can Bins, 2 sides, 24" deep, 1 back 48" ft. side; 1 bottom 24" deep 48" wide for storing formed cans @ EC$ 182 each f.o.b., New York, USA	4,368.00
Pulper:	
Dixie, Model 175-S Junior Pulper, capacity 15 tons/hour on preheated products or 5 tons per hour on cold, uncooked products, powered by 3 H.P., 3 Phase Electric Motor, complete with pulp screen .060; f.o.b., Athens, Georgia, USA	15,652.00
Finisher:	
Dixie, Model 402-S, Paddle Finisher with capacity of 30 to 50 gallons per minute, powered by 3 H.P., Electric Motor, 3 Phase; complete with finish screen 0.27; f.o.b., Athens, Georgia, USA	17,524.00

	Value in ECS
Pasteurizer:	
Para flow pasteurizer, complete with controls, pumps and variable speed drive; f.o.b., Buffalo, New York, USA	60,775.00
Stainless Steel Sanitary Pipe:	
250 ft. 2" stainless steel sanitary pipe complete with sanitary fittings, hangers, etc., f.o.b. Philadelphia, USA	39,000.00
Lift Truck:	
Clark Lift Truck, 83" low, 130" high, 2000 lb. capacity, f.o.b., Philadelphia, USA	46,085.00
Machine Shop Equipment:	
Tools, maintenance equipment, complete with all accessories, e.g., welders, electric & aceteylene and tools of various types & specifications; f.o.b., Philadelphia, USA	60,528.00
Quality Control Laboratory:	
Laboratory Equipment, Glassware, Reagents, Chemicals & Electrical precision instruments; Arthur H. Thomas f.o.b., Philadelphia, USA	43,209.00
Fairbanks Morse Scale - Portable:	
Capacity 2 tons capacity, platform 36" x 54" made with steel clad, finished in blue and varnished, rust resistant, self-aligning bearings; f.o.b., New York, USA	6,500.00
Aluminum Buckets - 20:	
Aluminum buckets, 3 gallon capacity, nesting type with bails @ ECS 390 each; f.o.b., Philadelphia, USA	7,800.00
Conveyors - 2:	18,200.00
Conveyors 18" x 10', equipped with sanitary rubber belting with 1/2 H.P., gear head, motor drive, simple angle construction; f.o.b., Philadelphia, USA	
Pumps - 3:	
Pumps, Wauhesha 2538 connected to manually controlled varidrive; all stainless steel parts with 1 H.P., complete base and couplings @ ECS 2,500 each; f.o.b., Indianapolis, USA	7,500.00

	Value in EC$
Holding Tank:	
Utensco Model JPP-260, Type 304, stainless steel, sloped bottom tank with jacketted sidewalls by steam, diameter of 45" & a depth of 40" and overall height of 59"; equipped with 1 1.2" sanitary stainless steel outlet; f.o.b., factory, Baltimore Maryland, USA	15,067.00
Can Filling Equipment:	
Semi-Automatic Filler adjustable for 12 ounce to No. 10 can size with change parts, stainless throughout; f.o.b., Indianapolis,USA	27,300.00
Can Electric Sealers - 3:	
2 - Dixie, Model 23 completely automatic operation with capacity from 6 to 10 cans per minute; motor 1/3 H.P., 1725 RPM, 115 Volts, 60 cycles, single phase with seperate pricing for extra equipment for different can diamters @ EC$ 5,006 each; f.o.b., Athens, Georgia, USA	12,012.00
1 - Dixie, Model No. 10 sealer; Capacity 3 to 5 cans per minute; Range - 5 1/8" to 6 5/8" ; Diameter x 3/3" to 7" height, adpatable for taller cans for # 10 & #12; all features same as Dixie Model 23; f.o.b., Athens, Georgia, USA	5,941.00
Stainless Steel Steam Jacketed Kettle - 3:	
1 - Dixie, 100 gallons, FT Model 1 - Dixie, 80 gallons, D(Tri-Leg Model) 1 - Dixie, 20 Qt. TDC/2 Model All heavy duty, durable, solid one-piece welded constriction and operate dependably at any steam pressure between 5 and 25 lbs; f.o.b., Athens, Georgia, USA	16,380.00
Blancher-Cooler:	
Dixie, Steam Blancher-Cooler, complete with 4 trays, 2 quick opening valves and ready arranged steam and water lines with cooling water spray nozzle; with M-o-A extra trays, perforated bottoms, 24" x 24" x 3" deep & another M-o-3 extra stainless steel trays perforated bottoms 24" x 24" x 3" deep; f.o.b., Athens, Georgia, USA	5,551.00

	Value in EC$
Retort Steel - 3:	
Dixie, 40 lbs. retort regular equipment furnish each with RDSW-3 retort and minimum accessories for automatically controlling and recording temperature during process time and pressure during cooling time with manual timing for each @ EC$23,439 each; f.o.b., Athens, Georgia, USA	70,317.00
Compressor:	
Dixie, heavy duty type, No. M-79-2, UAM-5040, displacement CFM- 5.25; Cylinders- 2; Motor H.P.- 2; Phase- 3; A/C 400 volts; Cycles 50; f.o.b., Athens, Georgia, USA	4,573.00
Hoist, Electric - 2:	
Electric hoist "Budgit", push button control, coil type, load chain and hook type suspension; capacity 2,000 lbs, lifting speed 8; Motor 1/2 H.P., 220V, 3 phase, & 60 cycles f.o.b., Athens, Georgia, USA	18,200.00
Can Forming Equipment - One (1) Set:	
Rotary flat can body reformer with complete set change parts for cans 60 - 35 mm; 85 - 115 mm; 115 - 170 mm. With Double Flanging Machine for both ends simultaneously; and a Double Seaming Machine Type V 10,Size 1,with automatically operated seaming rolls for can ends Nos. 2Z1, 307, & 603. f.o.b., Rieck & Melzian, Hamburg	57,507.00
Inspection & Trimming Table:	
Roller Conveyor Inspection Triming Table with 4" OD; Aluminum rollers set 4 1/2 " on chain driven by 1 H.P. gear head motor; 14' length x 35" wide; f.o.b., Philadelphia, USA	30,576.00
Glass Filler:	
Single-head heavy-product filler; semi-automatic; f.o.b., Albro Fillers & Engineering Co., Ltd, England	6,500.00
Utility Capper:	
Electric capper for glass containers (Huskins) with motor shaft and change parts for glass capping; f.o.b., Buffalo, New York, USA	3,900.00

	Value in EC$
Exhauster:	
Dixie, M-2 Continous Line Exhauster, complete with standard equipment with filling and sealing tables 33" x 33"; Motor 1/3 H.P.; equipped with 3-step pulleys for variable speed adjustments; guide rails are adjustable for all cans up to No. 10's; 230 Volts, single phase, 50 cycles; f.o.b., Athens, Georgia, USA	13,000.00
Oven, Electric:	
Gallenhamp Modular Ovens (BS 3421) Size 2; 220 Volts, 50 Cycles; 250°C; Accurate temperature control, safety thermostat with capacity to 210 litres; insulated for cool exterios and stainless steel interior; f.o.b., A. Gallenkamp & Co., Ltd, London	3,081.00
Tables, Working - 3:	
Working Tables 4' x 8' wood construction with stainless steel clad tops (tops supplied for fruits & vegetables preparation, local fabrication) @ EC$ 2,600 each table, estimated	7,800.00
Generator: (Standby)	
60 KVA, powered by Perkins 6 cylinder Diesel Engine, complete with pressure lubricating system; fuel and lubricating filters and air cleaner; water cooling system with thermostatic control, water circulating pump; water circulating pump, mounted tropical radiator; oil cooler and pusher fan; electric starting system; c.i.f., Kingstown, St. Vincent by S.V. Supply Services at St. Vincent	40,000.00
Truck:	
3/4 to 1 Ton Capacity (Japanese Brand) for pick-up utility	45,000.00
4 Tons to 5 Tons Capacity (Japanese Brand) for cargoes	60,000.00
Local Cost & Purchases:	
Office tables, chairs, refrigerator, filling cabinets, typewriters, gas range, water cooler, electric fans, air-conditioners, calculators, canteen furniture & accessories, cash register, stencilling set, additional working tables and other minor needs of the plant, estimated	100,000.00

	Value in EC$
Sundries:	
Portable Mixer, 1/2 H.P., Aluminum stock pots, label gluer, can seam test kit, vacuum & pressure testers for cans, retort crates, pipe line strainers for retorts, pressure regulator, blanching utility baskets, filler hot water hose, water heater, and others, estimated	52,653.00
TOTAL	1,135,095.00

Exhibit D-1a

ESTIMATE FOR DEPRECIATION

Item	Estimate Cost (EC$)	Estimate Life (Years)	Depreciation/ yr (EC$)
Land	55,087.00	-	-
Buildings & Plant	1,508,394.00	33 - 40	37,709.00
Electrical System	36,036.00	20	1,801.00
Installation Costs	78,000.00	20	3,900.00
Boiler w/Burner controls & pump	91,000.00	25	3,640.00
Trimming and Slicing knives	1,560.00	5	312.00
Bins	4,368.00	15	291.00
Pulper	15,652.00	20	782.00
Finisher	17,524.00	20	876.00
Pasteurizer	60,775.00	20	3,039.00
Stainless Steel Sanitary Pipes	39,000.00	25	1,560.00
Lift Truck	46,085.00	20	2,304.00
Machine Shop Equipment	66,528.00	20	3,326.00
Quality Control Laboratory Equipment	43,209.00	20	2,160.00
Portable Scale	6,500.00	12	541.00
Aluminum Buckets	7,800.00	20	390.00
Conveyors	18,200.00	20	910.00
Pumps	7,500.00	15	500.00
Stainless Steel Holding Tank	15,067.00	20	753.00
Can Filler	27,300.00	20	1,365.00
Can Sealers	17,953.00	15	1,197.00
Steam Jacketted Kettles, S.S.	16,380.00	20	819.00
Blancher-Cooler	5,551.00	15	370.00

Item	Estimate Cost (EC$)	Estimate Life (Years)	Depreciation/ yr (EC$)
Retorts, Steel	70,317.00	20	3,516.00
Compressor	4,573.00	15	305.00
Hoist, Electric	18,200.00	15	1,213.00
Can Forming Equipment	57,507.00	20	2,875.00
Inspection and Triming Table	30,576.00	20	1,529.00
Glass Filler	6,500.00	10	650.00
Utility Capper	3,900.00	10	390.00
Exhauster	13,000.00	15	866.00
Oven, Electric	3,081.00	10	308.00
Working Tables	7,800.00	20	390.00
Generator	40,000.00	20	2,000.00
Trucks	105,000.00	10	10,500.00
Local Purchases & Costs(Refer to Exhibit D-1 for details)	100,000.00	20	5,000.00
Sundries (Refer to Exhibit D-1 for details)	52,653.00	20	2,632.00
		TOTAL	100,718.00

SUMMARY

Yearly Depreciation	EC$	100,718.00
Monthly Depreciation	EC$	8,393.00
Per Day Depreciation	EC$	279.77

NOTE: The computation used for depreciation in the study was EC$ 276.90/day which was based on earlier price quotations as compared to EC$ 279.77/day based on later quotations that increased.

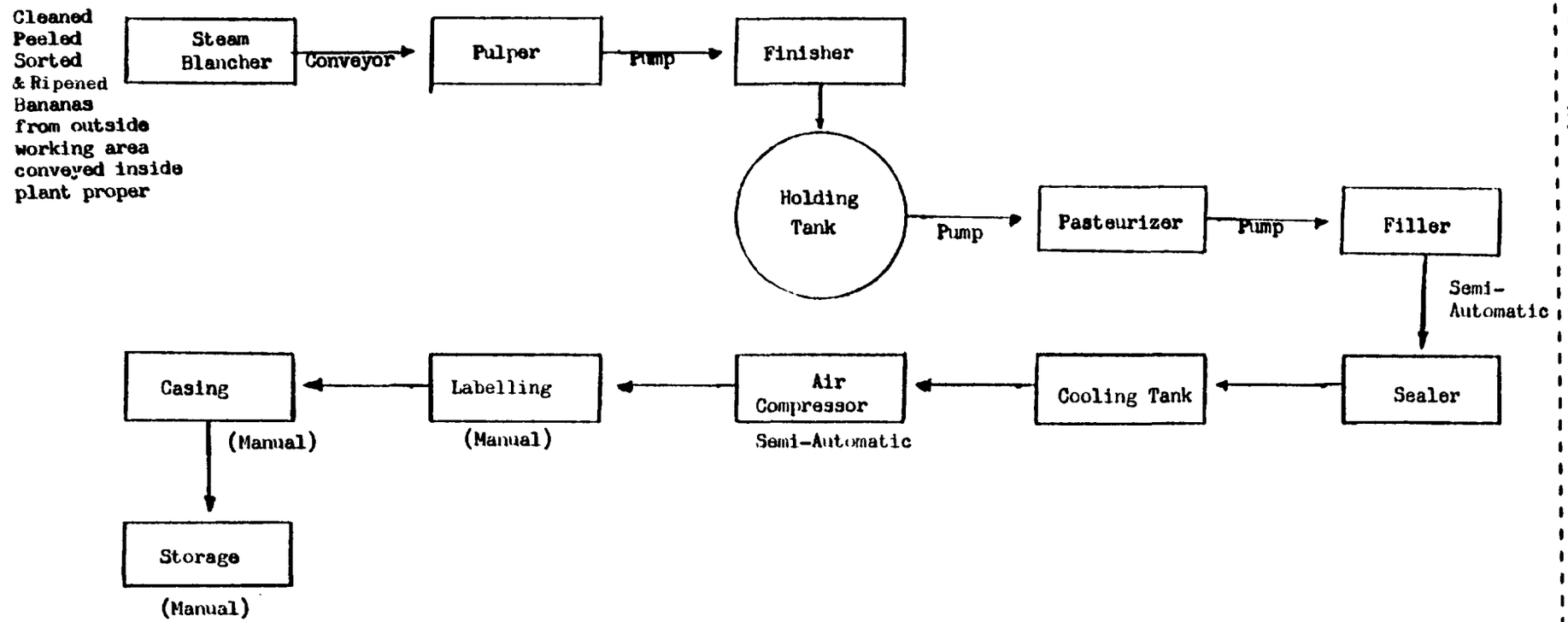
Exhibit D-2

ESTIMATE COSTS OF LAND & BUILDINGS

	Value in EC$
Land: 195 ft. x 226 ft. = 44,070 sq. ft. (0.9105 Acres) @ $1.25/sq. ft.	55,087.50
Civil Engineering	
Land Improvement & Development:	
Preliminaries	26,500.00
Excavation & Fill	39,949.00
Drainage	15,180.00
External Works	33,155.00
Buildings & Superstructures:	
Office, Laboratory & Canteen (Area: 2,413 sq. ft.) @ 356/sq.ft.	135,128.00
Can Making & Can Reforming Sheds (Area: 5,475 sq. ft.) @ $43/sq. ft.	262,800.00
Ripening & Production Area (Area: 6,334 sq. ft.) @ 354/sq. ft.	371,736.00
Storage Shed (Area: 3,402 sq. ft.) @ 60/sq. ft.	204,120.00
Fixed Building Furnitures	26,752.00
Services & Built-In Equipment	97,750.00
	1,319,097.50
Five Percent (5%) Contingencies	74,528.00
TOTAL	1,392,625.50
Say:	1.4 million

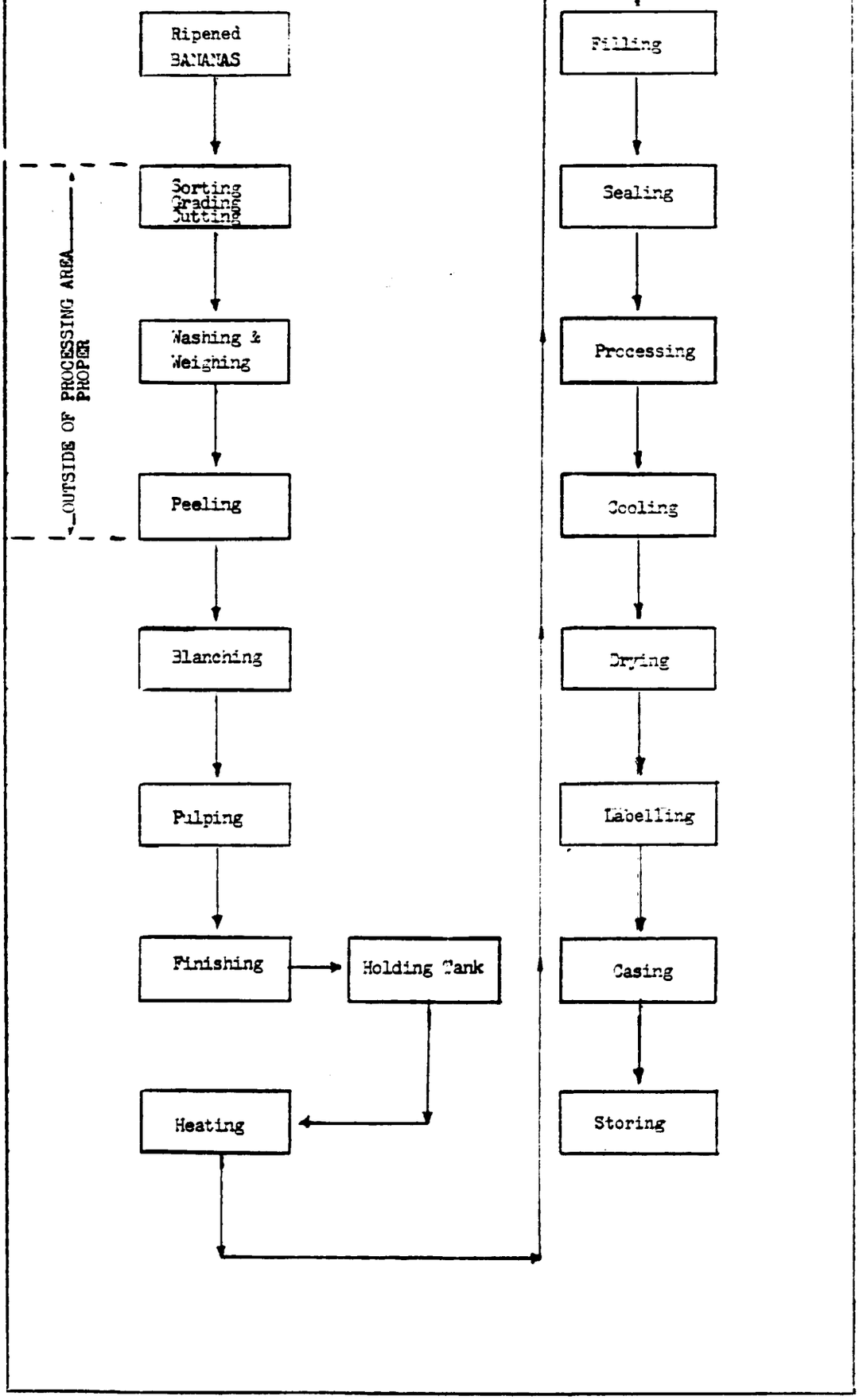
PROPOSED EQUIPMENT LAYOUT OF THE PURSE PROCESSING PLANT

Exhibit D-3



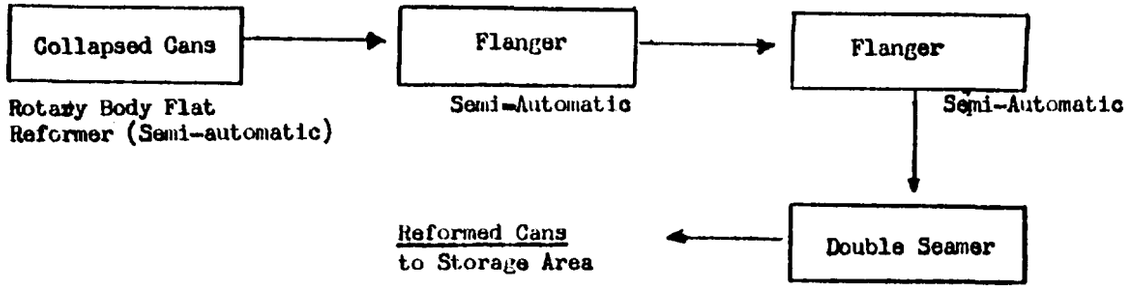
PROCESS FLOW OF FRUIT PUREE PROCESSING
(Semi-Automatic)

Exhibit D-4



PROPOSED LAYOUT FOR THE CAN REFORMING OPERATIONS

Exhibit D-3a



NOTE: Shipping the fully formed cans (particularly in the larger sizes) involves a prohibitive ocean freight rate. The regular cans are collapsed in such a way that the can lids are wrapped in rolls of cubic measurements of about 75% plus other economies in cartons, handling charges, etc. In addition, the cans that are collapsed are less likely to be damaged than they would be if fully formed. A special equipment is required at the canning plant to reform the collapsed can.

VII. PLANT ORGANIZATION AND OVERHEAD COSTS -(COST CENTRES)

A. Plant Organization

The proposed fruit puree processing plant has the following cost centres:

1. Production Cost Centres - The areas of activity where the major industrial operations will actually be done are the following: (a) Sorting & Grading (b) Washing & Peeling (c) Blanching (d) Pulping & Finishing (e) Acidification & Sugaring (f) Filling (g) Sealing (h) Processing (i) Cooling (j) Packing & Storage.

2. Service Cost Centres - These are the areas that render the supplementary services necessary to the smooth running of the plant. The centres are identified as follows: (a) Office-site transport activities not related or connected to the production process (b) Purchasing of raw materials, spare parts, and other supplies (c) Repair and maintenance of machinery and equipment, buildings, vehicles and others (d) Electricity for production use (e) Steam production (f) Water supply (g) Quality Control Laboratory (h) Waste and effluent disposal.

B. Overhead Costs

There are two major components of the overhead costs in the proposed plant.

1. Factory Overheads - These are the expenses accruing in connection with the transformation, fabrication or extraction of raw materials. The estimated factory expenses are as follows:

Per Annum	EC$ 21,600.00
Per Month	1,800.00
Per Day	59.00

2. Adminstrative Overheads - These are the expenses incurred in the administrative activities and services which are inherently important in the overall mangement and operation of the plant. The estimated administrative expenses are as follows:

Per Annum	EC$ 66,480.00
Per Month	5,540.00
Per Day	182.00

The estimated costs for fuel and power are as follows:

Per Annum	EC$ 38,221.00
Per Month	3,185.00
Per Day	148.00

NOTE: Computed on a total of 257 working days

Exhibit E-1

PRODUCTION COST CENTRES SHOWING AREAS WHERE MAJOR INDUSTRIAL OPERATIONS ARE PERFORMED

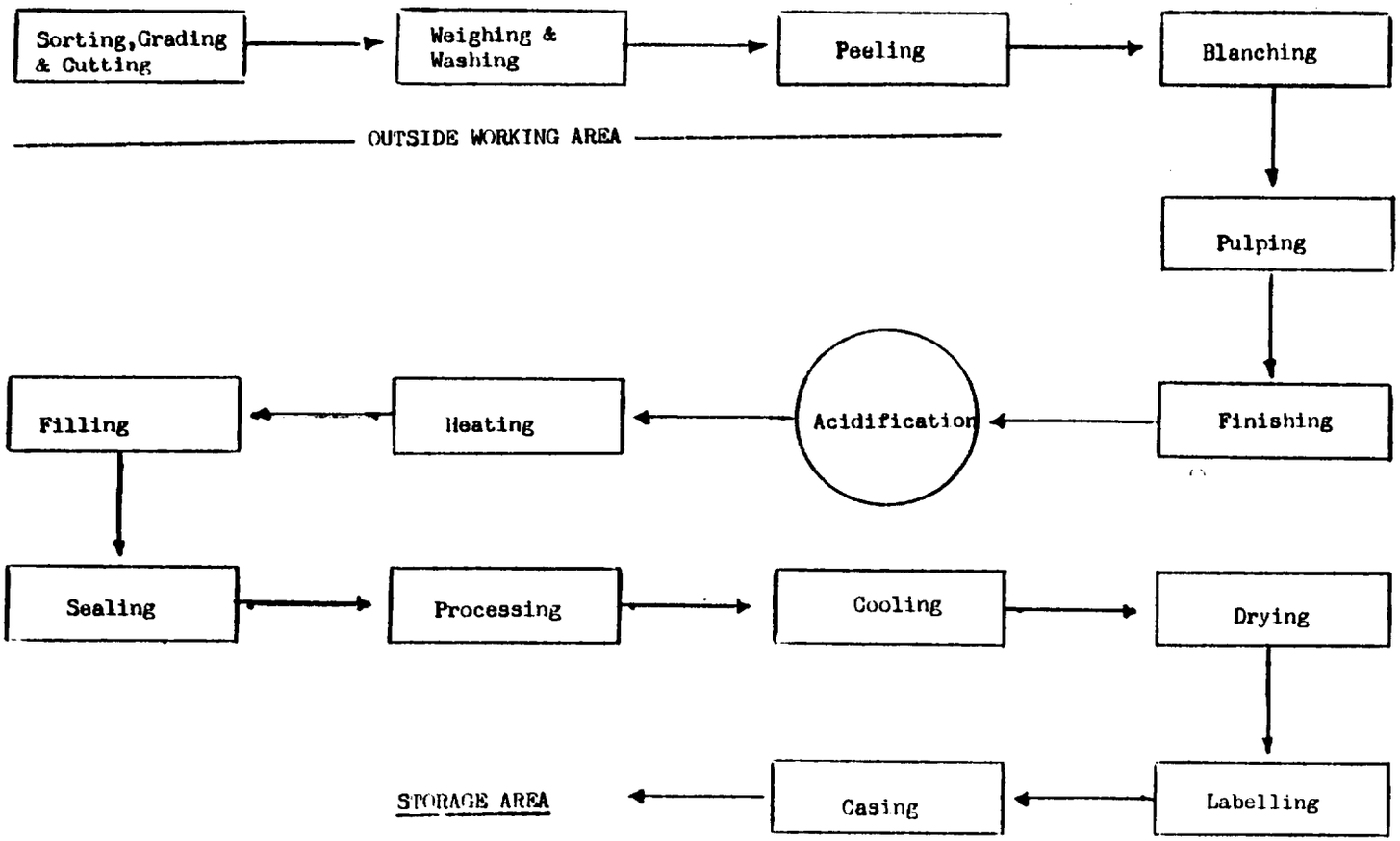


Exhibit E-2

OVERHEAD COSTS : ESTIMATED FACTORY EXPENSE

	EC$
Maintenance & Repairs	500.00
Factory Supplies	300.00
Automotive Expense	150.00
Depreciation - Automotive	150.00
Technical Consultants	200.00
Electricity - General Plant	500.00
Per Month	1,800.00
Per Annum	21,600.00
Per Day	59.17

OVERHEAD COSTS : ESTIMATED ADMINISTRATIVE EXPENSE

	EC$
Administrative Salaries	4,690.00
Communications	150.00
Legal & Professional	150.00
Electricity	200.00
Depreciation - Office Equipment	150.00
Stationary and Supplies	200.00
Per Month	5,540.00
Per Annum	66,480.00
Per Day	182.14

Exhibit E-3

OVERHEAD COSTS : ESTIMATE FOR FUEL & POWER

	Per Day	Total Cost
Fuel Oil- 5 gallons/hr. @ $4.10/gallon (5 hours) Operate: 257 Days	$ 102.50	$ 26,342.50
Gasoline - Lift Truck .5 Gallon/hr. @ $4.15/gallon (3 hours) Operate: 257 Days	$ 6.22	$ 1,598.54
Electric Power - 40 KW/day @ $1.00/Kwhr. Operate: 257 Days	$ 40.00	$ 10,280.00
	Total	$ 38,221.04

Per Annum (257 Operating Days) .....$ 38,221.04

Per Day .....$ 148.72

VIII. MANPOWER

The manpower requirements of the project is classified into direct, indirect or superintendence and the managerial staff. The workers were defined further by functions and viewed in the context of the operational phase of the project. They were categorized into supervisory, skilled, semi-skilled and unskilled and the other staff into managerial and administrative.

In St. Vincent, there are limited working opportunities. The overall level of skills is low and this constitutes a difficulty in hiring and employing the right person for the right job. However, this situation can be improved by training programmes within the plant.

The principal source of semi-skilled labour for food processing are persons who have worked directly or indirectly with the AGROLAB. This entity is a produce laboratory established by the Government in 1973 with the assistance of the British Development Division (BDD) that did some limited research and development along food processing. Although these workers are limited in number, the fact remains that their services can be utilized as a nucleus for the training of future workers needed in food processing activities.

The state of St. Vincent, a developing country with abounding resources, has practically no manpower skilled or experienced in commercial food processing. This situation can inevitably reduce performance and productivity especially in the early stages of production.

Again this can be made up by extensive training programmes at the factory level utilizing the services of competent managerial personnel for the purpose of obtaining the much needed expertise.

There is an imperative need to identify a qualified and experienced manager who can best organize an efficient and competent managerial staff. Many investment projects have failed because of bad management. A definite recruitment policy is important for an effective training programme. In St. Vincent, there are individuals who have the basic educational qualifications but lack the exposure and/or experience which can be augmented by proper management training.

The Government of St. Vincent has established labour rules and regulations with regard to wages, annual leave and hours of work.

The personnel requirement in the proposed fruit puree plant is:

Manager	1
Administrative staff	10
Indirect labour	8
Direct labour	14
Labelling labour	4
Can and case reforming labour	7
Total	44

Exhibit F-1

ESTIMATED SUPERINTENDENCE & INDIRECT LABOR

	Value in ECT
Production Supervisor	700.00
Quality Control Supervisor	600.00
Storekeeper	530.00
Fork-Lift Truck Operator & other vehicles	400.00
Maintenance & Repair	
Chief Mechanic	550.00
Assistant Mechanic	350.00
Cleanup & Sanitation: (Daily)	572.00
Helpers 2 @ $13.00/day (22 days/mo.)	
Per Month	3,702.00
Per Annum	44,424.00
Per Day	121.70

Exhibit F-2

ESTIMATED ADMINISTRATIVE PERSONNEL - SALARIES

Administrative Section	Monthly Range (EC$)
Manager	1,200.00
2 - Clerks & Typists @ $325/month	650.00
1 - Messenger & Janitor	300.00
Accounting Section	
1 - Bookeeper & Cashier	450.00
1 - Accountant	750.00
Quality Control Section	
1 - Chemical Technician	400.00
Security & Utility Section	
2 - Security Guards @ $320/month (1 - Day Duty) (1 - Night Duty)	640.00
1 - Automotive & Truck Driver	300.00
Per Month	4,090.00
Per Annum	56,280.00
Per Day	154.19

IX. FINANCIAL & ECONOMIC EVALUATION

EXPLANATION OF ASSUMPTIONS

Raw Materials: The principal raw material in the proposed project are the banana rejects coming from the fresh-fruit trading in St. Vincent. There is no established price for this particular commodity which is considered a waste item. At this situation, the banana growers are not deriving at all additional income and/or benefits from these rejects. The price as proposed in the feasibility study is EC$10C/Ton broken down as follows:

Price to Growers	EC$60/ton	- $0.06/kg
Transportation Cost from boxing station to the processing plant	EC$4C/ton	- $0.04/kg
	EC$10C/Ton	- $0.10/kg

Equipment Cost: The capital requirement for equipment is based on recent quotations from foreign manufacturers and suppliers in the United States, the United Kingdom and the Federal Republic of Germany. Most of the items are quoted f.o.b., (factory) and the effectivity of price quotations was limited for a period of 45 to 90 days after which updated quotations are necessary for possible changes, revisions, and/or amendments in prices. This item can be considered as fairly accurate within the period covered in the price quotations. However, price changes if any can be attributed to the increasing costs of fuel caused by the energy crisis. Refer to Exhibit D-1.

Buildings: The following cost factors are assumed in the study. They may vary with local conditions depending on price increases for construction and/or building materials. Refer to Exhibit D-2.

Office, Laboratory & Canteen Area	- EC$56/sq.ft.
Can Making & Reforming Area	- $43/sq.ft.
Production & Ripening Area	- $54/sq.ft.
Storage Area	- $60/sq.ft.

Erection Costs: The erection costs amount to approximately EC$114,036.00 and this represents 11% of the total equipment and electrical costs. The prevailing local conditions were taken into account closely. Refer to Exhibit B-1a.

Working Capital: It has been assumed that the following is required:

Raw Material	15 Days or 1/2 Month
Other Ingredients	60 Days or 2 Months
Packing Materials	60 Days or 2 Months
Accounts Receivable equivalent to one month production	30 Days or 1 Month
Operating Expenses	60 Days or 2 Months
Finished Goods Inventory	30 Days or 1 Month
Cash on Hand	EC$50,000.00

Approximately, the working capital needed is EC$921,700.00 Refer to Exhibit B-5.

Operating Cost Factors: The total estimated operating cost factors amount to EC$1,107,703.00. The breakdown for each of the operating factors is covered in detail in Exhibits B-2; B-1; B-2; B-3; B-4; B-5; & B-6. Interest on the working capital was not accounted for in view of the fact that there has not been any formal or preliminary agreement on the funding sources for the project.

Product Prices: The price assumed for banana puree is based on that for banana puree imported into the United States, although it had not been indicated whether this were cif or fob prices.

With high costs of transportation and other handling charges prices are bound to increase above the US import prices for the years 1977 & 1978. Approximately, the imported value could be within the range of US$ 0.65/kg (f.o.b) and this can escalate further to US$ 0.80/kg in view of the high inflationary rate. The proposed selling price for the banana puree processed in St. Vincent as per feasibility study is US$0.55/kg or equivalent to EC$ 1.50/kg (f.o.b.) factory packed in No. 10 cans containing 3.29 kg per can. The proposed selling prices of the other product items were based on the prevailing market prices for the same class (local and imported) and are competitive. The total sales for all products processed during the first year of operation is estimated at EC$ 1,337,557.00. For detailed coverage on the proposed selling prices for the 15 product lines refer to Exhibit A-5a.

SUMMARY OF CAPITAL REQUIREMENTS	Value in EC$
Equipment & Machinery	1,135,095.00
Land & Buildings	1,392,825.00
Working Capital	931,705.00
Total Capital Required	3,459,625.00

Refer to Exhibits D-1; D-1a; & D-2

YEARLY OPERATING EXPENSES	Value in EC$
Labour Cost	135,469.00
Supplies	847,576.00
Utilities	37,287.00
Maintenance	16,207.00
Depreciation	71,169.00
Total	1,107,709.00

Refer to Exhibit D-2

INCOME: The total output of the plant for the first year of operation is computed from the following yields.

Product	Quantity	Value in EC$ Sales
Banana Puree	545,737 kg	818,680.00
Banana Catsup	64,125 bottles	147,487.50
Mango Juice	14,640 cans	25,620.00
Mango Jam	25,200 jars	40,620.00
Soursop Juice	29,568 cans	48,787.00
Papaya Juice	22,080 cans	36,432.00
Guava Juice	5,356 cans	9,[illegible]62.40
Guava Jelly	8,640 jars	22,896.00
Guava Jam	15,140 jars	25,738.00
Sorrel Juice	22,620 cans	30,537.00
Sorrel Jelly	2,400 jars	6,120.00
Sorrel Syrup	4,284 bottles	10,495.00
Pina Colada	3,100 bottles	21,700.00
Gravy Browning	13,200 bottles	29,120.00
Salted Peanuts	26,200 cans	57,640.00
	TOTAL INCOME	1,337,557.90

SUMMARY OF PROFITABILITY: The analysis shows that the profit for the first year of operation is EC$229,854.30 or 17.18% of the gross sales estimated at EC$1,337,557.90. Obviously, this calculation can only be valid if the assumptions upon which the analysis was based are correct. The total packaging material cost represents approximately 30.4% based upon the total expense calculations. This factor is the principal reason for the limited profits. The possibility of packaging banana puree into larger containers of about 50 kg

instead of the No. 10 can size which can hold only 3.29 kg can reduce the total packaging costs by approximately 50% and increase profitability to almost 50%. No matter how cheap the reject bananas are procured, as long as the puree is not stored in bigger containers, the net profit will be limited. However, in spite of the high cost for packaging the banana puree in No. 10 cans, the feasibility study still indicates that this can be a profitable investment. An analysis on the packaging of banana puree is presented in order to maximize profitability. Refer to Exhibit 6-7.

Exhibit 3-1

OPERATING STATEMENT FOR TOTAL PRODUCTION

	Value in EC$
TOTAL COSTS OF PRODUCTION	1,107,703.60
TOTAL SELLING PRICE	1,337,557.90
TOTAL PROFIT	229,354.30
PERCENT OF PROFIT	17.184%

Exhibit C-2

OPERATING STATEMENT OF INDIVIDUAL EXPENSE ITEM FOR TOTAL PRODUCT LINES

	Value in EC$
Direct Labor	41,120.00
Superintendence & Indirect Labor	31,274.10
Raw Product	123,083.60
Other Ingredients	103,278.96
Containers	558,996.23
Can Forming	4,390.00
Case Forming	3,666.00
Fuel & Power	37,287.05
Depreciation	71,163.30
Indirect or Factory Expenses	16,207.17
Labels	62,217.24
Labelling Labour	7,710.00
Administrative	46,809.98
TOTAL	1,107,703.60

Exhibit 7 - 3

OPERATING STATEMENT OF INDIVIDUAL COST/PRODUCT

Product	Value in ECS
Banana Puree	712,359.80
Banana Catsup	109,339.75
Mango Juice	20,429.81
Mango Jam	30,189.98
Soursop Juice	36,058.98
Papaya Juice	28,372.48
Guava Juice	3,243.81
Guava Jelly	20,426.50
Guava Jam	20,287.85
Sorrel Juice	24,277.39
Sorrel Jelly	4,911.79
Sorrel Syrup	8,266.03
Pina Colada	16,065.91
Gravy Browning	22,963.19
Salted Peanuts	45,010.41
TOTAL	1,107,703.60

PERCENTAGE RELATION TO INDIVIDUAL PRODUCTION COST AND PROFIT/PRODUCT

Exhibit C-4

Product	Cost of production (EC$)	Percentage of total production cost	Profit (EC$)	Percentage of total profit
Banana Puree	712,359.80	64.30	106,322.00	46.25
Banana Catsup	109,839.15	9.91	37,648.35	16.37
Mango Juice	20,429.81	1.84	5,190.19	2.25
Mango Jam	30,189.98	2.72	16,430.02	7.14
Soursop Juice	36,058.98	3.25	12,728.22	5.53
Papaya Juice	28,372.48	2.56	8,059.52	3.50
Guava Juice	8,243.81	0.744	1,418.59	0.617
Guava Jelly	20,426.50	1.84	2,469.50	1.07
Guava Jam	20,287.85	1.83	5,450.15	2.37
Sorrel Juice	24,277.89	2.19	6,259.11	2.72
Sorrel Jelly	4,911.79	0.443	1,2[illegible].01	0.56
Sorrel Syrup	8,266.03	0.746	2,229.77	0.97
Pina Colada	16,065.91	1.45	5,634.09	2.45
Gravy Browning	22,963.19	2.07	6,156.81	2.67
Salted Peanuts	45,010.46	4.06	12,629.54	5.49
TOTAL	1,107,703.60	100	229,854.30	100

Exhibit C-5

OPERATING STATEMENT OF INVESTMENT REQUIREMENTS

	Value in ECS
A. MACHINERY & EQUIPMENT	
Processing Equipment, Accessories, Boiler, & Mechanical Installation	1,135,095.00
B. LAND & BUILDING	
Land (0.9105 Acres) @ $ 1.25/sq.ft.	55,087.50
Buildings	1,098,286.00
Land Development & Improvement	164,724.00
Contingencies	74,528.00
(Sub-Total: $ 1,392,625.00)	
C. WORKING CAPITAL	
Raw Materials (15 Days)	15,000.00
Other Ingredients (2 Months)	44,550.00
Packing Materials (2 Months)	329,472.00
Cans $ 142,407 Labels 9,570 Cases 12,759 $ 164,736/month	
Accounts Receivable (1 Month Production)	249,131.00
Operating Expenses (2 Months or 60 Days)	42,840.00
Direct Labor $ 160/day Indirect 122/day Can Forming 30/day Case Forming 22/day Fuel & Power 139/day Factory Exp. 59/day Administrative 182/day $ 714/day	
Finished Goods Inventory (1 Month)	200,712.00
Cash on Hand	50,000.00
(Sub-Total: $ 931,705.00)	

Exhibit G-6

PROJECTED INCOME STATEMENT FOR A 5-YEAR PROGRAMME

Value in EC$

	First Year	Second Year	Third Year	Fourth Year	Fifth Year
Sales	1,337,557.00	1,404,435.00	1,471,313.00	1,538,190.00	1,605,507.00
Cost of Goods Sold	1,107,703.00	1,163,088.00	1,218,473.00	1,273,858.00	1,329,244.00
Gross Profit	229,854.00	241,347.00	252,840.00	264,332.00	276,263.00
Less Selling Expenses... (12%)	27,582.00	28,961.00	30,341.00	31,719.00	33,151.00
Net Profit before tax...	202,272.00	212,386.00	222,499.00	232,613.00	243,112.00
Sales increase over first year.....	-	5%	10%	15%	20%

ASSUMPTIONS

1. Sales increases yearly by 5%, 10%, 15%, & 20% based on the First Year.
2. Cost of goods increases likewise yearly by the same percentage as in 1.
3. Selling Expenses is assumed at 12% based on the Gross Profit.

Exhibit C-7

COMPARATIVE ANALYSIS OF PACKAGING BANANA PUREE

CAN PACKAGING (Assumed in the Feasibility Study)		SMALL DRUM PACKAGING (Alternative Proposal)	
1. Size	: No. 10 (603 x 700)	1. Size	: Small round drum w/capacity of 50 kg (net)
2. Net Contents/can:	3.29 kg	2. Net Contents/drum:	50 kg
3. Net Contents/case: (6 cans/case)	19.74 kg	3. Assumed Cost/drum:	EC$20.00
4. Packaging Cost/case:	EC$ 10.49	4. No. of Drums required to packed the 545,737 kg of banana puree	: 10,915
5. Packaging Cost/kg:	EC$0.8353		
6. Total Packaging Cost of the Banana Puree Production with total output of 545,737 kg in 91 days	: EC$ 455,395.88	5. Total Cost of Drums	: EC$ 218,314.30
		6. Packaging Cost per kg	: EC$0.40

FINDINGS

1. Per kg savings in packaging : EC$ 0.4353
2. Total savings in packaging : EC$ 237,581.00
3. Percent Savings in packaging : 52.11%

Exhibit I-8

ESTIMATE OF BREAK-EVEN POINT - SELLING PRICE

PRODUCT	BEPSP/UNIT (Value in EC$)
Banana Puree	1.2421/kg
Banana Catsup	1.9046/bottle
Mango Juice	1.4491/can
Mango Jam	1.5319/jar
Soursop Juice	1.3003/can
Papaya Juice	1.3003/can
Guava Juice	1.3003/can
Guava Jelly	2.1944/jar
Guava Jam	1.4077/jar
Sorrel Juice	1.1179/can
Sorrel Jelly	2.1116/jar
Sorrel Syrup	2.0288/bottle
Pina Colada	5.7967/bottle
Gravy Browning	1.3249/bottle
Salted Peanuts	1.3213/can

Exhibit 1-9

ESTIMATE OF NET PROFIT BY PRODUCT (REPSP)

UTILIZING THE BREAK-EVEN POINT - SELLING PRICE

(Value in EC$)

Product	Output	Net Profit/unit	Total Profit
Banana Puree	545,738 kg	0.2579/kg	140,758.72
Banana Catsup	64,125 bottles	0.3954/bottle	25,355.02
Mango Juice	14,640 cans	0.30/can	4,392.00
Mango Jam	25,200 Jars	0.3130/jar	8,013.60
Soursop Juice	29,568 cans	0.2837/can	8,388.44
Papaya Juice	22,080 cans	0.2837/can	6,264.09
Guava Juice	5,856 cans	0.2837/can	1,661.94
Guava Jelly	8,640 jars	0.4556/jar	3,936.38
Guava Jam	15,140 jars	0.2923/jar	4,425.12
Sorrel Juice	22,620 cans	0.2321/can	5,250.10
Sorrel Jelly	2,400 jars	0.4334/jar	1,052.16
Sorrel Syrup	4,234 bottles	0.4212/bottle	1,804.40
Pina Colada	3,100 bottles	1.2023/bottle	3,727.13
Gravy Browning	13,200 bottles	0.2750/bottle	5,005.00
Salted Peanuts	26,200 cans	0.3782/can	9,909.84

X. SUPPLEMENTARY FEATURES

In the original concept for the establishment of the proposed fruit puree plant in St. Vincent, it was intended to install a small can making plant, import the tin plates, manufacture the can requirements. It was further proposed to develop the market for can containers for the small scale food processors in the area in order to maximize the utilization of a can making equipment. With this contemplated approach, it was found necessary to consider important factors on which a decision whether to carry out the original plan or not would be based. Such factors are (1) availability of capital funds (2) cost and abilities of local labour (3) the availability of adequate technology and (4) size and nature of can requirements. An analysis of the existing conditions in St. Vincent showed a high degree of deficiencies in relation to these factors rendering investment risky and uncertain. It became more apparent then and more logical to consider finally the importation of collapsed cans and reforming them at the plant. It is economically sound and feasible to collapse can bodies at the can factory and ship them along distances to canners who reshape the bodies and attach the ends.

The equipment for reshaping collapsed bodies is available from can manufacturers and the cost is not as high as for can making equipment. It has been claimed and established that unless there are approximately 15 million cans annually to fill, the operation of a small can-making plant is not warranted and therefore not economical. Although in some European countries it is common for small canneries to make their own cans using simple equipment but as these canneries grow in size they tend to take advantage of improved can technology.

The expected product output of the proposed plant for a five-year period does not generate a level of can requirements to justify the establishment of a small can making plant. A small semi-automatic can making plant normally produces cans at the rate of approximately 30 per minute and even at this limited rate the projected output falls below the economical level of manufacturing the cans locally.

The estimated can requirements for the proposed puree plant and for a five-year period are as follows:

	Cans of Different Sizes				
	1st Yr.	2nd Yr.	3rd Yr.	4th Yr.	5th Yr.
One Shift	290,000	305,000.	319,000	334,000	348,000
Two Shift	580,000	610,000	638,000	668,000	696,000

The above figures were based on a yearly increase of 5, 10, 15, 20% over the estimated production of the First Year Operation. Assuming that there is a possibility of a second shift operation, the incremental increases are still way-off from an established level where the local manufacture of cans could be considered economical. From all foregoing considerations can be gathered that the importation of collapsed cans would be the most economical approach. The expected reduction in cubic

measurements of about 75% plus other economies in cartons, handling charges, etc., including the fact that collapsed cans are less likely to be damaged than they would be if fully formed are added advantages. Shipping fully formed cans (particularly in the larger size) involves a prohibitive ocean freight compounded further by the present energy situation the world over. In view of the high cost of shipment, the feasibility study proposes that all tin can requirements for packing the products of the proposed processing plant should be in collapsed form and reformed then at the plant. This could definitely reduce the cost of production. It had been stated that for a single shipment of 100,000 collapsed cans the saving from the overseas freight costs can purchase the cost of a reforming equipment. (Refer to Exhibit H-1 for estimate of operating expenses in the reforming and casing of collapsed cans).

A. CAN REPROCESSING

STAGE

CANNED PRODUCTS	Forming	
Product	Banana Puree	Mango Juice
Size	6/10	24/12
Total cans required	165,893	146,640
	Total per day	
Can Forming (Production 1,250 cans/day		
1 Laborer, rounding @$8.00	$8.00	
1 Laborer, flanging @$6.00	6.00	
1 Operator, applying ends @$10.00	10.00	
1 Laborer, packing cans @$6.00	6.00	
Total per day	30.00	
Days Production required	91	10
Cost	2,730	300
Total Cases Required	27,648	6,110
Case Forming Production/day	303	611
1 Laborer, folding	8.00	
1 Operator, stitching	8.00	
1 Laborer, stacking	6.00	
	22.00	
Cost	2002	220

Exhibit II-1

ENT OF OPERATING EXPENSE – CANS & CASES

Value in EC$

Soursop Juice 24/12	Papaya Juice 24/12	Guava Juice 24/12	Sorrel Juice 24/12	Salted Peanuts 48/6	
29,568	22,080	5,856	22,620	26,196	Total Days Required
16	12	4	10	20	163
480	360	120	300		
1,232	920	244	942	545	
77	76	61	94	27	
352	264	88	220	440	

Exhibit H-2

COST INVESTMENT - CAN REFORMING EQUIPMENT

Value in EC$

Item	Unit	Description
1	1	Rotary flat can body reformer type BRF - 100 arranged for motor drive, including motor and switch gear, suitable for 400 v. 50 cycles, 3 phases, C, 75 kW. Net Weight ..... approx. 120 kg Gross Weight ..... approx. 190 kg Shipping Space ..... approx. 7 m^3
	1	Set change parts for cans 60 - 85 mm
	1	Set change parts for cans 85 - 115 mm
	1	Set change parts for cans 115 - 170 mm
2	1	Double flanging machine type DF For flanging round bodies on both ends simultaneously. The machine is equipped for direct electric drive with motor 3 phases 400 V., 50 Cycles, 75 kW and complete electrical installation. One set of flanging rolls is supplied with the machine Maximum diamter of cans .... 200 mm Maximum height of cans ..... 270 mm Net Weight ..... approx. 254 kg Gross Weight ..... approx. 355 kg Shpping Space ..... approx. 8 m^3
3	1	Double seaming machine type 7 10 size 1 With automatically operated seaming rolls. for closing round rotating cans and for applying bottoms to bodies. The machine is equipped with electric motor 400 V., 50 cycles, 55 kW and and complete electrical installation. Maximum diameter of cans .... 162 mm Maximum height of cans ..... 300 mm Net Weight ..... 110 kg Gross Weight ..... 150 kg Shipping space ..... 8 m^3

EXHIBIT H-2 (Cont'd)

COST INVESTMENT - CAN REFORMING EQUIPMENT

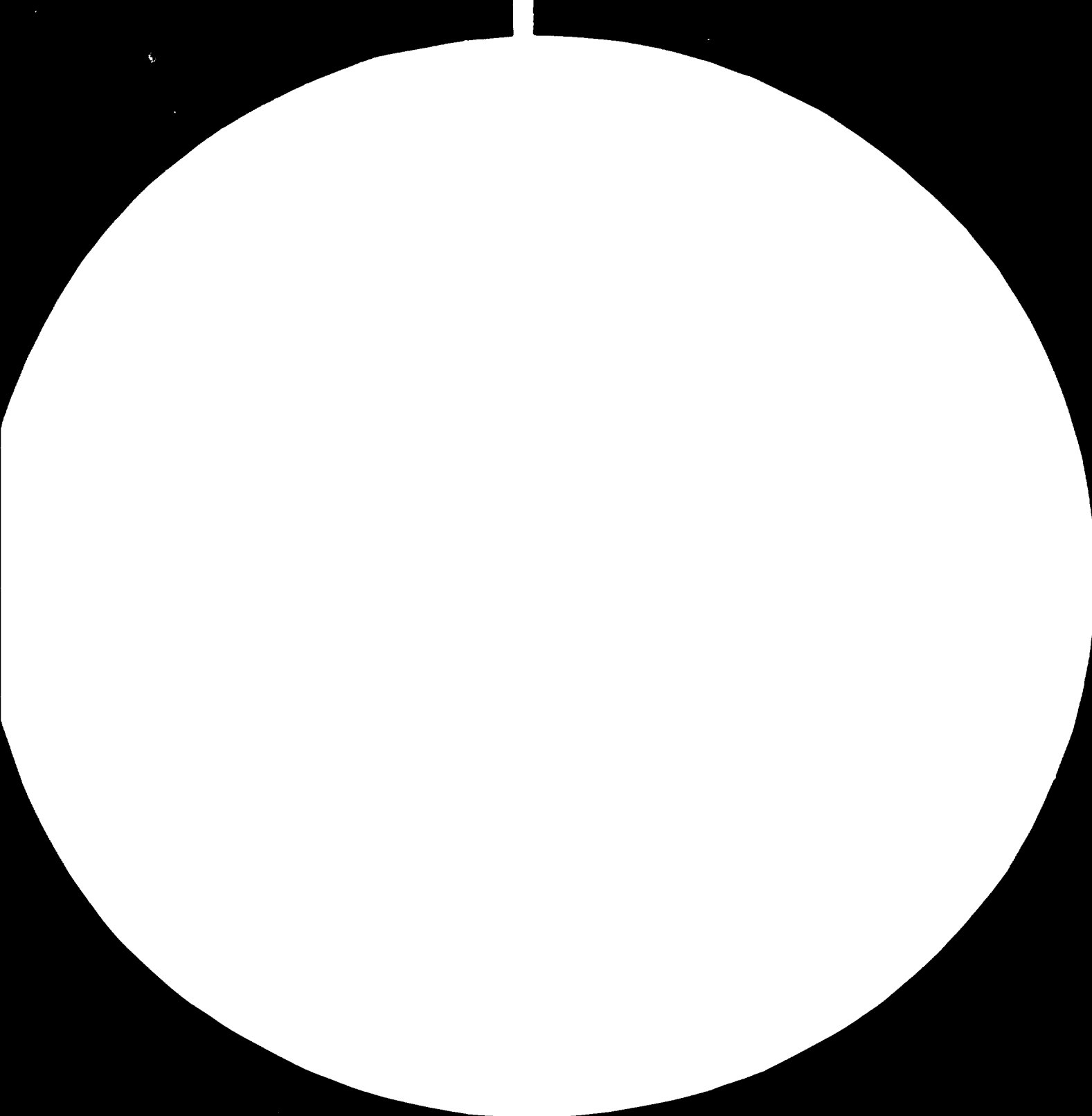
Item	Unit	Description
	1	Seaming device for ends 211
	1	Seaming device for ends 307
	1	Seaming device for ends 603

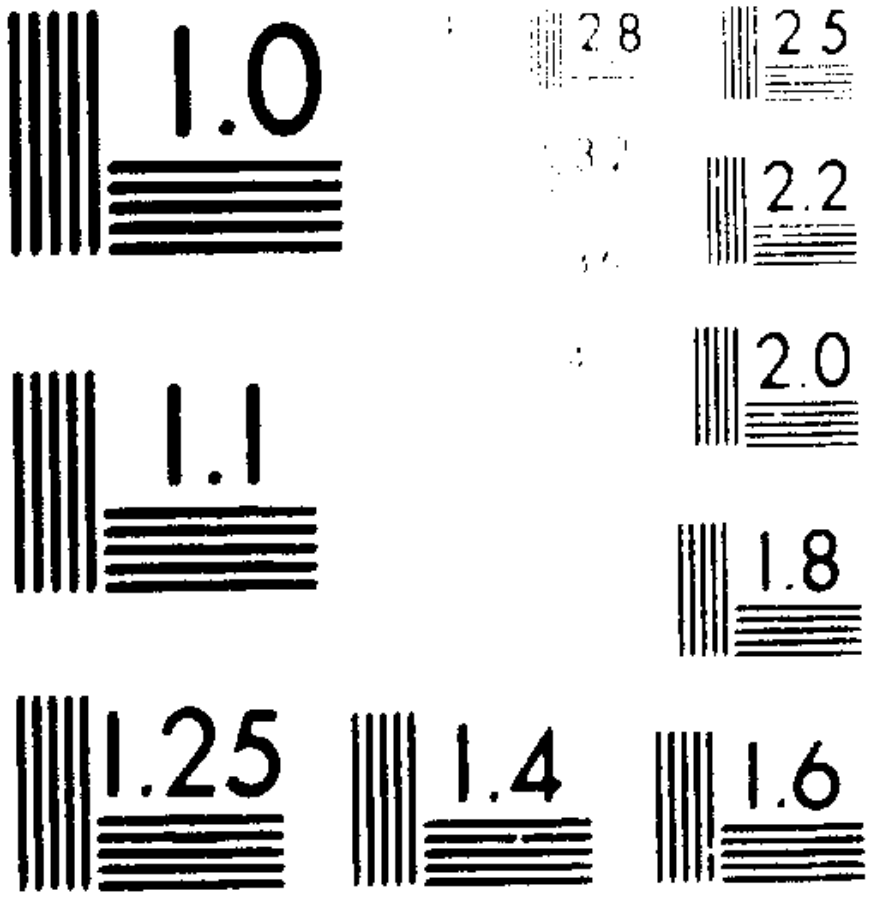
TOTAL PRICE ..... EC$ 57,507.42

PRICES: fob Hambourg, including seaworthy case packing

TIME OF DELIVERY: Approximately 6 months

81.09.25

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B. CAN MAKING — Exhibit I-1

COST INVESTMENT - CAN MAKING PLANT

(In sequence of operation)

Feature	Supplier from United States	Supplier from Federal Republic of Germany
1. Type	Semi-Automatic	Semi-Automatic
2. Output	10 cans/ minute 600 cans/hour	5 - 6 cans/minute 300 - 400 cans/hour
3. Cutting Operation	Gang Slitter Type 29-D complete with grinding attachment	Power Guillotine Type KT w/o grinding attachment
4. Body Making Operation	Notcher, Type 213	Double Notching Type ZP
5. Body Forming Operation	Roller Former Type 613	Body Former Type ZR size 2
6. Folding & Closing Operation	Forming Press Type	Length Semi-Folding & Closing Type
7. Soldering Operation	Soldering Unit w/gas controls	Soldering Apparatus Type LA operated by Treadle with Mandrel
8. Flanging Operation	5C - Flanger Semi-Automatic Bench Type Roll	Double Flanging Type DB for flanging round bodies on both ends simultaneously
9. Double Seaming Operation	168-C, Double Seamer complete with seaming device	Double Seaming Type LR complete with seaming device
10. Air Testing Operation	225 Air Tester Electronic Type	NOT OFFERED
11. Water Testing Operation	227-S, Water Tester for under water	Testing Apparatus Type WPA for under water
12. Conveying Operation	Slow Speed Conveyor	NOT OFFERED
13. Tooling, for repairs, adjustments	Four (4) Sets for can sizes 211, 202, & 307 & Height change parts	NOT OFFERED

Exhibit I-1 (Con't)

14. Manufacture of Ends:	4 1/2 OTI Press with tooling	Inclinable Eccentric Press Type TI
	1C-3 Curler with tooling	Duffer Combination Cutting & Stamping Die
	Lining Machine	Nozzle Liner Type NTL
	Rotary Oven	Electrical Heated Oven
	3 Sets of Tooling for 21, 207 & 202 diameter size cans	Included in Nozzle Liner Type under the item Lining Machine
TOTAL PRICE	ESD 1,135,870.00	ESD 217,476.00

(f.o.b. factory)

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Annex A

ESTIMATE OF STEAM REQUIREMENTS FOR PROCESSING THE VARIOUS FOOD PRODUCTS IN THE PROPOSED PLANT

Product	Pounds of Steam/Case		Total	No. of Cases
	Preparation	Retorting		
Banana Puree (#10 Can Size)	10	6.5	16.5	27,048
Banana Catsup, [illegible] oz. (Bottles)	-	-	20	2,671
Fruit Juices, 12 Oz. (Cans)	-	-	15	4,308
Fruit Jams & Jellies (12 Oz. Bottles)	-	-	20	1,780
Other Minor Products	5	5	10	9,940

TOTAL STEAM REQUIREMENTS/PRODUCT LINE -(IN LBS.)

Basis: - (91 Working Days - One Shift)

Banana Puree	456,192
Banana Catsup	53,420
Fruit Juices & Nectars	64,620
Fruit Jams & Jellies	35,600
Other Minor Products	9,940
Total	619,772 lbs.

Annex 3

ESTIMATE OF STEAM REQUIREMENTS FOR THE VARIOUS UNIT OPERATIONS IN THE PROPOSED PUREE PROCESSING PLANT

UNIT OPERATION	PEAK DEMAND	OPERATING DEMAND	AVE. LBS./CASE STEAM USED
Retort	lbs/hr	lbs/hr	
1 1/4 inch steam inlet	3,500	100 - 150	6.5
Open kettle processing 212°F - 60 mins.	8,000	100 - 200	2-5
Blanching, reel	3,000	1000	5-6
Exhausting, box, steam (4' x 20')	500	500	5-6
Cooking	2,000	750	5-6
Open Kettle concentration tomato puree-1.045	6,000	5000	6-10
Brine Heating (60 to 200°F)	.....	.....	3
Flask Sterilization	950	750	1.8

Peak Demand - Refers to the venting period when the air is being expelled from the retort. The peak may vary depending upon the size of steam inlet line.

Operating Demand - Refers to when the peak demand drops off rapidly until it reaches operating temperature

Annex 2

ESTIMATED PERCENTAGE RECOVERY AND/OR UTILIZATION OF PULP FROM FRUITS IN ST. VINCENT FOR PROCESSING

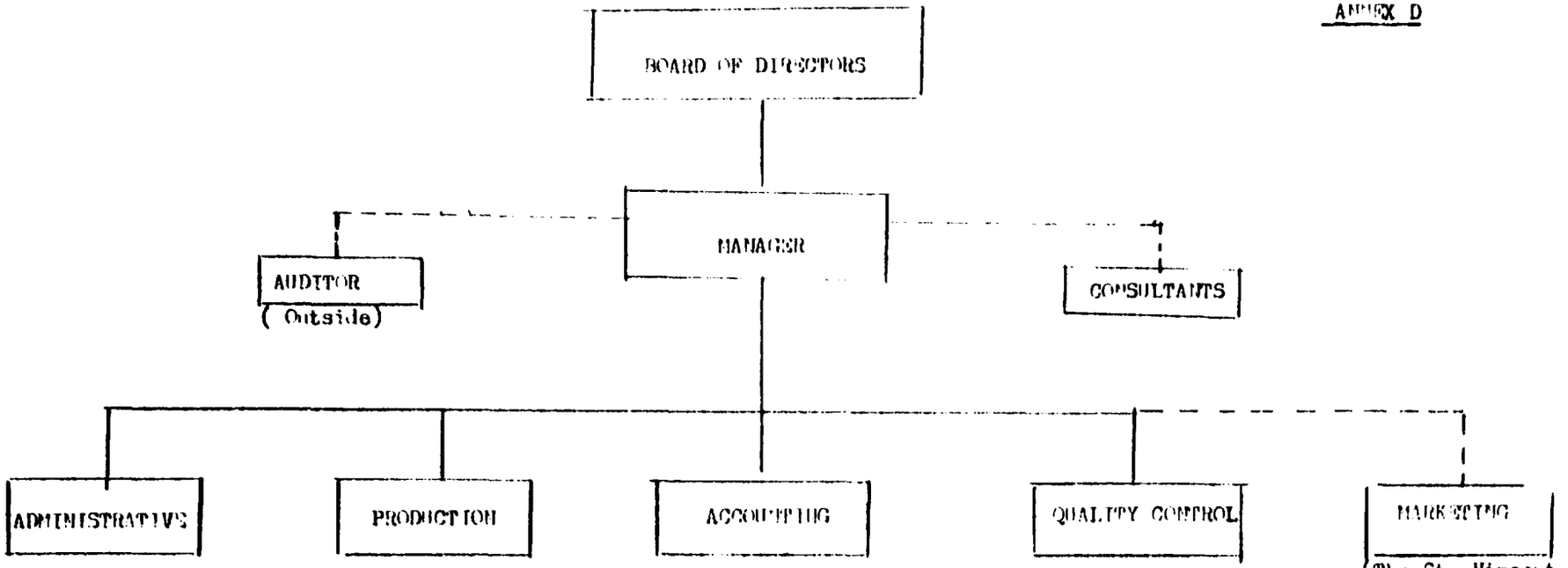
FRUIT	PULP(%)	SKIN & SEEDS(%)
Banana	60	40
Mango	70	30
Guava	60	40
Soursop	70	30
Papaya (Paw-paw)	50	50
Sorrel (Roselle)	40	60 Water
Peanuts	60	40

NOTE: Mango: Pulp can still be recovered from the seeds by approximately 2 to 3% depending upon the variety of the fruit.

Sorrel: The 60% as by-product is water as as the sepals are completely dried either under the sun and/or by artificial drying.

Peanuts: The 40% represents the outer shell and the inner skin covering the whole nut.

ANNEX D



(The St. Vincent Marketing Corporation can be the marketing arm for the proposed project.

PROPOSED ORGANIZATIONAL CHART FOR THE FRUIT PUREE PROCESSING PLANT
ST. VINCENT, WEST INDIES

LEGEND:

- - - - (Outsider) Management Advisors
_____ Line Function for Management

THE PROJECTED FIVE(5)YEAR PROGRAMME FOR THE PRODUCTION OF BANANA PUREE IN THE PROPOSED PLANT FOR ST. VINCENT, W.I.

Annex E

FACTORS	1st Year	2nd Year	3rd Year	4th Year	5th Year
1. Daily Supply of Raw Materials	10 Tons/day	10.5 Tons/day	11 Tons/day	11.5 Tons/day	12 Tons/day
2. Projected Yearly Increase (Percent)	-	5%	10%	15%	20%
3. Puree Recovery at 60%	6 Tons/day	6.3 Tons/day	6.6 Tons/day	6.9 Tons/day	7.2 Tons/day
4. Output in #10 can size/day (1 can contains net 3.29 kg	1,823	1,914	2,006	2,097	2,188
5. Total Output in #10 can size per 91 working days	165,893	174,174	182,546	190,827	199,108
6. Total Output in kg/91 working days	545,787	573,032	600,576	627,800	655,065

Annex F

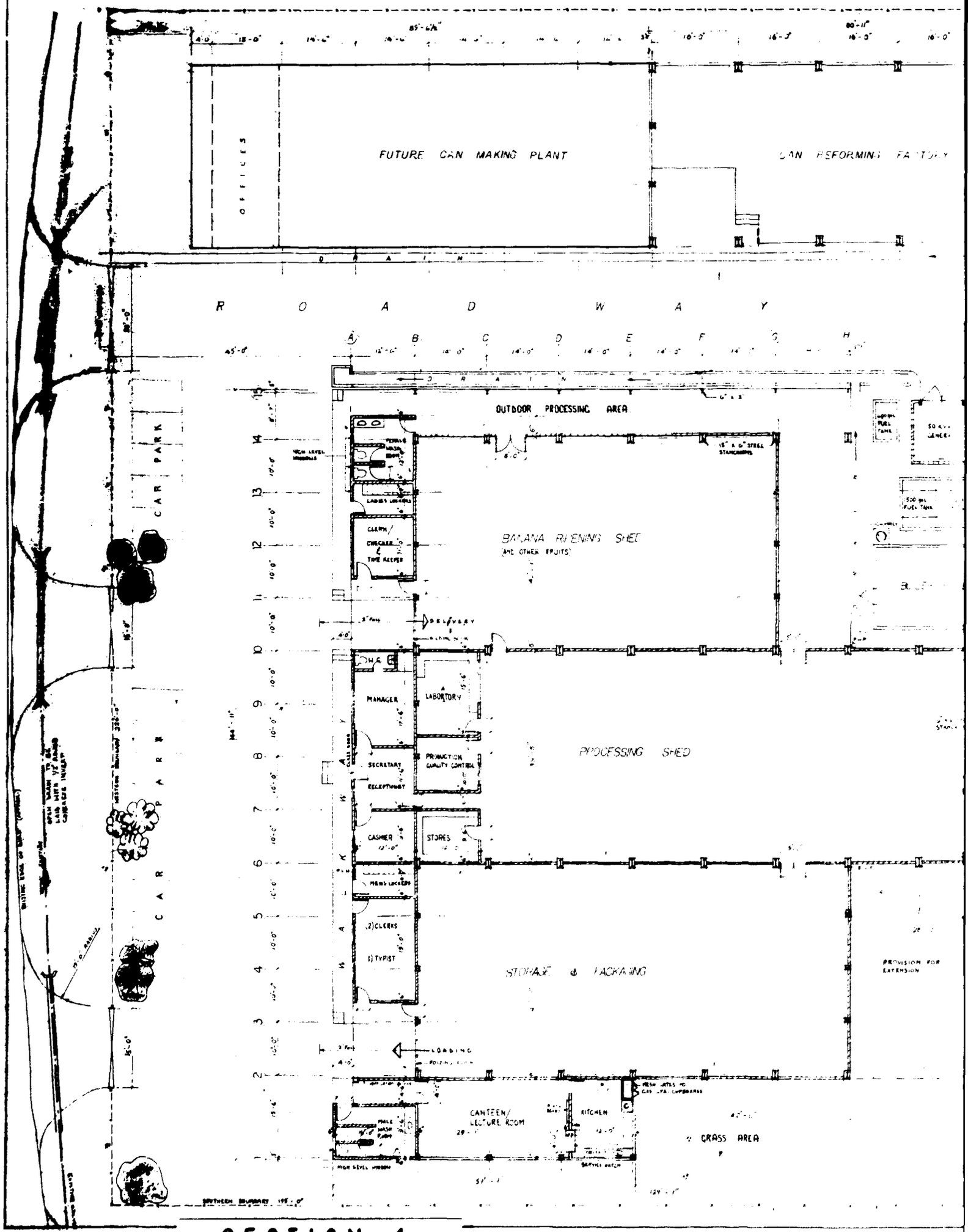
SEASONAL AVAILABILITY OF SELECTED AGRICULTURAL CROPS PRODUCED IN ST. VINCENT FOR PROCESSING

CROP	MONTH	PEAK PERIOD	ESTIMATED QUANTITY/PEAK PERIOD
Papaya	April,May,June	June	1/4 Ton/day
Soursop	April,May,June	April	1/2 Ton/day
Mango	June,July,Aug.	August & July	2 Tons/day
Guava	Aug.,Sept.,Oct.	August	1 Ton/day
Golden Apple	Sept.,Oct.,Nov.	Sept.	1/2 Ton/day
Sorrel	Jan.,Feb.,Mar.	Feb.	1/2 Ton/day
Bananas	Jan. to Dec.	All months	Export Quantity
Peanuts	June,July,Aug.	August	1/2 Ton/day

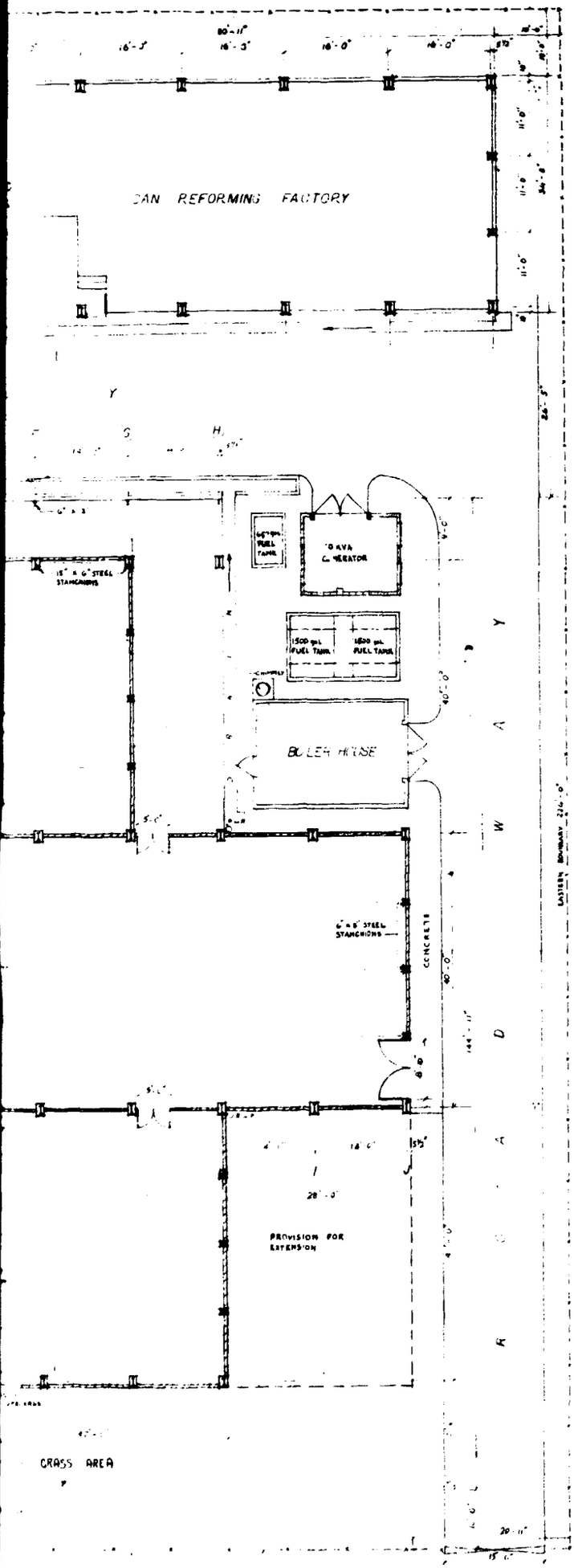
NOTE: Outside of peak period rest of the months are limited in quantity and are largely sold in the open market for consumption.

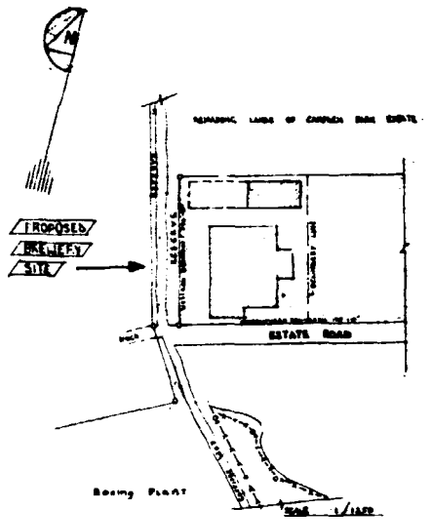
BASIS OF ESTIMATING THE PEAK PERIOD OF PRODUCTION

1. Experimental & pilot operations of the AGROLAB(Produce Laboratory of the government for the last four (4) years.
2. St. Vincent Marketing Corporation Purchases and Exports of agricultural produce of St. Vincent.
3. Evaluation of prevailing prices at a given season. Differential in prices are dictated by supply & demand.
4. The available information gathered from the St. Vincent Marketing Board.
5. The information gathered from beach otels, and other eateries in St. Vincent.
6. Information gathered from transportation utilities that transport agricultural crops from points of production to Kingstown, central point of marketing.


FUTURE CAN MAKING PLANT
OFFICES
CAN PERFORMING FACTORY
ROADWAY
CAR PARK
OUTDOOR PROCESSING AREA
BANANA RIPENING SHED
(AND OTHER FRUITS)
PROCESSING SHED
STORAGE & PACKAGING
MANAGER
LABORATORY
SECRETARY
RECEPTIONIST
PRODUCTION QUALITY CONTROL
CASHIER
STORES
MENS LOCKERS
(2) CLERKS
1) TYPIST
CLERK/ CHECKER & TIME KEEPER
LADIES LOCKERS
DELIVERY
LOADING
CANTEEN/ LECTURE ROOM
KITCHEN
GRASS AREA
PROVISION FOR EXTENSION
SOUTHERN BOUNDARY

SECTION 1





REVISION

NO.	DETAIL		

M. C. W.
ST. VINCENT.

SURVEYED BY	
DRAWN BY	
CHECKED BY	
DESIGNED BY	
ENGINEER, ARCHITECT	
CHIEF ENGINEER	
APPROVED BY	

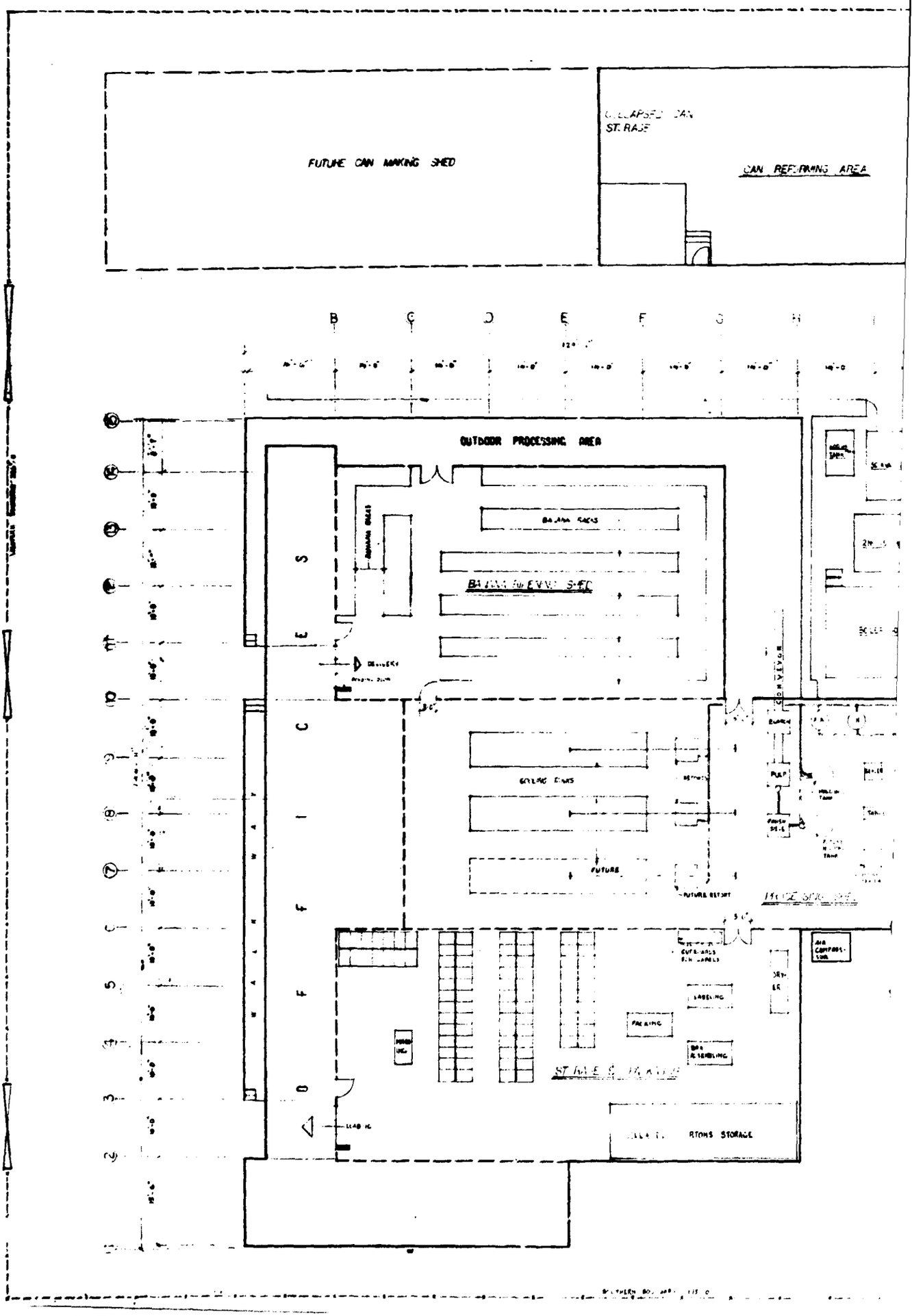
PROJECT

ST. VINCENT FOOD PROCESSING CENTRE

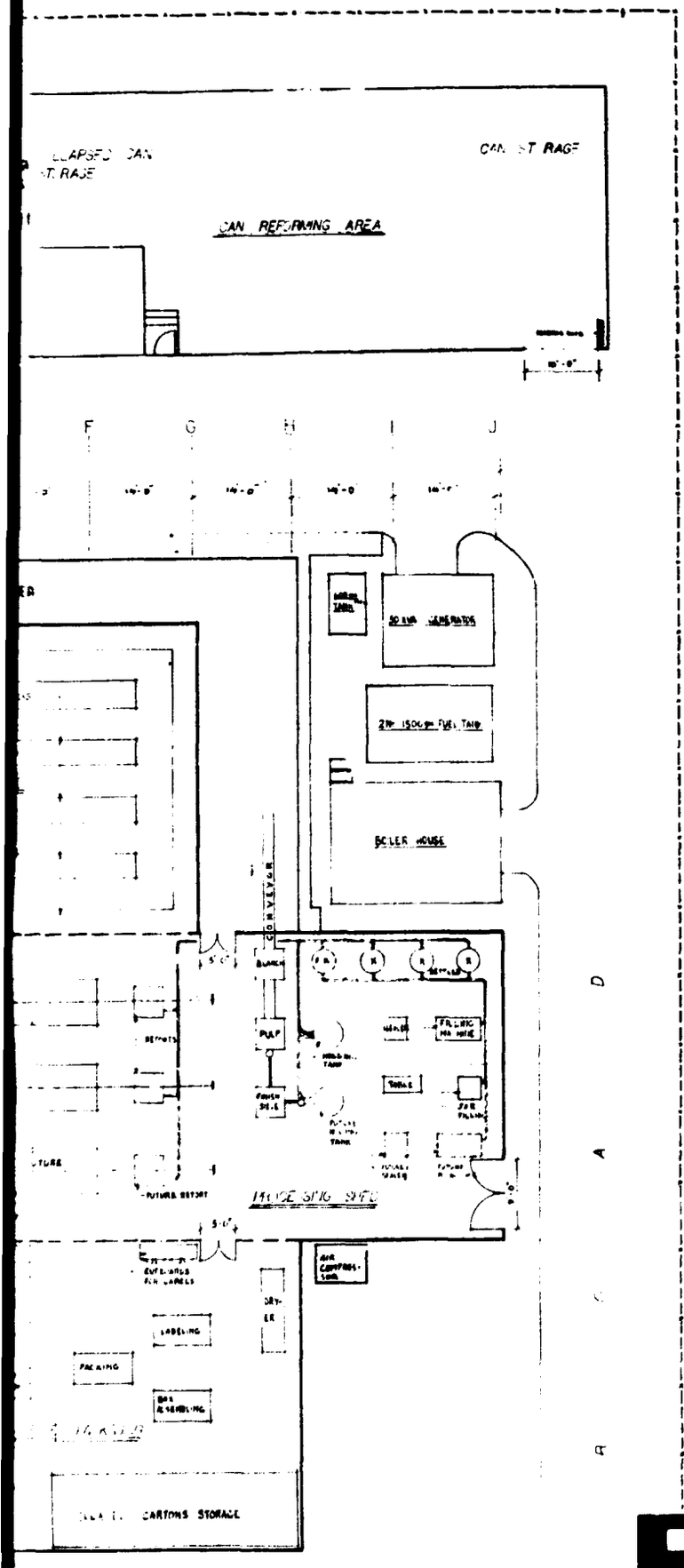
FLOOR PLAN & BOUNDARY LAYOUT

SCALE	DWG NO
1/8 TO 1'-0"	ANNEX G

SECTION 2


FUTURE CAN MAKING SHED
COLLAPSED CAN STORAGE
CAN REFORMING AREA
B C D E F G H
OUTDOOR PROCESSING AREA
BAGGING RACKS
BAGGING OVER SHED
DELIVERY
OFFICE WAREHOUSE
GRADING RACKS
PULP
FUTURE
FUTURE REPORT
OFFICE STORAGE
LABELLING
PACKING
LABELLING
STORAGE RACKS
LOADING
RTONS STORAGE

SECTION 1



SECTION 2

REVISION

NO	DETAIL	INITIAL	DATE

M. C. W.

ST. VINCENT.

SURVEYED BY	
DRAWN BY	G. St. Clair
CHECKED BY	
DESIGNED BY	
ENGINEER/ARCHITECT	
CHIEF ENGINEER.	
APPROVED BY	

PROJECT

ST. VINCENT FOOD PROCESSING CENTRE

PLANT LAYOUT OF MACHINES AND OTHER EQUIPMENT.

SCALE	DATE
1/8" to 1'-0"	Feb 1980

ANNEX H