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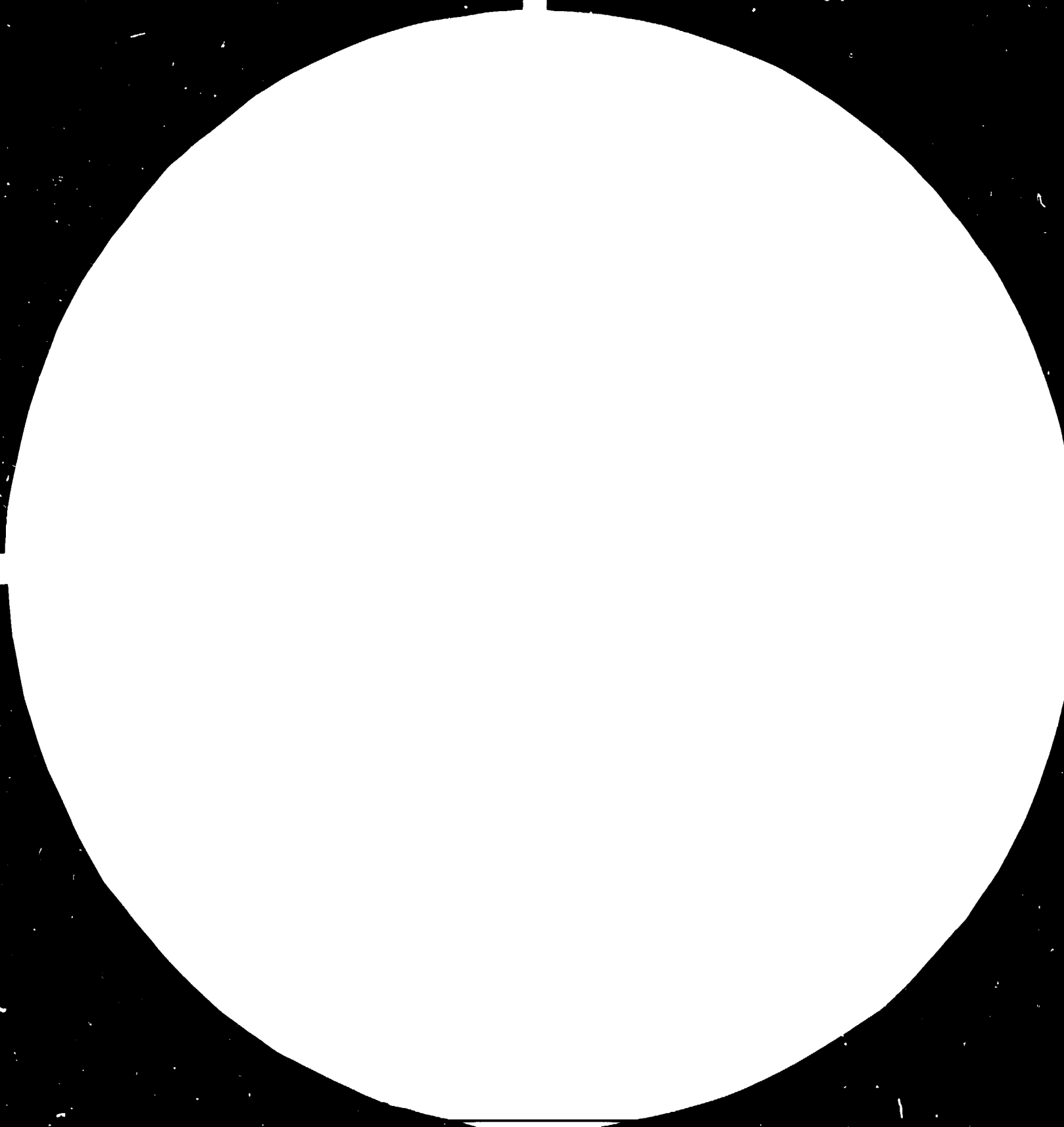

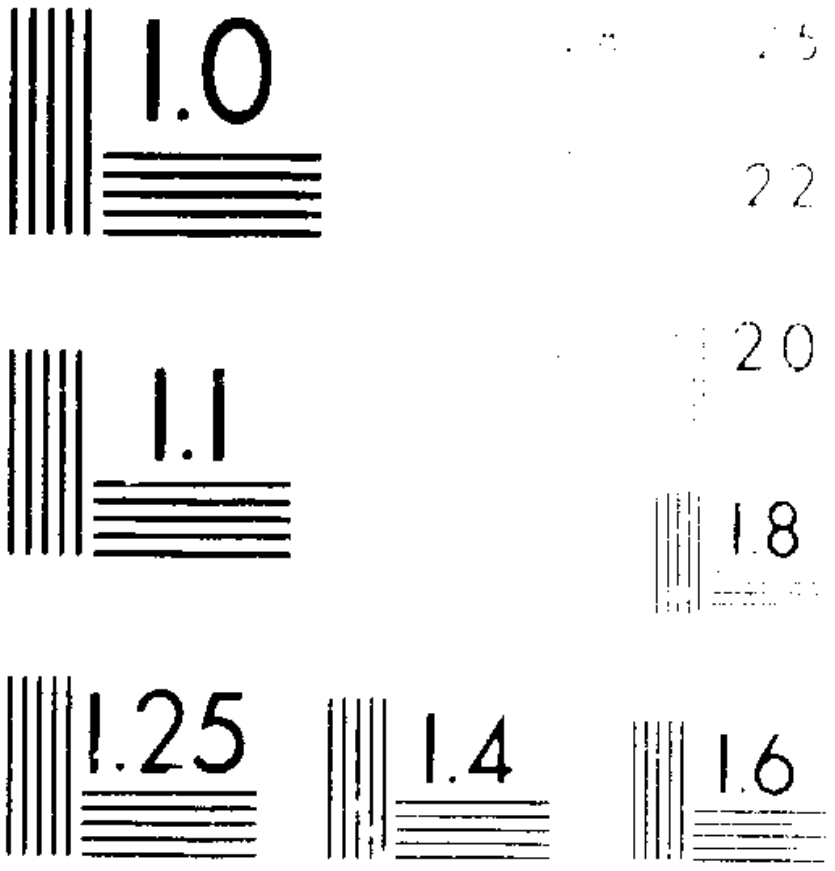
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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION

THE GOVERNMENT OF THE REPUBLIC OF SIERRA LEONE

INDUSTRIAL, DIAGNOSTIC AND MANAGEMENT SERVICES FOR FRUIT PROCESSING INDUSTRY - SIERRA LEONE
(Project No. SI/SIL/83/801)

FINAL REPORT

14035

MABOLE FRUIT COMPANY LIMITED

MINSTER
AGRICULTURE
LIMITED

SL.026/1
6.84

UNITED NATIONS INDUSTRIAL DEVELOPMENT

ORGANISATION AND THE

GOVERNMENT OF THE REPUBLIC OF

SIERRA LEONE

UNIDO CONTRACT NO: 83/96

PROJECT NO: SI/SIL/83/801

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INDUSTRIAL, DIAGNOSTIC AND MANAGEMENT SERVICES FOR FRUIT PROCESSING INDUSTRY

MABOLE FRUIT COMPANY LIMITED

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0.0 EXECUTIVE SUMMARY AND CONCLUSIONS

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0.1 INTRODUCTION

This report presents the findings of an appraisal for the proposed rehabilitation of the Mabole Fruit Company Limited (MFC) which owns a fruit processing factory situated at Makeni in the Northern Province of Sierra Leone. Terms of reference are presented in Appendix 1.

The study was undertaken by a team of consultants from Minster Agriculture Limited with full back-up support as required from Head Office personnel in the UK. The team comprised:

Mr. Michael P. Tinne	Agriculturist/Agro-industry Specialist (Team Leader)
Mr. D.W. Nicholson	Food Processing Technologist

Support facilities in Sierra Leone were provided by the Industrial Development Department in the Ministry of Trade and Industry:

Mr. Eugene O. Davies	Permanent Secretary
Dr. A.D. Monteiro (UNIDO)	Chief Technical Adviser

The fruit processing factory situated at Mahebo is a very considerable national asset, which certainly must not be abandoned. Its replacement cost today would be far in excess of its original cost due to inflation and the substantial devaluation of the Leone since the Company was formed and the factory erected. (See Appendix 9 - Exchange and Currency Movements).

The findings indicate that the factory can be rehabilitated without too large an investment of capital, but it is essential that 'working' capital is made readily available as and when required.

0.2 SUMMARY OF FINDINGS

Since the factory began operations in 1978 for the production of fruit juices and jams, it has only worked intermittently and has never achieved the output projected in the original feasibility study prepared by HVA of Holland. The factory has not operated during the past two years. Security guards are maintained permanently on site, paid for by the NDB, and maintenance and cleaning of the site continues. The NDB's resident representative in Makeni, Mr. Fofonah, holds a watching brief on the factory and ensures that the generator is run regularly for a short period.

The causes of the current situation are numerous and are discussed in depth later in the report, but the main reasons are summarised as follows:

(i) Poor financial control from the NDB, the agency responsible for the disbursement of funds; these were often not available for importation and purchase of raw materials and spare parts, as well as for wages and salaries.

(ii) Lack of technical management/training programme. This was entirely inadequate for dealing with technical problems associated with processing. A range of fruits were being processed and there was no-one at the plant to solve and advise on technical problems as and when they arose. It is unfortunate that there has never been a food processing technologist on the pay-roll of the Mabole Fruit Company, nor was any programme suggested to train one. (See Chapter 3, paragraph 3.3, page 37).

(iii) Location. The site chosen for the erection of the first fruit processing factory in Sierra Leone was not the 'optimum' site from many points of view. This resulted in a number of constraints on and difficulties for production. These are discussed later in the report. (See Chapter 2.1)

(iv) Raw material/fresh fruit supply. It would seem that insufficient investigation was carried out into the raw material supply position as regards quanity and quality; this oversight is in the process of being resolved with the co-operation of the Northern Integrated Agricultural Development Programme (NIADP) and the Project Evaluation and Monitoring Service Unit (PEMSU) of the Ministry of Agriculture and Forests (MAF). It also seems that the fruit calendar presented in the original feasibility study is incorrect.

(v) Design of process. Certain essential pieces of equipment were omitted from the factory. As a result the factory was unable to turn out products of an acceptable quality.

(vi) Packaging system. This area of the Company's operation was a major weakness and undoubtedly contributed substantially to its failure; the wrong type of packaging material of inferior quality resulted in a very short shelf life for the juice products. These quickly deteriorated resulting in almost complete consumer resistance. This was due to the 3-layer laminated pouches separating; they could also become easily torn thus not only wasting the contents but damaging other goods (see page 31, Chapter 2.9.4.5 and Appendix 8).

(vii) Design of buildings and layout. There are a number of weaknesses in this area which mitigated against economic production. Apart from failing to meet standards of acceptable hygiene in a food processing factory, the factory would be unlikely to obtain certification from the factories inspectorate.

(viii) Lack of marketing strategy. The factory management found it virtually impossible to develop any planned approach due to intermittent raw material supply and in many cases variable and unacceptable quality of the products. Suggestions as to how this vital area for the Company's success can be improved are presented later in this report. (See page 20, 2.7.2).

0.3 THE POSITION OF THE NATIONAL DEVELOPMENT BANK

It is relevant to comment on the position of the NDB, as any decision with regard to the Bank's future will affect the MFC.

The NDB was founded in 1968 for the purpose of providing loans and equity finance for small and medium size 'business enterprises' (in the widest sense); the Bank's performance, has been disappointing because of the poor results of several large scale financing operations (including MFF) and severe loan recovery problems. In addition, there has been a lack of experienced management, particularly with regard to in-depth appreciation of project appraisal techniques.

The NDB currently appears to be insolvent having lost its capitalisation. It is therefore largely incapable of carrying on its lending activities.

It would appear that the sale of the MFC (along with other companies owned by NDB) may be unavoidable and the implications of this are discussed further in the report. (See Chapter 4.5, page 50).

0.4 CONCLUSIONS

In order to rectify the problems outlined above the following recommendations have been made; these are amplified in the body of the report:

Above all it is essential that:

- the Mabole Fruit Company Limited is completely relaunched with new ownership; this will entail the sale of the enterprise, and a suitably drawn up prospectus of sale should be prepared for wide circulation to all possible interested parties or identified potential purchasers both in Sierra Leone and overseas;

- a suitable management team with the necessary depth of both technical and financial experience be employed;

- adequate and timely funds are made available for:

  (a) purchase of the necessary additional capital equipment;

  (b) rehabilitation of existing plant and buildings;

  (c) provision of adequate 'Working' capital.

ABBREVIATIONS AND ASSUMPTIONS USED

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Throughout the report a number of abbreviations, and assumptions on such matters as exchange rates, have been used. These are as follows:

ABBREVIATIONS

ADB	African Development Bank
CFTC	Commonwealth Finance and Technical Cooperation
CID	Centre for Industrial Development, Brussels
FMO	Netherlands Finance Company for Developing Countries
GSL	Government of Sierra Leone
HVA - HAI	Holland Agro Industries
JTI	Jutland Technological Institute (Hansen report)
KIADP	Koinadugu Integrated Agricultural Development Programme
MAF	Ministry of Agriculture and Forests
MFC	Mabole Fruit Company
MFF	Mabole Fruit Factory
MRU	Mano River Union
NDB	National Development Bank
NIADP	Northern Integrated Agricultural Development Project, Makeni
PEMSU	Project Evaluation and Monitoring Service Unit
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organisation

EXCHANGE RATES

US$ 1 = Leones 2.50

ACKNOWLEDGEMENTS

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The consultants wish to thank the many individuals and organisations in Sierra Leone for their assistance during the Mabole Fruit Company assignment.

We would particularly mention Mr. S.S. Kamara, Senior Development and Planning Officer in the Ministry of Planning and Economic Development, currently seconded to the Ministry of Trade and Industry, who acted as counterpart and gave very considerable support and assistance throughout the team's stay in Sierra Leone. We would also mention Miss Jette B. Jensen, Junior Project Officer UNIDO, with the United Nations Development Programme (UNDP), for help with administrative and travel arrangements, and with whom the team leader maintained a close and continuing relationship as the representative of the UNDP Resident Representative in Sierra Leone, Mrs. M. Chinery Hesse.

The team were also continually in discussion with members of the National Development Bank (NDB), particularly regarding the current financial position of the Mabole Fruit Company (MFC).

The team wishes to thank the UNIDO staff in Vienna, the UNDP staff in Freetown and the many organisations and persons who have helped in this project, for their outstanding co-operation.

1.0 INTRODUCTION

1.0 INTRODUCTION

1.1 BACKGROUND AND HISTORY

Sierra Leone's tropical climate is suitable for the production of a range of fruit crops. Estimates put the area of land suitable for fruit production at 3 million hectares but only 20 percent of this area is cultivated at present.

In the Mabole region a wide range of fruits are grown by farmers and the Mabole Fruit Factory developed from a concept to set up a processing industry based on this fruit production area.

A Feasibility Study for the Establishment of a Small Scale Tropical Fruit Processing Plant was prepared by HVA-HAI (Holland Agro Industries BV) and submitted in July 1977. In our view this study contained a number of undoubted weaknesses and omissions and these should have been discovered and highlighted, allowing appropriate action to be taken and modifications made prior to any investment decision being taken. We can only stress how important it is that either the Government Ministry concerned or the NDB has available to it a sufficiently experienced project evaluation unit; if this had been available at the time of the evaluation of the original feasibility study we would suggest that the project would have had a far greater chance of success.

As a result of this a joint venture company was formed, the shareholders being the Government of Sierra Leone in the name of the National Development Bank (NDB), the Government of the Netherlands through the Netherlands Finance Company for Developing Countries (FMO) and the consultants/managers HVA-HAI. The Company was formally registered on 18th January 1978, and construction of the factory and development of the site went ahead during the same year. Factory trials were held late in 1978 and production of juices and jams went ahead in early 1979.

Problems arose soon after the factory commenced operations and a technical consultant visited in April 1980. Improvements to production, marketing, personnel and financial aspects were recommended but little action appears to have been taken.

A large multi-disciplinary team of consultants visited the factory in November 1980 and a comprehensive report was published in January 1981. Unfortunately none of the recommendations made in the report were taken up. After the capital injection resulting from a transfer of shares in December 1982, debts were paid off and the factory ceased to produce. It was, in effect, mothballed until some way of resolving the various problems was identified.

Late in 1982, the Government of Sierra Leone requested UNIDO through the UNDP to provide technical assistance to the Mabole Fruit Factory.

1.2 THE REPORT

This report has been prepared in partial fulfilment of the terms of reference issued by UNIDO under the contractual agreement with Minster Agriculture Limited. The terms of reference for the study are presented as Appendix 1.

The report is structured to cover the three main topics specified in the terms of reference. The three major sections are:

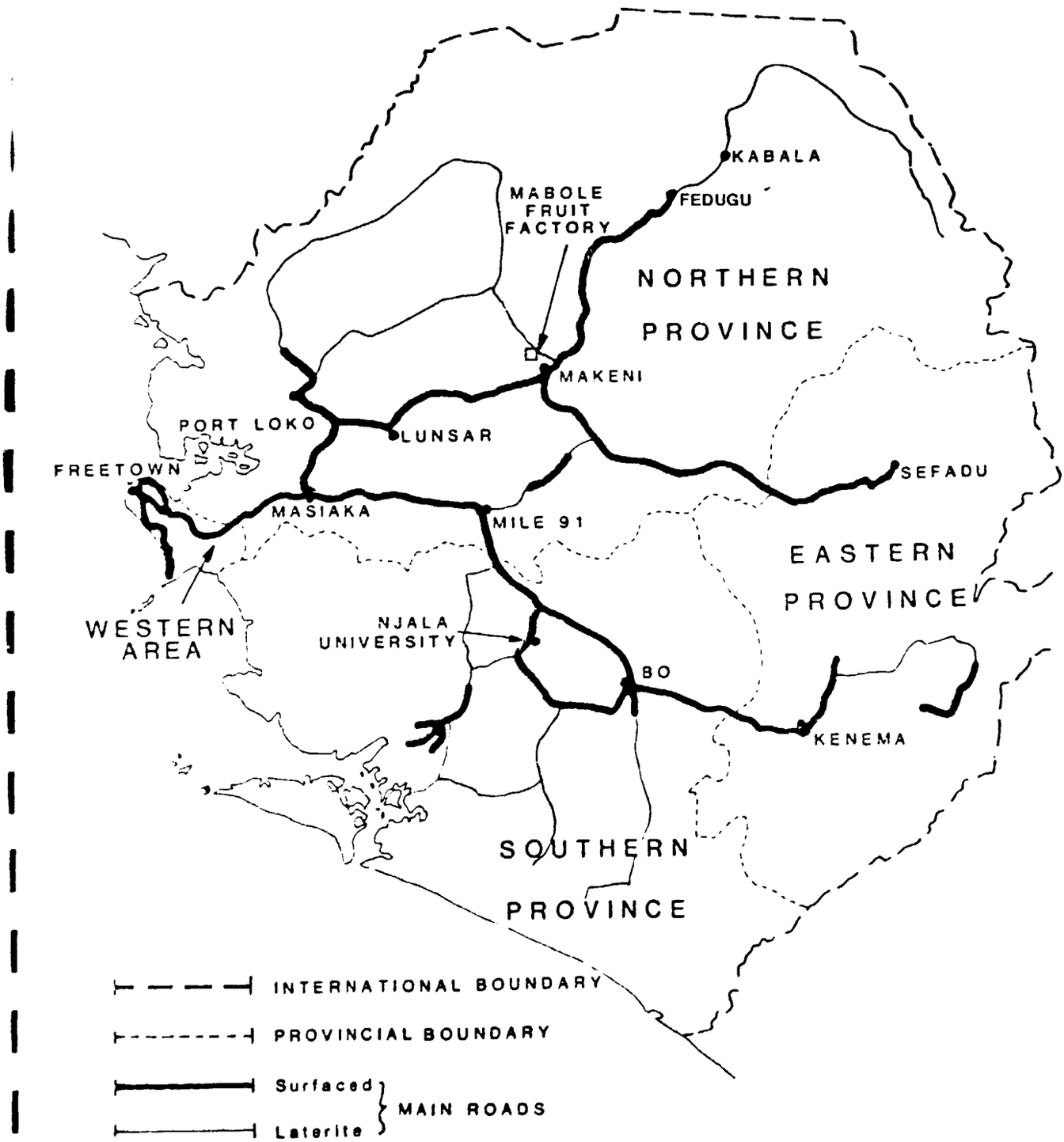
- technical aspects of Mabole Fruit Factory;
- organisational and management aspects;
- financial aspects.

Each section is sub-divided to cover the detailed requirements of the terms of reference and appendices are added to provide supporting information.

2.0 TECHNICAL ASPECTS OF MABOLE FRUIT FACTORY

FIGURE 2.1

MAP SHOWING LOCATION OF MABOLE FRUIT FACTORY, SIERRA LEONE



2.0 TECHNICAL ASPECTS OF MABOLE FRUIT FACTORY

2.1 LOCATION AND SITE

The Mabole Fruit Factory is located approximately 13 km outside the town of Makeni in the Northern Province of Sierra Leone. Makeni is 185 km from Freetown the capital (see Figure 2.1).

The factory is approached from Makeni along the Kalangba/ Kamakwie road from Pamlap, a village on the Kabala road. The site occupies 17.23 acres (6.98 hectares) and stands on the northern bank of the Mabole river adjacent to the road bridge. The site area is known locally as Mahebo and lies within the Pendembu Gowahun Chiefdom.

The roads serving the Mabole Fruit Factory vary in quality and state of repair. The main road from Freetown to Makeni requires extensive repair to the metalled surface and it is understood that repairs are to be shortly carried out with World Bank assistance. The Kabala road to the north of Makeni is presently under construction, the Makeni-Fedugu section having been recently completed. This is probably the finest section of highway in Sierra Leone at present. The final 30 or so kilometres between Fedugu and Kabala are due to be constructed in the near future but the final alignment may depend on the proposed Bumbura hydro-electric scheme.

2.2 GENERAL ESTABLISHMENT AND INFRASTRUCTURE

The Mabole Fruit Factory was evaluated from both the technical and cost standpoint by Edward Davis and Associates, Consulting Engineers, during February 1982. As the factory continued to operate for only a few months after this evaluation it is considered a fair assumption that their technical appraisal is still valid. A continuous security guard and maintenance team have been operating at the factory from close-down to the present and it is considered that the buildings, services and indeed much of the equipment could be re-commissioned without much difficulty.

2.2.1 Leased Site of Mabole Fruit Factory

The site of Mabole Fruit Factory incorporates the factory within its own fenced compound in the south-east corner of the site and staff housing which is situated to the north of the factory compound outside the fenced area. A plan of the site is presented as Figure 2.2.

2.2.1.1 Fencing

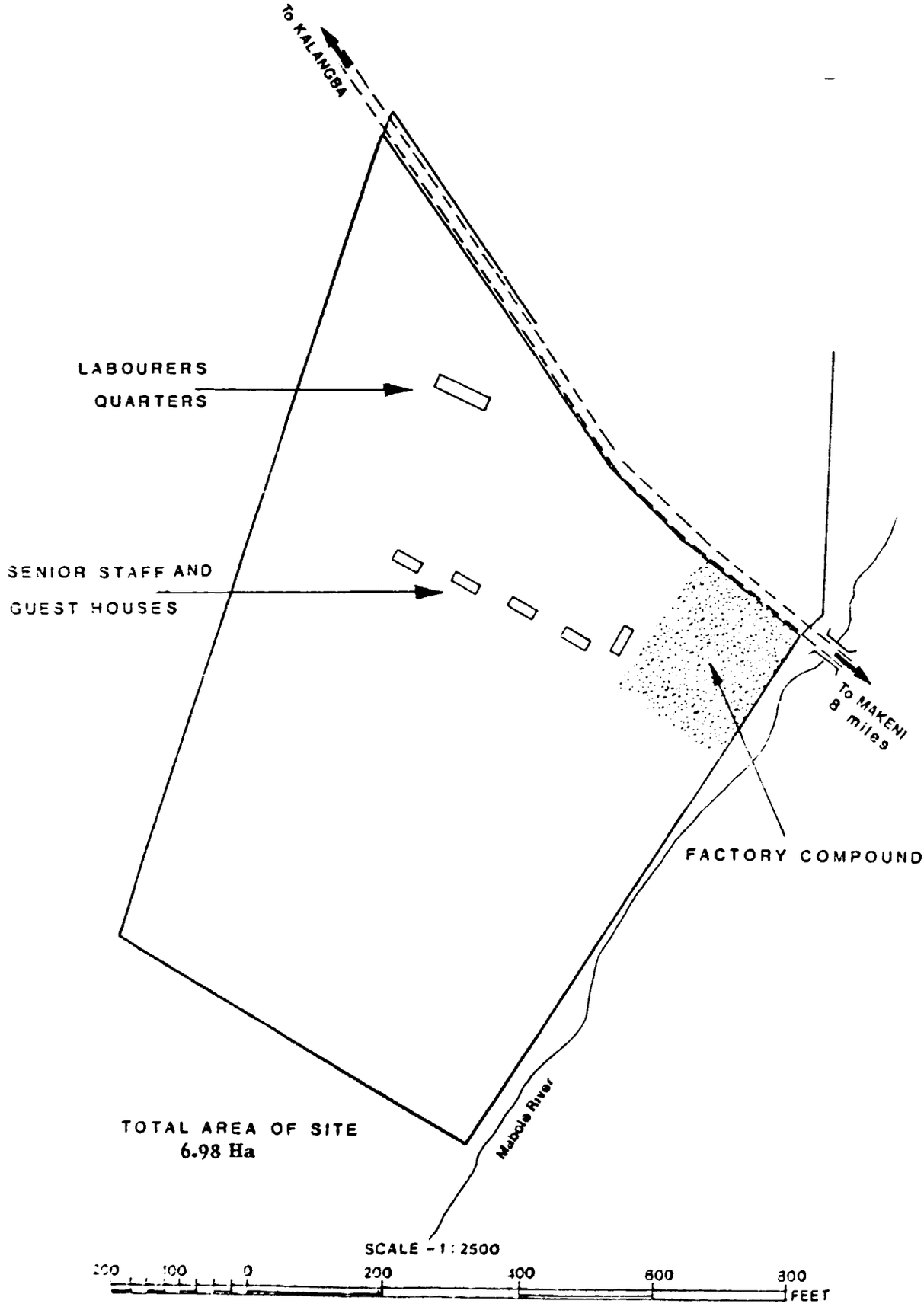
A total of 280 m, 6 ft. high BRC link chain fence, with three strands of barbed wire tapping supported with hollowed section galvanised posts located at 10 ft centres, is provided around the factory perimeter. Repairs are required in one section which has been damaged by a fallen tree.

2.2.1.2 Paved access and hard-standing

Approximately 1,000 m^2 of paved area leads into the factory compound and provides hardstanding for vehicles around the factory buildings. There is significant surface deterioration in the form of pot holes and exposed sub-surface material.

FIGURE 2.2

PLAN SHOWING LAND LEASED BY MABOLE FRUIT FACTORY, MAHEBO, NEAR MAKENI, NORTHERN PROVINCE, SIERRA LEONE



2.2.2 Buildings

Buildings within the factory compound include:

- Main factory building, incorporating laboratory and offices;
- Utility building, with generators and water treatment plant;
- Guest house;
- General Manager's house;
- Senior staff houses (2);
- Production Engineer's house;
- Junior staff dormitory.

2.2.2.1 Factory Building

The floor area of the factory is 35.45 x 22.45 m = 795.85 m^2.

The factory building is sub-divided to provide for the following:

- Laboratory;
- Factory main floor;
- Office(s) section.

General structural arrangements consist of roof cladding of corrugated aluminium sheets on high pitched gable roof made up of steel channel purlins and steel trusses located at 1.4 m and 5 m centres respectively, and supported on reinforced concrete columns with point load stemming into reinforced pad foundations. The load bearing gable end walls and partition walls are supported on strip foundations. A reinforced ring beam is provided to strengthen the structure at lintel level.

The floor is of reinforced concrete slab laid on compacted crushed hard core.

The windows are of glazed steel frame, each 6 ft x 6 ft x 6.5 ft.

The main entrance to the factory floor is fitted with an 8.5 ft steel roller shutter door. Outside walls are of 9 in. solid sandcrete blocks.

2.2.2.2 Utility building

The utility building is 5.45 x 6.60 m = 35.97 m^2. This building is a single storey structure with high pitched gable roof supported on gable end load bearing walls of 9 in. solid sandcrete block on mass concrete strip foundations, with plants and equipment positioned on plinths of reinforced concrete slab on hard core base.

The building is sub-divided into two separate compartments:

- Power generation room;

- Water treatment room.

The generation room is provided with louvre block and wire mesh opening for through air ventilation and houses the two generators supplying the complex with electricity. The water treatment plant room is equipped with glazed steel windows and door.

The general condition and structural appearance of all the buildings are satisfactory.

2.2.2.3 Senior staff quarters and guest house

There are a total number of five single storey units of this type, each with three bedrooms, a living room, kitchen, bathroom and front and back verandahs. The guest house is the largest of the group. The floor areas of the five buildings according to allocation are:

Guest house

General Manager's house	112.88 m^2
Senior staff house	112.88 m^2
Production Engineer's house	94.80 m^2
Senior staff house	94.80 m^2

The roof claddings are of long deep trough corrugated aluminium sheet of adequate gauge on low pitched ridge type gable roof with 2" x 2" purlin at 4 ft centres mainly supported by gable end load bearing walls constructed from 9" x 9" x 18" solid sandcrete blocks, partition walls and hollow steel column sections. The walls are on mass concrete strip foundations while the hollow steel section columns are founded in reinforced concrete pad foundations.

Reinforced concrete lintels are provided at top of all windows and door openings. The windows are of glazed galvanised louvre carries; all external doors are metal glazed, and hollow core flush type 2.5 ft. x 6.5 ft x 1.5 in. thick internal doors complete with mortice locks.

2.2.2.4 Junior staff quarters

These comprise a 9-room workers' dormitory provided with outside kitchen and toilet facilities. The total floor area is 120.62 m^2.

The general structural arrangement is of single storey low pitched linto type roof structure supported on load bearing walls and partition walls on mass concrete strip foundations. The roof claddings are of long deep trough corrugated aluminium sheets.

2.2.3 Communications

The total lack of telephone or radio links with nearby towns and the capital city are considered a major obstacle for the successful

development of MFF. Recommendations on how to improve this situation are made elsewhere in this report (Section 2.8).

2.2.4 Transport

The vehicles which MFC owned during the first years of operation were sold during 1983 leaving the factory without transport. This situation cannot continue if the factory is to become operational again. Recommendations are made for the transport necessary to collect fruit from growing areas, deliver finished products and transport miscellaneous materials. Management will also require mobility so that adequate supervision can be provided.

2.3 SERVICE UTILITIES - PLANT AND EQUIPMENT

2.3 SERVICE UTILITIES, PLANT AND EQUIPMENT

This category comprises:

- electricity generators and switchgear;
- diesel fuel supply;
- water treatment plant and controls;
- steam generating boilers and controls;
- cold store
- compressed air generator.

As the various equipment had not fundamentally changed since the consulting engineers appraisal in 1982, it is assumed that all were in good working condition, with the exception of one electrical generator (see comments below).

2.3.1 Electricity Generators, Switchgear and Circuits

Two diesel-fuelled generators are located in the utilities building at the rear of the main factory block. Each unit is mounted individually on a concrete foundation and permanently connected to a wall-mounted distribution board by cables. The technical details of these generators are presented in Appendix 4.

The main generator, rated at 150 KVA output, was in working order. The stand-by generator of 50 KVA is understood to have never performed satisfactorily. The consultant engineer's report identified this generator to have a faulty starter. However, considering the age and design of this generator, it is probable that it was obtained second-hand and the Mabole Fruit Factory should seriously consider replacing this unit.

A description of the switchgear and distribution circuitry as prepared by the consultant engineers is included in Appendix 4.

2.3.2 Diesel Fuel Supply

An underground fuel storage tank is located within the project site adjacent to the factory building. It has a capacity of 600 gallons.

A filtered pump powered by a fractional horse-power motor is located in the utility house. The pump draws diesel from the underground fuel tank to a further smaller fuel storage tank in the utilities building.

2.3.3 Water Treatment Plant

The water treatment plant occupies a compartment within the utilities house and comprises two water intake pumps, a settlement tank, filters, chemical dousing units, booster pumps and an air scour pump. The electrical circuitry includes a control panel. Details of the equipment making up the water treatment plant are included in Appendix 4.

2.3.4 Steam Generation Plant

This comprises an oil-fired steam boiler with an output of 1,650 kg of steam per hour at 8 bar. It appears to be in good working order.

2.3.5 Cold Store

The cold air required for this facility is provided by a 3 HP compressor.

2.3.6 Compressed Air

There is an air compressor complete with buffer tank. This has an output of 24 m^3 per hour at 10 bar.

2.4 PRODUCTION FACILITIES - PROCESSING EQUIPMENT

2.4 PRODUCTION FACILITIES PROCESSING EQUIPMENT

The flow diagram for the processing of fruit into juice and/or jam is shown in Figure 2.3. The factory was designed to process a maximum of 1 ton of fruit per hour. The equipment was inspected and evaluated from the point of view of adequacy of the overall process and the suitability of the individual processing units. Comments on the equipment, the deficiencies and recommended modifications follow in Section 2.9 below.

The processing equipment comprises the following units:

Juice Processing

Juice press
Pulper/refiner
Pump
Mixing tank complete with stirrers
Fruit waste screw conveyor/pulveriser
Horizontal conveyor
Elevator
Conveyor
Pasteuriser/flasher

Flasher
Citrus tray
Fruit grader

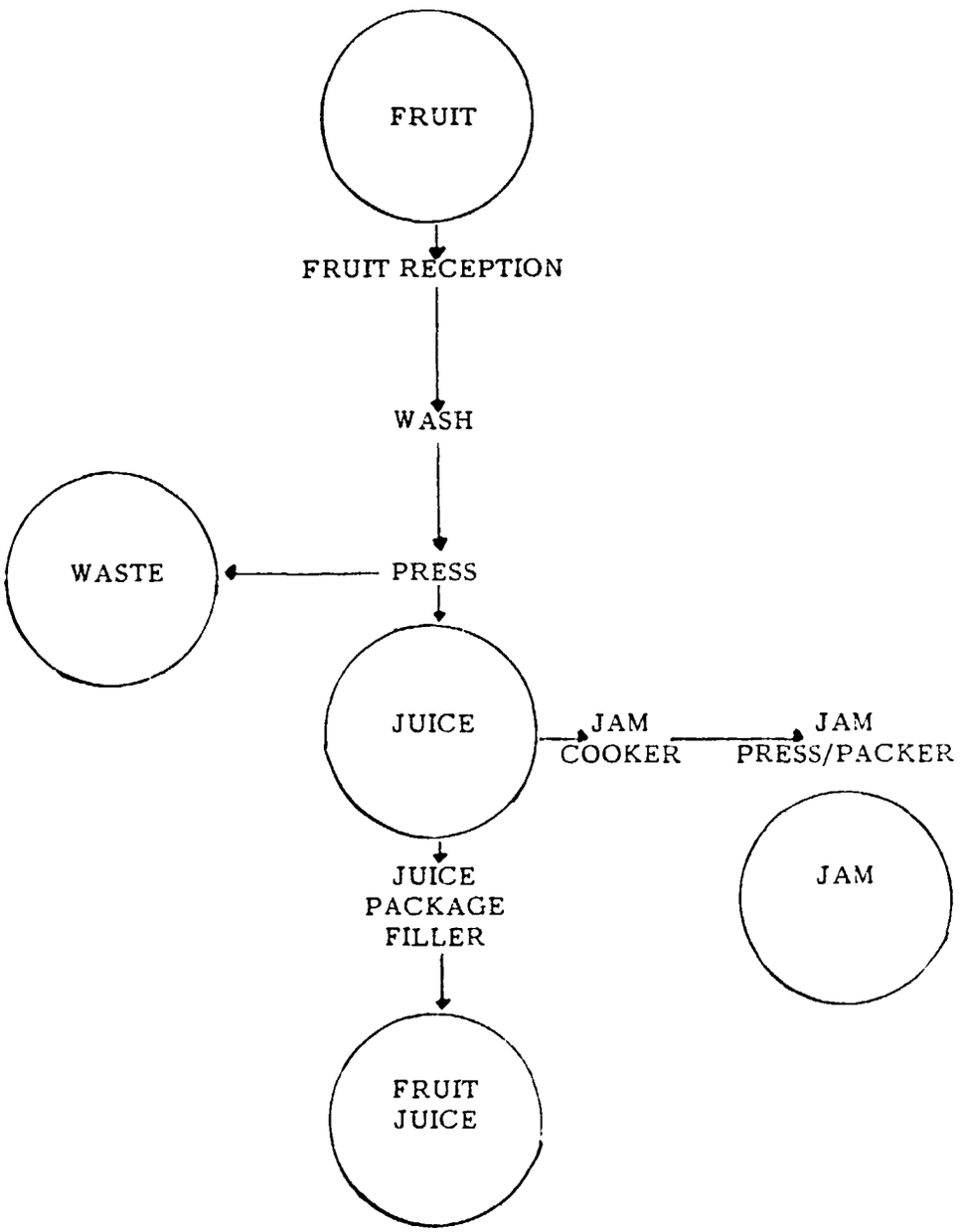
Jam Processing

Jam cooker
Pump
Jam filling machine
Scales (2)

Technical details of the individual items of processing equipment are presented in Appendix 5.

FIGURE 2.3

FLOW DIAGRAM OF MABOLE FRUIT FACTORY



2.5 RAW MATERIAL AVAILABILITY AND SUPPLY

2.5 RAW MATERIAL AVAILABILITY AND SUPPLY

The quantity and quality of fruit for processing at the MFF has been a continuous problem since the factory commenced operations.

2.5.1 Unsuitability of Local Citrus and Introduction of Improved Varieties

During the first year of operations it was found that the juice extracted from 'local sweet' oranges (and possibly some of the improved varieties developed by MAF) were unacceptable due to bitterness. To overcome this problem the management of Mabole Fruit Factory imported varieties of citrus, suitable for juice-manufacture, from the USA and a bud-wood nursery was set up on the leased-site adjacent to the factory at Mabole. Unfortunately, before bud-wood could be distributed to local farmers, the factory ceased operations.

As a result of an IBRD review mission to the area it was agreed that the bud-wood nursery be incorporated into the Northern IADP based at Makeni. The nursery was moved to a new site at Makumb and placed under the supervision of the NIADP chief agronomist. In return for the bud-wood the NIADP staff carried out a general cleaning and tidying up operation of the MFF leased area.

Budded seedlings are now available for purchase by farmers from the NIADP nursery.

Varieties of budded citrus becoming available for sale through the NIADP are as follows:

- Orange:
  - Trovita
  - Forest Valencia
  - Pineapple Orange
  - Hamblin
- Tangelo:
  - Frost Orlando
- Grapefruit:
  - Walters
- Tangerine:
  - Dancy
  - Fairchild

It is understood that the orange variety "pineapple" is showing particular promise, seemingly coming into fruit earlier than the other varieties. It has a relatively thin skin, and is almost seedless with a high juice content. Dependent on the yields from the other newly introduced varieties, which should begin to bear within the next 12 months, the NIADP will be able to make an assessment and make recommendations as to which variety(ies) should be encouraged and particularly propagated.

2.5.2 Immediate Availability of Citrus Fruit in the Vicinity of Mabole Fruit Factory

Whereas the future prospects for citrus fruit supply appear very good, the current situation is very unclear. Without an accurate assessment of both tree numbers and varieties it is difficult to make firm recommendations on whether there is sufficient fruit of the appropriate types to restart processing operations at the factory.

During discussions with the NIADP Project Manager it was learnt that a tree crop survey is currently being undertaken by PEMSU. This exercise forms part of a survey covering all farms in the NIADP area. A copy of the survey questionnaire is presented in Appendix 6. The information being gathered in the PEMSU survey will be collected and analysed in July 1984. When this information becomes available, the management of MFF will have an extremely valuable guide as to the quantity, location and type of fruits available for processing. In addition the location of the fruit can be ascertained accurately rendering the supply scheduling and organisation of transport much easier to manage.

A number of visits to farms were made during the consultancy assignment and discussions were held with farmers and local officials. As a result of many comments made, supported by personal observation it is considered that there currently exists more than enough fruit to supply the factory during the peak period of citrus availability. Mr. S.E. Aboke Cole, a MAF officer, stationed at Gberia Fatombu, agreed that sufficient fruit is currently available in the project area. Mr. Cole's opinion is particularly relevant as he was formerly in charge of fruit procurement at Mabole Fruit Factory.

The bitter flavour of juices from non-improved varieties of citrus could still become a problem and will not be totally resolved until there is sufficient fruit from the young budded trees being produced by the NIADP. An interim measure is recommended - the installation of a de-oiler/de-aerator to reduce bitterness during juice processing (see Section 2.9).

It is possible that a bitter element 'limonin' is present in the fruit of local 'sweet oranges' and possibly some of the improved varieties produced by MAF. The de-oiler/de-aerator will not remove this substance from the juice, the only method of overcoming the problem being to avoid fruit which contains 'limonin'. A survey of varieties to determine the extent of any 'limonin' problem and a simple test to be performed during fruit reception at the factory is recommended.

2.5.3 Future Availability of Improved Citrus Fruit for Processing by MFF

At present there are 44,000 budded citrus trees of improved varieties in the nursery at Makumb ready for sale to farmers. These will be sold in minimum quantities of 35 trees (representing the number of trees needed to plant half an acre). Assuming a yield from improved citrus varieties of 10 tons per acre, (local 'sweet oranges' yield 5-7 tons per acre), and a tree population of 30,000 in the area of the NIADP, (representing two thirds of the 44,000 trees currently available for sale to farmers) an annual fruit crop in excess of 4,200 tons should result. This is more than adequate to satisfy the raw material requirements of the Mabole Fruit Factory during the 3-4 month period of fruit availability, (even if two shifts per day were worked). Fruit in sufficient quantity and of suitable quality should be available by November/December 1985.

2.5.4 Fruit Availability Calendar

The fruit availability calendar presented with the original feasibility study for the MFF would appear to be inaccurate. Following extensive farm visits, discussions with local agricultural officials and NIADP staff an alternative fruit availability calendar has been drawn up. (Table 2.1).

TABLE 2.1

MODIFIED FRUIT PRODUCTION CALENDAR

Month / Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Notes
Oranges	X	X	/								/	X	Late and early (sometimes 2 weeks in March)
Grapefruit	X	X	(X)									X	Normally 3 months but does extend into March.
Tangerine	X	X										X	Only small quantities available
Lime	X	X							/	/	/	X	Extended and somewhat indefinite harvesting periods.
Lemon	/	/	X	X									
Pineapple		/	X	X	X	/							
Guava								X	X	X			
Mango				X	X	X							Mangoes can be found throughout most of year, but the large Guinea type which are the most suitable for processing are available April-June
Tamarind (Tumbi)	X	X	X										
Other Fruits etc													
Passion Fruit							X	X					Peak July-August.
Ginger) Pawpaw) Palm Wine) Onions) Tomatoes) Avocado)	To be determined												
Rainfall (Makeni) Mm/month	5	10	18	93	225	412	530	740	576	417	208	28	Total = 3,263

KEY:

X = Fruit available during whole month
/ = Fruit available during part of month

From this it can be seen that the availability of fruit is influenced by the rainfall pattern. Additional climatological information is presented at Appendix 7.

In many areas plantings have been made in sub-optimal ecological zones with limited soil-depth, drought stress (especially during late March and early April) and soil acidity being major adverse factors. New plantings are being encouraged around the edges of inland swamp areas so that the citrus trees can obtain ground water during the dry season. In this way the quantity of fruit per tree, the size of individual fruits and the period of fruit availability could be increased. The installation of irrigation systems could also be considered after careful agro-economic studies.

2.5.5 Supply of Citrus Fruit for Processing by MFF

The purchasing and uplifting of this fruit from the farms is of the utmost importance and it is recommended that someone of the experience and local knowledge of Mr. Aboke-Cole is recruited to work under the supervision of the Commercial Manager, (see Section 3.2, Organisation and Manpower).

Adequate transport and communications will be required. These are discussed in Section 2.8.

We consider that with Phase II of the NIADP programme now coming on stream it is not necessary for MFF to have its own citrus nursery and nucleus plantation. It will, however, be necessary to liaise closely with the NIADP. We further understand that integration of MAF and the IADP's is likely to proceed during the coming years, and this will undoubtedly assist the position substantially.

With the information being collected in the PEMSU survey, organising the collection and transportation of fruit will be made much simpler than was previously the case. Fruit is sold 'by the ton', 'by the tree' or 'by the bag' and it will be the decision of the chief buyer which method of purchase to adopt. This will depend on the size of the producer and whether casual labour is available to harvest the fruit bought 'by the tree'.

The unsuitability of certain citrus varieties may necessitate selective purchasing, although the inclusion of additional equipment in the processing line (see Section 2.9) should widen the range of fruit suitable for processing.

The problem of variation in the quality of MFF's products is considered more the result of poor packaging material and inadequate processing equipment rather than unsuitable fruit varieties. However the possible existence of limonin in some oranges should be verified as soon as possible.

2.5.6 Availability of Other Fruit for Processing

Other than citrus fruit, including oranges, limes, grapefruit, lemons and tangerines, the factory can utilise pineapples, guavas and tamarinds. It is considered that sufficient oranges and pineapples are available to enable the factory to run for 6-7 months of the year. Processing other fruits will extend

the active period of the factory by a further 2 months. This will mean that the factory will be without fruit supply for 2-3 months of the year, most probably at the height of the rainy season.

Details of the type and location of tree crops will become available with the results of the PEMSU survey. The only non-tree fruit required by the factory is pineapple and it is considered that the reopening of the MFF will stimulate sufficient planting of pineapple in the area to satisfy the factory's requirements. It is recommended that this be verified with the management of the NIADP, and that if not, a method is devised to make available sufficient pineapple planting material.

2.5.7 Supply of Sugar to Mabole Fruit Factory

With exception of fruit the only other major raw material required by MFF is sugar. This will need to be a high quality white refined grade. A visit was made to the Magbass sugar complex and the sugar at present produced there would require to go through a further refining process before it could be considered for use by MFF. The sugar presently produced at Magbass is only steam washed and cleaned raws and would be unsuitable for juice or jam making as the molasses remaining in the sugar would impart colour into the products.

We understand that the Sierra Leone Sugar Marketing Company Limited has exclusive rights for the sale of all sugar in Sierra Leone - both locally produced and imported. As the sugar to be used at MFF is considered a 'raw material' input and therefore not for sale to the consumer, a licence to import direct will be granted on application to the MTI provided clearance has been given by the Sierra Leone Sugar Marketing Company Limited. The sugar will then be bought direct at prices prevailing at the time. The price of sugar has fluctuated substantially over recent years, but the quantity involved in fruit drink manufacture is not large and will not be a major factor in the costs of production, however, for jam manufacture it becomes extremely important where the ratio of sugar to fruit is very high and becomes a significant cost factor.

2.5.8 Other Raw Material Requirements

MFF also requires small quantities of additives for juices and jams. In addition to sugar, other additives to enhance flavour and appearance include sugar syrup, citric acid, colouring agents, preservatives and in the case of jams, pectin.

All of these are imports with the availability of foreign exchange being a recurrent problem.

2.6 MARKET FOR FRUIT JUICES AND RELATED PRODUCTS

2.6 MARKET FOR FRUIT JUICES AND RELATED PRODUCTS

Before considering the range of products which the MFF could produce it is considered important to assess the market for the original products (juices and jams) and other products which, with minor modifications to the processing line, could be manufactured.

2.6.1 Market for Fruit Juices in Sierra Leone

The total recorded imports of fruit and vegetable juices into Sierra Leone were:

1979	-	268 tonnes
1980	-	151 tonnes
1981	-	236 tonnes

During the period 1979-81 the importation of citrus and pineapple juices rose from 72 to 144 tons. Although these quantities are too small to warrant a production unit in their own right, there is a limited opportunity for import substitution.

An analysis of the imported fruit juice market carried out by PD Media in 1980 showed the following market shares:

Orange	35	percent
Pineapple	20.5	percent
Mango	13	percent
Grapefruit	8	percent
Lemon	1	percent

During the season of availability, oranges are sold in considerable numbers at the roadside from 3-10 cents each. Commonly, sufficient peel is removed to enable the juice to be squeezed and sucked from the fruit. Fresh orange juice is not available outside the 12-14 week season and it is considered that there should be a potential to supply a similar, sterilised product, on a year round basis.

2.6.2 Export Opportunities for Fruit Juices

During a brief visit to neighbouring Liberia it was ascertained that there is a ready market for fruit drinks sold in tetrapak briquettes. These are at present imported from Europe. Unfortunately statistics on the quantities involved were unavailable due to inadequate staffing in the Central Statistics Office and the Custom and Excise Department.

However, the Liberian market, with its currency fully tied to the American dollar and being totally exchangeable immediately offers an excellent export market. If this can be developed, and the quality and the price of the product is competitive to that of the imported drink, then one of the major constraints to the successful operation of Mabole can be overcome, ie lack of foreign exchange required to import certain raw materials.

As the Mabole Fruit Factory will require some imported sugar and packaging materials it will be advantageous to export some of its produce. In

this way it can generate foreign exchange, which is very scarce in Sierra Leone, thereby avoiding the need to join the long queue of manufacturers waiting to permission to import raw materials.

Another incentive to develop an export market is that the foreign exchange earnings will enable the Company to employ the required trained expatriate expertise during the initial years of its rehabilitation.

Sierra Leone is one of the three signatories to the Mano River Union agreement, which means that the fruit drinks from Sierra Leone should enjoy a tariff preference over those imported from elsewhere and should therefore allow them to be sold at most competitive prices, particularly with the transport distances being small. With the proposed development of improved roads between Sierra Leone and Liberia the export proposition becomes even more attractive.

2.6.3 Substitution of Soft Drinks with Fruit Juice

There is substantial consumption of soft (carbonated) drinks in Sierra Leone, reported variously to be between 80 and more recently 50 million bottles per annum. Consideration should be given to the possibility of substituting a proportion of these soft drinks with sterilised ready to drink orange, and other appropriate fruit juices in 250 ml containers which approximate to the 285 ml bottles of soft drinks.

In the majority of Western countries the consumption of orange juice runs at some 7-12 percent of the soft drinks market. Using this analogy one might therefore expect a potential market of 3.5-6 million units, based on the lowest estimate for soft drink sales in Sierra Leone.

Using a figure of 4 million units of orange juice then the expected sales of other fruit juices might be:

Pineapple	2.3 million units
Guava	1.8 million units
Mango	1.5 million units
Grapefruit	1.0 million units

A strategy for developing the fruit juice market is presented in the following section of this report (2.7).

2.6.4 Market for Jams and Marmalade

The demand for jam in Sierra Leone has fallen recently. Imports during 1980 were only 18 tons however shortage of foreign currency may be a factor in depressing this figure. Nevertheless more than 50 percent of the composition of jam by weight is made up of sugar. The absence of adequately refined sugar in Sierra Leone would necessitate importation with associated foreign exchange problems. Therefore jam and marmalade manufacture by Mabole Fruit Farm cannot be recommended at this stage.

Small scale jam manufacture as a cottage industry could however be encouraged.

2.7 PROPOSED STRATEGY FOR RE-ACTIVATING THE MABOLE FRUIT FACTORY

2.7 PROPOSED STRATEGY FOR RE-ACTIVATING THE MABOLE FRUIT FACTORY

2.7.1 Marketing Policy

The poor market for jams and marmalade, coupled with the difficulties foreseen in obtaining imported refined sugar, render it unwise for MFC to consider their manufacture.

In contrast the market for fruit juices is considered to be sufficient to recommend the reopening of the Mabole Fruit factory. The initial production plan should concentrate on the orange and pineapple drinks, supplemented by guava, grapefruit and other citrus drinks. Other fruit drinks such as mango, pawpaw, and tamarind could be introduced at a later stage after additional processing equipment has been purchased and installed.

2.7.2 Marketing Strategy

It would appear that the MFC has never had a proper marketing strategy and it will be the responsibility of the new management to draw this up and put it into effect.

2.7.2.1 Quality Control

In the past, products of the MFF proved very acceptable to all levels of the community when manufactured following the correct procedure with proper controls and the best raw materials. It will be of the utmost importance for the management of the re-activated factory to attain and maintain high standards of product quality from the outset.

2.7.2.2 Packaging and Distribution

As a major objective will be to compete with soft drinks, it is recommended that a similar volume of fruit juice is offerred for sale. A 250 ml tetrapak briquette is most convenient for this purpose.

Previous studies have identified three market segments, retail (household), hotel and catering, and impulse markets. Ideally, different sized containers should be used for each of these markets, but a uniform container of 250 ml is considered the most suitable compromise for Mabole - at least in the first instance until quality control is fully satisfied, and acceptable products with adequate shelf life are being produced.

We would recommend strongly that there are two distribution points:

(i) Ex factory gate at Mahebo. Drinks can be sold ex-store either at a discount from the Freetown price (see remarks below) or at a fixed price with Freetown paying a premium.

(ii) Ex MFF store in Freetown. We recommend that in the marketing plan, allowance and provision be made for a store cum distribution point in Freetown. This will be manned by a salesman and a storeman/driver.

In addition to the above, it may be that the marketing manager will wish to come to arrangements with organisations that have a countrywide distribution network servicing the main centres of population other than Freetown and the Makeni area. The brewery and soft drink producers should be priorities to contact.

It is important that a proper pricing policy be devised offering incentives eg discounts, for:

(i) Quantity purchases.
(ii) Collection from factory or Freetown store.

2.7.2.3 Advertising

We would recommend that the new owners in their marketing plan develop a nationwide advertising plan through all sections of the media.

2.7.3 Production Strategy

Initially it is recommended that production is geared to manufacture 6,000 litres of juice per day. This quantity will be sufficient to keep the packaging machine running for six hours per day at a filling rate of 4,500 packages per hour. The daily production would therefore be 24,000 250 ml cartons, equivalent to a 90 percent efficiency rate for the packaging machine.

To produce fruit juice in parallel to the needs of the packaging machine the juice extraction equipment will be required to run for varying times, as follows:

orange	-	12 hours
pineapple and grapefruit	-	8 hours
guava, lemon, lime	-	2 hours

It would therefore be necessary to run the juice extraction equipment for an extended shift or 2 x 6 hour shifts to cater for orange juice production at the above packaging rate.

In order to supply 50 percent of the possible potential requirement (market) promulgated in the analogy in Chapter 2.6.3, page 19, a suggested production schedule has been drawn up (Table 2.2).

The management of MFF will need to consider the problems of the range of juice colours extracted from both guava and grapefruit. A decision will be required whether to mix pink and yellow juices to obtain a standard colour, or whether to pack non-mixed juices and market them separately with the juice colour marked on the package. Test marketing of limited samples should be undertaken to test consumer reaction to the various alternatives.

TABLE 2.2

SUGGESTED PRODUCTION SCHEDULE FOR MFF

	Variety					
	Orange	Pineapple	Guava	Grape-fruit	Other Citrus	Total
Cartons (250 ml) (Millions)	2	1.2	0.9	0.5	0.5	5.1
Days production	83.3	50	37.5	21	21	212.8
Weight of Fruit Required (1,000 kg)	1,000	400	64*	164*	*	-

* The availability of these fruits has not been established. It is anticipated, that initially there will be only sufficient grapefruit for 5 days production (120,000 cartons). The above table is based on all fruit juice being packaged in 250 ml cartons, and tabulates the production strategy discussed in Chapter 2.7.3.

2.7.4 Possible Products for the Future

2.7.4.1 Jams, Jellies and Marmalades

As pointed out in Section 2.6 the current market for jams etc appears depressed. However the manufacture of marmalade and jam would offer a use for the local 'sweet oranges' and residues left behind after pineapple juice extraction. Consideration should be given to recommencing the manufacture of jam etc when the market is seen to improve.

The existing open-top steam-jacketed jam boiler with a manually operated paddle stirrer is considered unsuitable for the commercial production of jam. This should be replaced as described in the following section (X Ref).

2.7.4.2 Fruit Squashes

Squash has an advantage over ready-to-drink juices in that it has a long shelf life, (providing the correct preservatives are added), and it can be diluted to suit individual taste.

Whereas the one-litre bottles in stock at the factory could be used as containers for squash, the lack of an established market for the product prevents us from recommending squash as a product during the first phase of MFF's rehabilitation.

In addition a number of pieces of processing equipment will be required before squashes can be produced at MFF.

2.7.4.3 Juice Concentrates

Juice concentration enables a factory to prepare and store fruit juice during the season of fruit availability, for dilution or mixing with other juices during the off-season. With citrus juice a 6 fold concentration is possible with substantial savings in storage space. With pulps from other fruits the pectin and high solids content renders them too viscous to be concentrated more than 2 fold.

The disadvantage with juice concentration is the capital cost of the equipment and the secondary re-processing costs involved for dilute juice manufacture. Although the possibility exists for the exportation of concentrates, the costs of a small scale operation are likely to make it uncompetitive, (especially for citrus) against the highly efficient large scale plants in North and South America, Israel and Spain. (The minimum size for a concentration plant is isually 5 tons/hour for internal consumption, and 10 tons or more when exportation is planned). Therefore juice concentration is not recommended to be incorporated in the first phase of the rehabilitation of MFF.

2.7.4.4 Passion Fruit Juice

Passion fruit has been grown on an experimental scale near Mabole factory and in Kabala.

Although the use of passion fruit juice has increased in recent years, the demand has not yet stabilised and a large scale venture into production of the juice at this stage, without more than one guaranteed outlet, would be very risky.

Moreover, the cultivation of passion fruit not only requires costly staking and wiring to support its growth but also careful husbandry. It is very liable to disease attack. In South America whole areas have been devastated, practically overnight, by attack from black Fusarium mould, especially during periods of high relative humidity.

Processing passion fruit would require an additional special extractor capable of separating the tough skins and seeds from the pulp. Such an extractor would cost an estimated £21,000.

A commitment to passion fruit processing must therefore be taken with great caution.

2.7.4.5 Other Products for the Future

One of the main responsibilities of any management team in a process industry such as Mabole Fruit Factory is to be continuously on the lookout for new products, which will require development and research. This should only occur however when the manufacture of existing products is producing a positive cash flow.

There is plenty of room for the installation of additional equipment in the Mabole Fruit Factory so that additional processing plant, eg a canning line could be considered at a future date if the market conditions are favourable.

We list below a number of products that could be considered by the management team in the future:

(a) Palm wine: This is considered by all Sierra Leoneans to be an extremely palatable beverage; it is, however, best when drunk fresh. If a method can be found to preserve the wine and retain its 'fresh' qualities whilst packaged, then there could be a considerable market for it - particularly in the urban areas where palm wine is difficult to obtain.

(b) Mangoes: There are many varieties in Sierra Leone and research will be required to identify those most suitable for processing and the period of fruit availability.

(c) Ginger beer: A possibility exists for development of this product.

(d) Production of crystallised fruits.

(e) Production of pickles and chutneys.

(f) Canned products: At present 4,000 tons of tomato paste are imported each year in 70 gram tins. The Kabala area appears suitable for tomato growing and when the roads in the area have been upgraded so that transportation of fresh fruit is made easier, a study on the viability of adding the additional processing equipment may be worthwhile undertaking.

2.7.4.6 Economic Use of By-products

To date no account has been taken of recovering the citrus pulp and other fruit waste. In many tropical countries such waste provides a valuable source of cattle feed, and some export is reported to occur.

For each tonne of fruit some 300-650 kg of waste remains and the recovery of this for sale should be seriously considered by management at MFF.

To date no allowance has been made for the recovery and sale of peel oil which could be separated at the rate of approximately 6 litres for every tonne of citrus processed. The plant is too small to make this an economic option, especially for orange oil, for which there is already over capacity world-wide. If the capacity of the plant is doubled, then consideration could be given to the recovery of lemon, and more especially grapefruit, lime and tangerine oils.

2.8 RECOMMENDED IMPROVEMENT AND MODIFICATIONS TO INFRASTRUCTURE AND SERVICES

2.8 RECOMMENDED IMPROVEMENTS AND MODIFICATIONS TO INFRASTRUCTURE AND SERVICES

Improvements to the installations and equipment at the Mabole Fruit Factory will be required before the enterprise can be re-activated. These improvements relate to the physical infrastructure, services and the processing equipment.

2.8.1 Deficiencies in Infrastructure

The following comments relate to the descriptions of the infrastructure presented earlier in this report.

2.8.1.1 Public Road

The public road from the factory to the village of Pamlap, where it joins the excellent tarred road from Makeni to the north must be brought up to a reasonable standard. There are particularly bad patches in the low lying areas, which make it almost impassable during wet season. It is recommended that an urgent request is made to the Ministry of Works to repair the road especially the rough areas on gradients where there are rocky outcrops.

2.8.1.2 Factory Compound

The fence around the factory compound requires repair. A pedestrian gateway should be installed in the fence near the factory entrance to increase surveillance of persons entering/leaving the factory.

The area of hardstanding around the factory has deteriorated badly and urgently requires resurfacing. In addition it is recommended that the area of hardstanding is extended so that it joins the main road.

2.8.1.3 Buildings

The buildings comprising the factory complex and associated staff housing are considered adequate for the needs of any future relaunching. There is sufficient space within the factory building to accommodate all the future possibilities discussed in Section 2.7.

However, there is a need to tile the floor of the factory to bring it in line with acceptable standards, and modifications to improve ventilation are required. In addition, some minor internal modifications to the factory are needed, specifically to the boiler room to provide toilet and changing room facilities.

It is recommended that general repairs and re-painting of the factory and housing complex are carried out before re-opening the MFF.

2.8.1.4 Telecommunications

The lack of these is a very major problem due to the remoteness of the location. The following telephone/radio links are urgently required:

(a) Within the factory/housing area, (telephone).

(b) Between the factory site and Makeni - and then on to Freetown, (radio or telephone).

(c) Mobile radio sets in the vehicles of the fruit collection officers and vehicles.

With regard to (a) an internal telephone system linked to the main offices within the factory and to the houses should be installed.

With regard to (b) we suggest a radio link with the NIADP HQ in Makeni; the IADP in turn have a radio link with Freetown (MAF) and urgent messages can be passed in this way; otherwise there will normally be someone from the Government HQ office in Makeni or one of the Ministries or the IADP travelling to or from Freetown every day.

With regard to (c) it is important that the Commercial Manager, who will be liaising on production requirements with the Factory Manager should be in permanent contact with his fruit buyers/extension officers who are responsible for raw fruit material procurement and transport to the factory.

2.8.1.5 Transport

A major problem in the past has been the lack of transport, therefore careful consideration has been given to estimating adequate transport needs.

The following transport is required to satisfy basic requirements:

Activity	Requirement	Quantity
Fruit collection	Tractor (65 HP)	1
	Tipping Trailer (4.5 ton capacity	2
Fruit collection, produce deliveries and general transport duties	Lorry, 5 ton tipping type	1
	4 wheel drive vehicle	1
Local deliveries and small general transport duties	Pick-up	1
Field supervision	Motorcycles	3
Personal Transport:		
General Manager	Saloon car	1
Factory Manager	Saloon car	1
Commercial Manager	4 wheel drive vehicle	1

No vehicle servicing facilities are available at site and we recommend a servicing bay and unit is installed.

Some of the staff and workers will probably live in Makeni and will therefore require daily transport to site. It is recommended rather than the MFF having its own mini-bus (known as a 'poda-poda' in Sierra Leone) that a contract hire arrangement is made with a mini-bus owner in Makeni.

2.8.2 Deficiencies in Utility Services

During the appraisal of the MFF plant and equipment a number of problems and inadequacies with the utility services were identified.

2.8.2.1 Electrical Supply

Whereas the main generator (150 KVA) is in good working condition, the 50 KVA stand-by generator has never worked satisfactorily. It is therefore recommended that this be replaced. This generator will be mainly used to provide power for the cold room and factory security lighting and lighting and air-conditioning of staff houses during the night or during periods of factory shut-down.

MFC should continue to press for the main power supply from Makeni to be extended. At present this only reaches the main Makeni town water supply pumping station located beside the bridge on the other side of the river from MFF.

2.8.2.2 Steam

The steam generating boiler is adequate even when additional equipment is added to the processing line.

2.9 RECOMMENDED IMPROVEMENTS AND MODIFICATIONS TO PRODUCTION FACILITIES AND PROCESSING EQUIPMENT

2.9 RECOMMENDED IMPROVEMENTS AND MODIFICATIONS TO PRODUCTION FACILITIES AND PROCESSING EQUIPMENT

In order to rehabilitate the fruit factory along the policy lines described earlier, some modifications to the processing line will be required. It is recommended that the factory concentrates on the production of fruit drinks, mainly orange and pineapple. Additional equipment and modifications to existing facilities will be necessary to ensure high quality products capable of competing on par with imported juices are manufactured. A diagram of the recomended modifications is presented as Figure 2.4.

2.9.1 Improvements Required for Fruit Reception

Inadequate provision was made by the designers of MFF for the reception, storage and pre-processing inspection of fruit. In the factory as it stands, fruit is transported into the processing area through roller doors and dumped on the floor.

A properly designed fruit reception area is recommended. This should be 50 sq metres in area and provide fruit weighing facilities and a concrete bin for storage of 6-8 ton batches of fruit.

2.9.2 Improvements to Fruit Washing Facilities

It is considered that the facilities for fruit washing are inadequate and a drum washer with associated mechanical handling equipment, be installed. An alternative might be to pass the fruit through a brush washer for cleaning before passing on to a conveyor/inspection/trimming belt and on into the factory proper.

2.9.3 Improvements to Facilities for Processing Different Fruits

2.9.3.1 Citrus

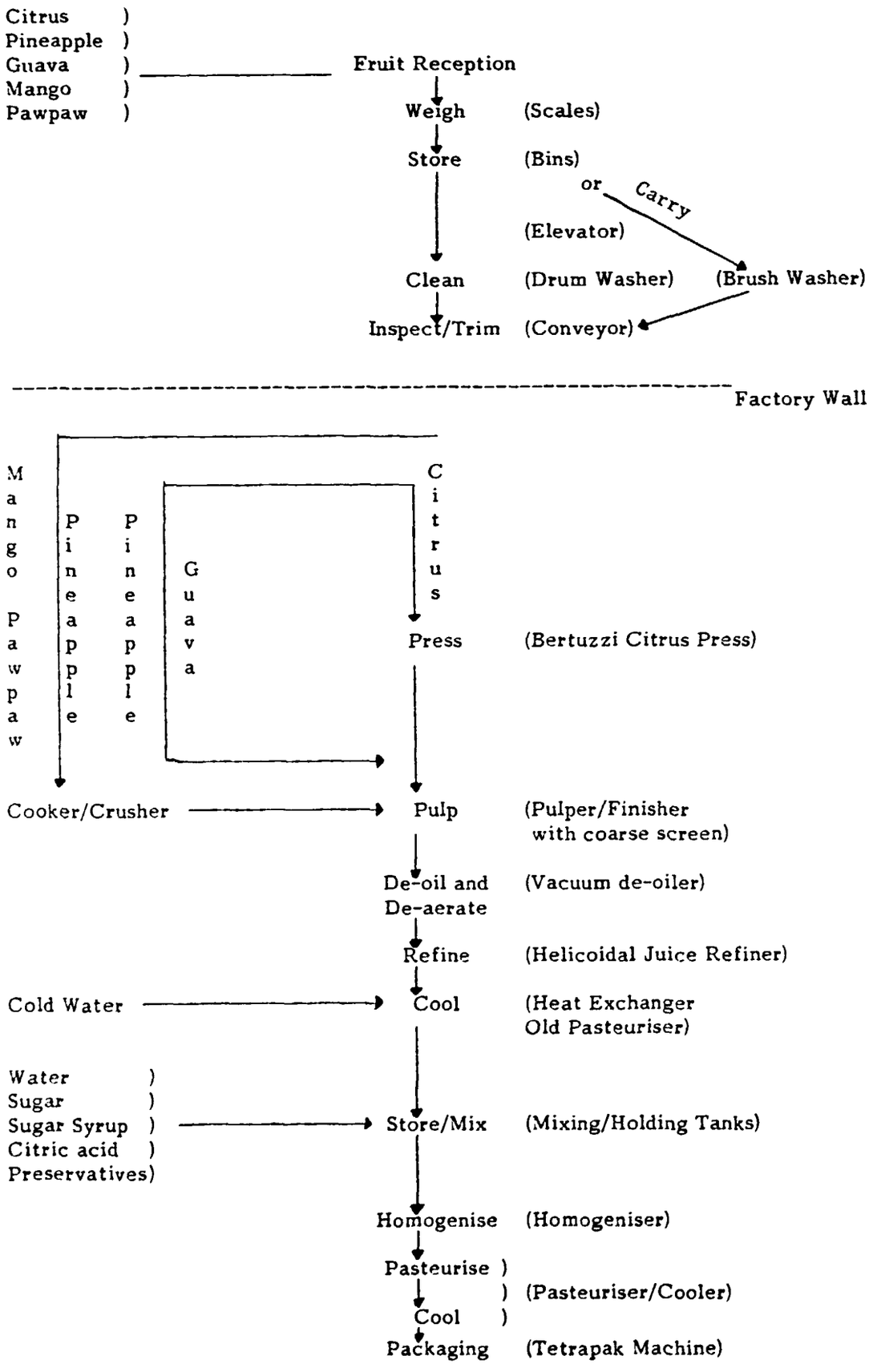
Citrus juice extraction at MFF is effected by a Bertuzzi Citronic press, which can be adjusted to accept pre-graded sizes of fruit from small limes to large grapefruit. The machine slices the fruit into halves and expels the juice by a squeezing action. It is robust, but coarse in its mechanical extraction of the juice, which gives rise to the release of substantial quantities of peel oil (up to 0.4 percent) and albedo (pith) in the resulting juice. No provision has been made at MFF for peel oil removal and this, together with the lack of de-aeration, results in the rapid development of bitter off-flavours from oxidation of the peel-oil terpenes.

Peel-oil can be removed from whole oranges by abrasion and elution in cold water. This method is unsuitable if used in conjunction with the Bertuzzi citrus press as the efficiency of juice extraction is impaired.

An additional process is required to remove peel-oil from the extracted juice by means of a vacuum de-oiler. This process also de-aerates the juice which destroys enzymes (eg pectin esterase) in the juice. The process also reduces oxidative processes such as browning, vitamin C loss and development of off-flavours.

FIGURE 2.4

MODIFIED PROCESSING LINE FOR MABOLE FRUIT FACTORY



2.9.3.2 Pineapples

Using the existing equipment to produce pineapple juice, it is necessary to replace the screen in the fruit pulper before changing from citrus to pineapple juice production. The coarse screen (0.05 or 0.03 in diameter holes) is replaced with a fine screen (0.03 or 0.01 in holes). Therefore, when the juice storage tank is full, the whole primary storage tank is full, the whole primary fruit processing system has to be stopped before screens are changed. Fruit throughput is thereby halved when pineapples are processed due to the reduced throughput caused by the fine screen.

It is recomended that an additional processing stage is required for pineapple juice production so that a better throughput of juice can be maintained. Either a fine mesh finisher or preferably a helicoidal extractor/ finisher could receive pineapple juice processed through the coarse-screen of the existing pulper.

2.9.3.3 Other Fruits

These include mango, guava etc. Many fruits contain polyphenol oxidase which produces an enzymic browning reaction when fruit cells are disrupted. To prevent this, it is essential that the juice or pulp is heat treated as soon as possible after extraction. The preferred method is to use a cooker/crusher which performs the two operations simultaneously.

The Mabole Fruit Factory has not been equipped with this item of equipment and de-activation of enzymes in the juice does not occur until the pasteurisation stage resulting in discoloured juice. It is recommended that a cooker/crusher be installed to enable production of high quality juice.

2.9.4 Improvements to Processing Equipment for Production of Juices in General

Prevention of discolouration and off-flavours by introducing a de-aeration process has been discussed above.

2.9.4.1 Juice Cooler

There is no facility for intermediate cooling of the juice and it is recommended that the existing heat exchanger/pasteuriser (capacity 600 1/hour) be located and modified to perform the intermediate cooling function. Juices should be cooled to 15-20°C before passing into the storage/blending tanks.

2.9.4.2 Mixing/Holding Tanks

The three 1,500 l stainless steel tanks are considered adequate, however one of the tanks should be relocated on the ground to enable its use as a mixing tank. Sugar, sugar syrups, water, citric acid and preservatives can all be added into the juice at this stage of the process.

2.9.4.3 Juice Homogeniser

It is considered necessary to break up agglomerates in the juices to give a more uniform product less liable to separation. A homogeniser should

be included in the juice processing line. Homogenised juice provides for more thorough pasteurisation.

2.9.4.4 Pasteurisation

As detailed in 2.9.4.1 above it is proposed to use the existing pasteuriser as a juice cooler. This would necessitate the installation of a further pasteuriser with a throughput capacity of 1,200 l per hour.

2.9.4.5 Filling and Packaging

Currently there is no surge tank between the pasteurisation and semi-automatic filler, making accurate process control and filling impossible. Previously a semi-automatic hot-filling technique was used. The juice was run into aluminium or plastic laminated pouches which were heat sealed. This was totally unsatisfactory as the pouches are designed for use with automatic precision filling and sealing equipment. The manual filling and heat sealing resulted in creased seals, and pin holes giving rise to high leakage and spoilage rates.

It is proposed that the semi-automatic filler be replaced by a Tetrapak machine capable of filling 4,500 250 ml packs per hour. A discussion on the availability of various packaging materials in Sierra Leone is presented in Appendix 8.

The hot filled/sealed pouches from the semi-automatic filler were cooled by immersion into a trough of ambient running unchlorinated process water. This was unsatisfactory since it gave slow cooling to 30-50°C and was wasteful on water. Product leakage from the pouches would have resulted in bacteriological contamination. All of these problems are overcome by the recommended combination of pre-cooling the juice before it enters the filling machine, and installing a Tetrapak machine.

The 250 ml filled-packs should be collated within outer cartons before despatch or holding in the cold room at MFF.

2.9.5 Improvements to Processing Equipment for Producing Other Products

In Section 2.7.4 it was proposed that MFC should consider the production of a number of fruit-based products as a second stage in the rehabilitation procedure. These will require modifications to the processing equipment.

2.9.5.1 Fruit Squash Manufacture

If a decision to manufacture squash is made the following additional items of equipment will be required:

- fruit quartering/peeling machine;
- peel shredding machine;
- colloid mill;
- pasteuriser (additional).

It is suggested that the equipment should have a capacity of 1,500 litres per hour.

2.9.5.2 Juice Concentrate Manufacture

Additional equipment required to produce juice concentrate will include a 680 kg/hour double-effect evaporator and a reheater so that the pasteurised juice passes through the inlet into the evaporator at the optimum temperature.

2.9.5.3 Jam, Jelly and Marmalade Manufacture

The existing open-top steam-jacketed jam boiler with manually operated wooden paddle stirrer is unsuitable for the commercial production of jam. When the decision to recommence the manufacture of jam is made, this piece of equipment should be replaced by a vacuum jam cooker complete with agitator, vacuum pumps and ancillary equipment. A citrus peel slicer would also be required.

2.9.6 Quality Control

A small quality control laboratory was installed at MFF. It is recommended that new equipment is provided to enable routine tests on raw material, at different stages during processing, and on the final products. The equipment required includes:

- portable pH meters (2);
- water still;
- sugar refrastometers to read 0-25 percent;
- equipment for determination of essential oils*;
- drying oven;
- analytical balance;
- miscellaneous glass ware and chemicals.

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* Locking and Middleton, or Scott Apparatus.

3.0 ORGANISATIONAL AND MANAGEMENT ASPECTS OF MABOLE FRUIT COMPANY

3.0 ORGANISATIONAL AND MANAGEMENT ASPECTS OF MABOLE FRUIT COMPANY

In this section of the report comments are made on the previous operational performance and the proposed changes to overcome some of the deficiencies.

3.1 PAST OPERATIONAL PERFORMANCE

When the MFC was formed a Board of Directors was constituted, composed of a representative of the NDB as financial co-ordinator, and representatives of FMO (Netherlands Finance Company for Developing Countries) and HVA-HAI (the Dutch consultancy company who undertook the feasibility study).

A manager, responsible to this board, was provided by HVA-HAI in accordance with the terms of the management contract between MFC and HVA-HAI.

Almost from the start, difficulties in production began to occur. In the attempt to rectify the serious situation which had arisen so soon after the factory commenced operations, Mr. Otto Ditler Hansen MSc, CE, of the Jydsk Teknologisk Institut (Jutland Technical Institute) undertook a mission from 8th-2nd April 1980 under contract 23.7.79 for the Centre for Industrial Development Brussels. This report concluded:

(i) Production

- It was considered necessary to install additional equipment valued (then) at Le 270,000 to bring production up to standard.
- Trial runs to improve product quality and test new packages were recommended.
- Standard production procedures were recommended, together with efficient quality control and a staff training programme.

(ii) Marketing

- It was recommended that unsold packages of juice be withdrawn from the market because of poor quality.
- Following the introduction of new packages a test-marketing programme was recommended.
- An efficient marketing staff should be developed by recruitment and training.

(iii) Personnel

- It was recommended that inefficient personnel be replaced.

(iv) Finance

- It was recommended that share capital should be written off and all creditors paid.

- New share capital of approximately Le 600,000 should be raised.

- Existing assets should be written down to approximately Le 700,000.

It appears that virtually no action was taken with regard to the recommendations made and the position was becoming so serious that a full Project Evaluation Mission to Mabole Fruit Company was made during October and November 1980. This was undertaken for the Ministry of Foreign Affairs, the Development Co-operation Department, The Hague, Holland. The team was led by Mr. O.D. Hansen who has prepared the earlier preliminary report. He had the dual role of team leader and processing technology specialist. The other members were an agriculturist, a packing technology specialist, a finance specialist - who was in fact the Assistant General Manager of FMO and was their representative on the board of MFC - all from Holland. The fifth team member was a marketing specialist from P.D. Media of Freetown. Four counterparts were supplied by the NDB.

A very full and comprehensive report was prepared and submitted to the Ministry of Foreign Affairs in the Hague on 13th January 1981. We are in agreement with cirtually everything detailed in this comprehensive report, but unfortunately none of the recommendations were taken up. We understand that the main reason was that the shareholders at the time were not prepared to put up any more finance. Additionally to this, a certain amount of apathy was shown by the Sierra Leone shareholder and the local management of the factory, resulting from the proposal that "the way to overcome the problem about the oranges not being suitable for juice production, it shall be necessary during the first years, until suitable fruit is available in the area, to import concentrate"*. We believe that this statement had a very serious effect on the morale of both the Sierra Leone shareholder and the management on-site and destroyed the will to see the plant succeed. It seems that the whole 'raison d'etre' of Mabole Fruit Factory was being demolished and could be considered -and indeed was by some - as an enterprise which it was no longer worth continuing to operate.

An injection of Le 65,000 capital in February 1980 had little effect. The company continued to be short of working capital which affected its long term stability.

Few of the recommendations in the Hansen Report were implemented, and as a result, the FMO and HVA-HAI negotiated a settlement with NDB whereby all their shares in MFC were transferred to NDB for a consideration. This was that NDB would indemnify FMO and NVA-HAI against any claims at that time or in the future, and that NDB would pay all outstanding creditors. As a result NDB made available Le 150,000 to MFC which together with the sale of certain assets (mainly vehicles) and remaining stocks of saleable jams and juices, together with the collection of as many

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* (See page 11, Chapter 1.2 Hansen Report, Key Problems and General Solutions).

debts as possible, made it possible for MFC to pay off most of its creditors. Sufficient funds were left to pay the wages of security and maintenance workers at the factory site. The factory ceased production and was 'moth-balled' until further studies as to its revilalisation could be undertaken.

This was the situation confronting the consultants at the beginning of this assignment.

3.2 RECOMMENDED MANAGEMENT STRUCTURE

3.2 RECOMMENDED MANAGEMENT STRUCTURE

It is not proposed to go into detail criticising the previous management structure as it is proposed that the factory be significant remodelled around juice production as its major activity.

It is necessary to comment on the fact that MFF has always lacked trained manpower, especially in the key positions of food processing technologist and marketing/sales manager. The difficulty in recruiting people with the necessary experience of this type of operation leads us to recommend that one or more expatriates should be recruited for at least the first three years after the re-activation of MFF. In this way the factory will be under the guidance of experienced managers and technologists, who can provide in-service training for Sierra Leonean counterparts who will ultimately assume responsibility for the factory operations.

As the recommendation that expatriates be employed is frequently controversial, this topic was discussed widely during the assignment and almost all agreed to the necessity for some expatriate management and technical skills.

There are however substantial obstacles to the employment of expatriates in Sierra Leone, mostly related to the difficult foreign-exchange situation. These are discussed further in the section discussing financial aspects of the MFC, (Section 4).

After considering the proposed size and operations of the revitalised MFF an organisation chart has been drawn-up and is presented as Figure 3.1.

As the three most senior positions are recommended to be occupied by expatriates a position for an Assistant to the General Manager has been allocated. This will enable the training of a Sierra Leone national to assume the post of General Manager after a two year period.

One of the key management positions upon which depends the future success of the MFF operation is that of the Factory Manager who should be a qualified Food Processing Technologist. The Factory Manager should be experienced in tropical fruit processing, capable of introducing Quality Control procedures for raw materials including the water work in progress, and finished goods, able to write detailed operating instructions and procedures, organise commissioning trials and new and existing product development, have experience of production planning and control and planned maintenance, as well as being able to train quality control and plant operatives.

Duplication of certain positions (see Figure 3.1), provides for two-shift working which will be necessary to attain the target throughputs during the citrus fruit-season (see Section 2.6).

3.3 MANAGEMENT AND PERSONNEL TRAINING

3.3 MANAGEMENT AND PERSONNEL TRAINING

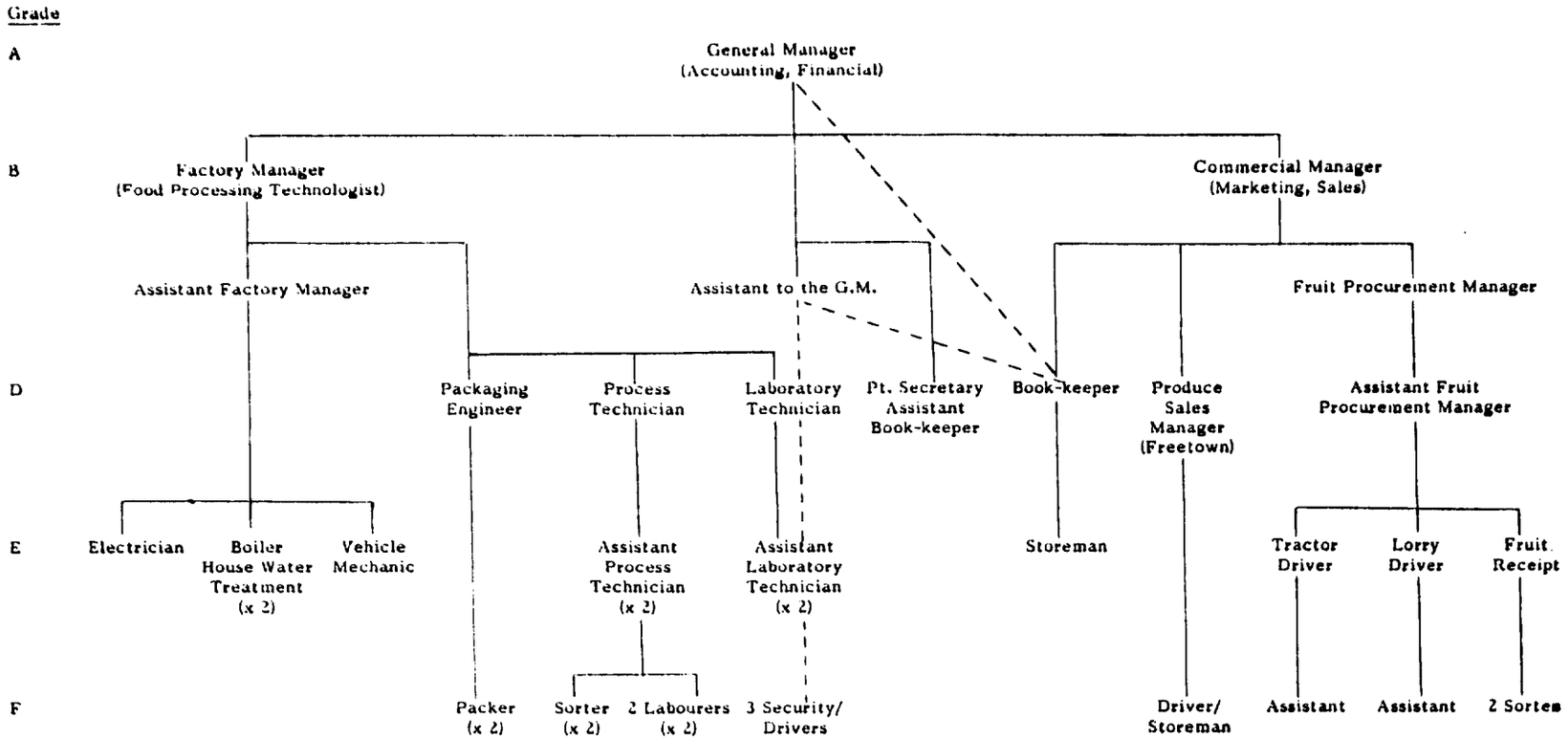
The lack of staff training was identified as a serious drawback of the previous MFF operation and efforts should be directed at overcoming this problem when MFF is re-activated.

In the personnel organisation chart (Figure 3.1), provision has been made for on process technician supported by two assistants. The vitally important aspect of quality control will fall under the responsibility of these technicians (supervised by the Factory Manager). The training of this section of the MFF is considered very important and at least one of these technicians, (preferably the senior), should receive overseas training preferably in a food processing factory in conjunction with an approved course in fruit juice processing technology (or similar).

One of the major roles of the three expatriates will be to train Sierra Leone nationals in readiness to take over their positions, and to impart their knowledge and experience to all staff members at all levels.

FIGURE 3.1

BOARD OF DIRECTORS



Notes

1. Within each grade there will be salary scales to take account of all factors of invididual filling the post.
2. Three expatriate positions: General Manager (2 yrs), Commercial Manager (1 yr), Factory Manager (3 yrs).
3. Position of Assistant to the G.M. is optional.

4.0 FINANCIAL ASPECTS OF MABOLE FRUIT COMPANY

4.0 FINANCIAL ASPECTS OF MABOLE FRUIT COMPANY

This section of the report covers the financial topics included in the terms of reference for the study. The current and historical capital ownership is described and the costs associated with the revitalisation of Mabole Fruit Factory are presented. Following discussions with representatives of the Sierra Leone Government, recommendations are made concerning the future ownership of the factory.

4.1 CAPITAL OWNERSHIP IN MABOLE FRUIT COMPANY

The issue of shares and shareholding in MFC is shown in Table 4.1. The initial share capital in 1979 was 650,000 shares of Le 1 each, distributed among NDB (72.3 percent), FMO (18.5 percent) and HVA-HAI (9.2 percent). A further issue of 65,000 shares of Le 1 were issued in 1980 to NDB, FMO and HVA-HAI on the same proportional basis as the 1979 issue.

The transfer of these 198,000 shares in 1982 resulted in the NDB owning 100 percent of the issued share capital (715,000) of the MFC. In order that the corporate status of MFC was maintained 1 share in MFC was allocated to Mr. E.S. Pearce Managing Director of the NDB.

TABLE 4.1

COMPANY SHAREHOLDING

Authorised Share Capital: 2 million shares of 1 Leone

Number of Shares	Date of Issue	Shareholder
Issues		
2	18.1.78	NDB
(as per audited accounts (31.1.78)		
469,998	17.12.79	NDB
120,000	17.12.79	FMO
60,000	17.12.79	HVA-HAI
Total issued 50,000 as per audited accounts of 31.12.79.		
47,000	21.2.80	NDB
12,000	21.2.80	FMO
6,000	21.2.80	HVA-HAI
Total issued 715,000 as per audited accounts of 31.12.80.		
Transfers		
132,000	22.12.82	from FMO to NDB
60,000	22.12.82	from HVA-HAI to NDB

HVA-HAI and their acquisition by the NDB was Le 150,000. In addition to this FMO/HVA-HAI agreed to write off all amounts due to them from the company, and NDB agreed to take over any and all liabilities that might be still or in the future, outstanding against FMO/HVA-HAI.

4.2 OPERATING ACCOUNTS

4.2 OPERATING ACCOUNTS

The last operating accounts for the MFC Limited were drawn up in December 1981 for the month of November 1981; since then no figures have been available.

The last audited accounts available were prepared by the Company's auditors, now known as Pannell Kerr Forster (wef 1.9.80) for the year ended 31st December 1980. Since then no audited accounts have been prepared. Additionally it has proved extremely difficult to find out the exact position from the NDB as their last published accounts are for the year ended 31st December 1981, and we can only point out that there are considerable weaknesses in this organisation in the matter of appraisal for investment in projects and their control.

The almost total lack of reliable operating accounts renders it impossible for the consultants to make substantiated comments on the past financial performance of MFC.

In discussions with involved parties it was learnt that the organisation has been run with limited working capital. The management never had a chance to develop planned growth, planned maintenance or planned strategy, having been concentrated on the daily survival of the company as a result of being continuously starved of funds and working capital.

Direct operating costs for an enterprise of this size with the establishment and structure proposed are quantifiable; however, any potential purchaser will wish to maintain a flexible negotiating position. A considerable rate of inflation in Sierra Leone will have to be taken into account as well as the very high interest rates required by banks for loan capital. It could be that the Government, who in effect will be making the sale through the NDB, might be able to be flexible on this point. Any investor/buyer will be looking for a reasonable rate of return, and the question of the non-direct costs (in particular interest and capital repayments) is likely to have a far greater bearing on the investment decision than the direct costs.

4.3 LOANS TO MABOLE FRUIT COMPANY

4.3 LOANS TO MABOLE FRUIT COMPANY

The Mabole Fruit Company received a loan from the National Development Bank on 1.6.79. This was made up of US$ 257,933.40 (at the time and then rate of exchange equivalent to Le 267,740.83) from the African Development Bank, loaned specifically to the NDB for the Mabole Fruit Company, and a further Le 22,259.17 from NDB, a total of Le 290,000.

The ADB loan has accumulated interest of US$ 137,348.08 which is to the account of MFC. Due to the devaluation* of the Leone, (currently at Le 2.50 = US$1.00) the loan situation stands currently at:

Principal	Le 644,833.50 (equivalent US$257,933.40)
Interest	Le 343,370.07 (equivalent US$137,348.08)
TOTAL	Le 988,203.57

The smaller NDB loan of Le 22,259.17 has accumulated interest of Le 37,948.54).

From the above it can be seen that the repayment postion, if the NDB was to call in these loans as at 31.3.84, would be as follows:

Principal	644,833.50
	22,259.17
	667,092.67
Interest	343,370.07
	37,948.54
	381,318.61
Total Principal plus interest	Le1,048,411.29

Therefore the Mabole Fruit Company has an outstanding loan, which continues to accrue interest, of over Le 1 million at the time of this report.

* Exchange rates and movements of currencies against the Leone are presented in Appendix 9.

4.4 COST OF RE-EQUIPPING MABOLE FRUIT FACTORY

4.4 COST OF RE-EQUIPPING MABOLE FRUIT FACTORY

A strategy for the revitalisation of the Mabole Fruit Company was presented earlier in this report, together with the modifications required to enable the production of quality fruit juice (Sections 2.7 - 2.9).

The costs associated with implementing these recommendations are discussed in this section.

4.4.1 Cost of Improvements and Repairs to Infrastructure

A discussion of the needs is presented in Section 2.8. The costed list of improvements is shown in Table 4.2.

The prices are only approximate but result from discussions with local agents/suppliers and contractors and include (where applicable) duty and import charges and are the landed prices in Freetown; there would be a reduction of some 33 percent in all the prices except for the civil and construction work if the items listed were to be imported duty free.

4.4.2 Cost of Improvements and Additional Items of Equipment for Processing

The details of recommended modifications to the production equipment at MFF are discussed in Section 2.9. The list of equipment with costs is presented in Table 4.3.

Attention was drawn earlier in the report to the need for a high standard of quality control. The equipment recommended for installation in the quality control laboratory at MFF, together with estimated cost, is presented in Table 4.4.

4.4.3 Cost of Providing Additional Pieces of Processing Equipment for Production of Jams, Squashes, Concentrate etc.

In Section 2.9.5 additional items of processing equipment were identified which would enable MFF to diversify away from fruit juice manufacture in the future. The cost of such equipment is listed below:

Jams, Jellies and Marmalade	
Vacuum jam cooker Citrus peeler	£17,500
Squashes	
Fruit quartering machine Peeling machine Peel shreeder Colloid mill Pasteuriser	£65,000
Juice Concentrate	
Juice reheater Single evaporator	£55,000
Double evaporator (alternative)	£90,000

TABLE 4.2

COSTED LIST OF IMPROVEMENTS TO INFRASTRUCTURE AND SERVICES

Description	Requirements	Cost (Le)
Resurfacing of hardstanding surrounding MFF and linking to public road	1,100 sq. yds. @ Le 30/sq. yd.	33,000.00
Repairs to fencing		3,000.00
Tiling of factory floor		87,000.00
Modifications to ventilation system of factory		5,000.00
Installation of fruit reception bay		5,500.00
Fruit storage bin		19,000.00
Internal modifications to factory (boiler room, toilet and changing room facilities)		5,000.00
General paintwork and repairs to factory and accommodation complex		10,000.00
Transport vehicles:		
Tractor, 65 HP	1	50,375.00
Trailers, 4½ ton	2	13,000.00
Lorry, 5 ton tipper	1	73,010.00
Saloon cars	2	80,000.00
Pick-up	1	22,000.00
4 wheel drive vehicles	2	90,000.00
Motorcycles	3	9,000.00
Maintenance workshop with vehicle inspection pit		25,000.00
Electricity generator (50 kva)		54,649.00
Cooling tower for additional chilled water		10,000.00
TOTAL		594,534.00

4.3 LOANS TO MABOLE FRUIT COMPANY

TABLE 4.3

LIST OF ADDITIONAL PROCESSING EQUIPMENT AND ASSOCIATED COSTS

Description	Cost (£ Sterling)
Fruit washer	3,500
Inspection trimming belt	4,000
Vacuum de-oiler	30,000
Helicoidal juice refiner	19,000
Cooker crusher	19,500
Homogeniser	18,500
Pasteuriser	25,000
Tetrapak machine	60,000
Miscellaneous valves, pipework, fillings etc. for modifications	5,000
TOTAL	£ 184,500

TABLE 4.4

EQUIPMENT RECOMMENDED AND ESTIMATED COSTS

Description	Estimated Cost (£ Sterling)
Portable pH meters (2)	300
Water still	250
Sugar refractometers (2)	150
Equipment for essential oil determination	100
Drying oven	275
Analytical balance	300
Assorted glassware and chemicals	125
TOTAL	1,500

4.4.4 Services Required and Estimated Running Costs of Revitalised MFF

4.4.4.1 Water

Maximum daily water requirement for the processing of oranges into juice is:

Product make up	3,000 litres over 12 hours
Fruit washing)	
Cooling tower make up)	4,900 litres
Washing down)	
Tetrapak machine	3,600 litres over 6 hours
TOTAL	11,500 litres per day

At a cost of Le 1 per 1,000 litres, Le 12 per day has been allocated for costing purposes.

4.4.4.2 Electricity

The electrical rating for the fruit processing equipment amount to approximately 40 Kw, and for the homogeniser, pasteuriser and tetrapak machine 25 Kw. The fruit processing would run for 2 - 12 hours per day according to the nature and supply of fruit and the pasteurising/packing 6 hours per day. Maximum daily usage would therefore be 480 + 150 = 630 Kwh. Maximum load would be 65 KVA, excluding office air conditioning.

The 150 KVA generator will never be called upon for more than 50 percent of its capacity, and much of the time it will be operating at 20 percent of its installed capacity.

Small diesel generators usually produce 3 - 3.5 Kwh/litre of fuel under normal load. In this instance, allowing for the light load, a figure of 2.2 Kwh/litre is taken. At a current diesel price of Le 1.1/litre fuel costs would be Le 2/Kwh, or a maximum of Le 1,500 per day. (Excluding the cost for lighting and air conditioning of the offices and staff quarters).

4.4.4.3 Steam

The boiler has an output capacity of 1,650 kg steam per hour. The maximum daily steam usage would be:

100 kg for 12 hours for processing	1,200
130 kg for 6 hours for pasteurising	780
TOTAL	1,980 kg

The introduction of the cooker/pulper would increase the steam usage by 300 kg/hour for an estimated 2 hours/day. Therefore a steam requirement of 2,600 kg per day is estimated. In terms of fuel this is equivalent to 150 litres of oil per day valued at Le 165 per day:

Total maximum services cost per day	Le 1,722
(ie for 24,000 cartons equivalent to	Le 0.07/carton)

4.4.4.4 Compressed Air

The tetrapak machine would require an estimated 26m³ of compressed air per hour at 6-9 bar.

4.4.5 Estimates of Raw Material Requirements and Costs for Fruit Juice Production

Table 4.5 presents the estimated requirements and associated costs of revitalising the MFF. Details of fruit requirements are shown in Table 4.6.

TABLE 4.6

FRUIT REQUIREMENTS

(Fruit required per day (1,000 kg) for 6 hour filling and packaging run (6,000 L), assuming fruit processing section has a capacity 1,000 kg* fruit per hour).

Oranges	Grapefruit	Lemon/Lime	Pineapple	Guava	Mango
12	7.8	1.7	8	1.7	1.7

* The estimated current capacity of 1,000 kg per hour has been taken, but this may be increased to 1,500-2,000 kg, with good quality fruit supplies and efficient plant operation.

4.4.6 Problems Relating to MFC's Need to Employ Expatriates

Earlier in this report it was emphasised that experienced management with the technical experience of fruit juice manufacturer would be crucial to the successful revitalisation of the MFC. There is a lack of these skills in Sierra Leone and it is generally agreed that expatriates would be needed to launch the operations of MFF and, as important, to train Sierra Leone nationals to assume the responsibility for managing the enterprise after 2 - 3 years.

One of the major constraints on employing expatriates, or being in a position to employ them in Sierra Leone, is the exchange control laws with regard to overseas remittances, and the high level of taxation in the higher income brackets. Our overall recommendation, with which the NDB and Government both agree, is that the MFF should be sold (at least the majority of the equity) to private shareholders or to a company within the private sector, and it is here that the problem of being in a position to employ expatriate staff will arise. Unless the purchasing company has considerable hard currency earnings outside Sierra Leone, or is part of a group with access to outside funds, no local company would be able to adequate the calibre of expatriates, which we recommend.

A personal remittance quota to a maximum of US$ 6,500 per annum is allowed. In addition application may be made in respect of mortgages, life insurance and education (school fees), but with the extremely tight foreign currency position in Sierra Leone the amounts allowed and possibly granted for the latter will probably be of a fairly minimal amount.

To enable remittance of the $6,500 allowance and any other discretionary amounts granted, these have to come out of net income it would mean extremely high salaries, having to be paid in Leones which MFF certainly in the early years of its rehabilitation would be unable to afford.

It is therefore necessary to look for other sources and methods for financing the employment of expatriates. No aid agency will be prepared or allowed to do this if the Company is 100 percent within the private sector and it is therefore important that the NDB maintains at least a minority holding so that the Company can benefit in this way.

TABLE 4.5

QUANTITIES OF FRUIT REQUIRED AND RAW MATERIAL COSTS TO PREPARE

1,000 L FRUIT DRINK PER HOUR (4,000 x 250 ml CARTONS)

	Oranges	Le	Grapefruit	Le	Lemon/ Lime	Le	Pineapple	Le	Guava	Le	Mango	Le
Fruit Required kg	2,000		1,300		278		1,333		286		278	
Estimated Yield (%)1/	36		36		36		60		70		40	
Price per Tonne (Le)	150		120		180		450		300		600	
Fruit Cost		300		156		50		600		85.5		166.8
Litres Juice/Pulp	720		467		100		800		200		111	
Sugar (kg)2/	34		64		108		24		96		107	
Cost at Le 1,400/tonne		47.6		89.6		151.2		33.6		134.4		149.8
Water Requirement L (at Le 1/1,000L)	260	0.3	496	0.5	837	0.8	186	0.2	744	0.7	826	0.8
Preservatives $Na_2S_2O_5$ 0.1 kg at Le 10/kg3/		1.0		1.0		1.0		1.0		1.0		1.0
Citric Acid 0.2% in the added water, cost Le 6/kg2/		0.5		1.0		1.7		0.4		1.5		1.7
Per 1,000 L (4,000 Cartons)		349.4		248.1		204.7		635.2		223.4		320.1
Packaging Cartons		60		60		60		60		60		60
Outer Cartons		25		25		25		25		25		25
TOTAL		434.4		331.1		289.7		720.2		308.4		405.1
Cost per Carton		0.109		0.083		0.072		0.180		0.077		0.101
Allow 5% processing and filling losses. Net Cost		0.114		0.087		0.076		0.189		0.081		0.106

1/ The estimated yields of juice are based on previous production runs and may be improved by up to 20 percent by the installation of the new equipment and better management practices.

2/ The quantities of sugar and citric acid are approximate and vary according to the analysis of the extracted juice/pulp, and local requirements.

3/ Sodium metabisulphite is recommended as the preservative, in place of the potassium sorbate used previously, as this reduces the vitamin C loss, prevents browning, as well as acting as a preservative. The proposed level (equivalent to 70 ppm in the finished pack) is permitted universally, whereas potassium sorbate is not permitted in fruit drinks in many W. African countries, UK, France and USA.

4.5 COMMERCIAL FUTURE OF MABOLE FRUIT COMPANY

After exhaustive and lengthy meetings with the officers of the NDB and representatives of various Government ministries, it was made abundantly clear to us that no further funding for the rehabilitation of the MFC would be forthcoming from the NDB or Government sources.

Indeed, the policy of the Sierra Leone Government and the NDB, where it has majority shareholdings, is to privatise the operations. The NDB clearly stated that they wished to sell off a majority shareholding in the Mabole Fruit Company.

The consultants feel therefore that their brief is to show the current position with regard to the operations of the MFF and give guidelines as to the possibilities ahead. It will be the responsibility of the NDB to commence negotiations with interested parties, who might consider investing in and/or purchasing a majority holding in the business. We understand that there are a number of organisations and individuals who could be interested in this, and we trust that this report gives the basis for such negotiations, and will enable prospective purchasers to assess the potential of the Mabole Fruit Company.

It must be remembered that at the end of the day the value of an operation such as Mabole Fruit Factory is only that which a purchaser is prepared to pay. There are no operating figures and costs to work on, and any purchaser can therefore only really work on his estimate of the cost of rehabilitating the factory and putting it in working order to produce products of an acceptable quality.

Additionally these investors will wish to see a return on their money, and if the price is too high or will only produce a return less than they might receive by investing elsewhere, then they will only offer a price probably substantially below what the NDB would be seeking in order to cover their investment, loans and interest outstanding. (See Chapter 4, Table 4.1, page 34 and paragraph 4.3, page 42).

APPENDICES

APPENDIX 1

TERMS OF REFERENCE FOR

INDUSTRIAL DIAGNOSTIC AND MANAGEMENT SERVICES

FOR FRUIT PROCESSING INDUSTRY - SIERRA LEONE

APPENDIX 1

TERMS OF REFERENCE FOR INDUSTRIAL DIAGNOSTIC AND MANAGEMENT SERVICES FOR FRUIT PROCESSING INDUSTRY - SIERRA LEONE

1. BACKGROUND

Late 1982, the Government of Sierra Leone requested the United Nations Industrial Development Organisation (UNIDO) through the United Nations Development Programme (UNDP) to provide technical assistance to the Mabole Fruit Factory (MFF) located in the Mabole region of Sierra Leone.

Sierra Leone has about 3 million of hectares of fruit, cultivable land of which only 20 percent are cultivated at present. Soil and climate of the country lend themselves to the cultivation of a variety of fruits. In the Mabole region, existing farms are producing a great variety of fruits which can be made available for processing at MFF.

Fruit	Annual Production (MT)
Oranges	350
Pineapples	300
Mango	100
Grapefruit	50
Lime	20
Tamarind	10

The quality of oranges has recently been improved by the introduction of better varieties.

The National Development Bank of Sierra Leone established MFF several years ago and holds a 72 percent share in equity while the Dutch Government and a Management Firm (HVA) co-operated.

So far, MFF experienced continuous problems for producing jams and jellies of acceptable quality. The installed equipment in MFF may not be ideally suitable for processing of the fruits grown in the Mabole area. MFF is now operating on a care and maintenance basis. The failure of MFF to purchase and process the fruits grown in the Mabole area has created a crisis in the confidence of the farmers who largely depend on the revenue from the sale of their fruit crop.

Since 1983, Sierra Leone has obtained the status of a Least Developed Country. This status may entitle Sierra Leone to receive financing for rehabilitation of the MFF from the United Nations Capital Development Fund (UNCDF).

2. OBJECTIVES

The MFF will be analysed and rehabilitated for the successful and profitable processing and marketing of food products. Analysis and recommendations will cover three main areas:

(i) organisation;
(ii) management;
(iii) technique/technology.

3. SCOPE

The sub-contractor will analyse and comment on all areas within and around MFF and prepare recommendations for a profitable operation. The areas may include but should not necessarily be limited to: MFF ownership, management systems and practices, procurement and marketing, production organisation and technology, (re-)investment, financial and cost-accounting, financial forecasts.

The information provided by the sub-contractor should be sufficient for an analysis through a financing institution such as UNCDF.

4. ANALYSIS, COMMENTS AND RECOMMENDATIONS

The sub-contractor's activities will cover the following main subjects:

A. MFF capital-ownership

B. MFF past operational performance

C. MFF management systems and practices

D. Present and possible future raw material base for MFF

E. MFF production facilities/capacity, organisation and technology

F. MFF production programme

G. MFF (re-)investment

H. MFF financial and cost-accounting

I. MFF financial projections.

There are obvious close inter-relations between several of the above subjects, (such as raw material base-production programme or marketing-production programme-(re-)investment. Despite these inter-relations, the above subjects should be described separately.

A. MFF Capital Ownership

Past and present ownership of MFF as well as requirements for continued supply of fruits and/or availability of marketing facilities may require the participation of new owners and/or the takeover of MFF by new owners.

B. MFF Past Operational Performance

The kind and date of information will already indicate the quality of part of the management systems and practices. A further part of the analysis will cover the identification of the principle reasons for disappointing performance.

C. MFF Management Systems and Practices

Under this chapter the motivation of management and of employees by management, the remuneration levels, the internal management information systems, the caliber of middle-management etc, are the main issues.

D. Present and Possible Future Raw Material Base for MFF

Quantity, quality, timely availability and pricing (cost) of tropical fruits in the Mabole region will have to be analysed. Several owners of tropical fruit farms in the Mabole area should be visited and possibilities should be found to improve the MFF procurement situation. Auxiliary inputs (energy, packaging material, sugar etc) should also be considered.

E. MFF Production Facilities, Capacity, Organisation, Technology

Production equipment should be inspected to find out details about the state maintenance, technology, capacity, lay-out, etc. In case of necessity for improving material flow, increasing or rehabilitating the production capacity through (re-)investment, the concepts should be outlined. The introduction of possibly labour-intensive, improved production technology will be considered.

F. MFF Production Programme

The production programme may comprise principal products like jams, jellies, juices, concentrates, as well as by-products like animal feed prepared from orange peel or other uses of waste.

G. MFF (Re-)Investment

The inspection of the production facilities could lead to a phased (re-)investment programme whose cost in local and/or foreign currency should be determined. Towards the end of the sub-contractor's field activities, government assurance should be obtained about the availability of local currency funds if such funds would be required for MFF rehabilitation including working capital.

H. MFF Financial and Cost Accounting

After analysis of the existing, operational systems, proposals should be made for improving the systems. These proposals should include the design of forms - if required.

I. MFF Financial Projections

Summarising all finds and recommendations, a realistic financial projection should be elaborated for the next seven to eight years, ie, for about five operation years after completion of the phsyical plant rehabilitation/expansion. The projections should include proforma income statements, cash-flows and balance sheets.

5. OUTPUT OF THE SUB-CONTRACT

The main output of this project will be a detailed report with recommendations of pre-conditions and action required for the rehabilitation and the successful, profitable future operation of MFF.

In addition, on-the-spot advice is expected from the sub-contractor to the MFF personnel and to other personnel whenever appropriate and/or requested.

6. INPUTS TO THE PROJECT

MFF, NDB and the Ministry of Trade and Industry will be the counterpart organisations for this assignment.

The total input of the sub-contractor will be in the order of six man-months of which about five and one-half m/m in the field. The total duration of the project will be about four to five months.

The sub-contractor's team leader should have experience in management and industrial engineering as well as in general agro-industrial plant operation. One additional short-term expert in production and processing of tropical fruit will complement the team leader's experience after thorough preparation by the team leader in the field.

7. EXECUTION OF THE WORK

Subsequent to the briefing of the team leader in Vienna by UNIDO, the team leader will proceed to Sierra Leone for initial fact-finding and preparation of the visit of the short-term expert in tropical fruit production and processing. The date of arrival of the short-term expert as well as the overall project work plan will be determined by the team leader.

The team leader will prepare a draft terminal report for discussions with the UNIDO back-stopping officer during the debriefing in Vienna at UNIDO Headquarters. The draft terminal report may be commented by UNIDO immediately during the discussions with the responsible back-stopping officer or in writing not later than two weeks after the debriefing visit of the team leader. The draft terminal report will then be finalised and will be submitted to UNIDO Headquarter as terminal report in 30 copies not later than four weeks after the team leader's debriefing.

8. PRIOR OBLIGATIONS AND PRE-REQUISITES

The working language will be English. The Government of Sierra Leone shall avail all maps, documents, statistics and other related information

required for the project in this language. The Government will provide local (road) transport, secretarial services and suitably equipped office facilities for drafting/typing and/or copying documents.

The sub-contract for this assignment will be signed between the sub-contractor and UNIDO as Executing Agency, which is also responsible for the international tendering of this task. All questions related to the implementation of this project have to be submitted to UNIDO and changes have finally to be agreed between UNIDO and the sub-contractor.

APPENDIX 2

CONSULTANTS' PROGRAMME

APPENDIX 2

CONSULTANTS' PROGRAMME

1984

January 23rd - 24th	Team Leader in Vienna for briefing by and discussions with UNIDO personnel.
February 3rd	Team Leader arrives in Sierra Leone.
February 13th - 15th	Brief investigatory and reconnaissance visit to Mabole Fruit Factory and the Makeni area by the Team Leader.
February 24th - 27th	Visit to Kenema and EIADP area.
February 27th - March 19th	Food Processing Technologist in Sierra Leone.
March 5th - March 9th	Up-country visit to Mabole Fruit Factory and farmers in Makeni and Kabala areas; visit to Magbass Sugar Factory; discussions with personnel from NIADP, MAF and other local interested parties.
March 14th - 22nd	Minster Agriculture's Project Director in Sierra Leone.
March 23rd - 27th	Team leader briefly in Liberia; possible to make non-detailed assessment of potential market for MFF products.
April 4th and 5th	Visit to Njala University Faculty of Agriculture and Herbariaum and further brief visit to Mabole Fruit Factory and Makeni.
April 11th	General discussion meeting with all interested parties in boardroom of NDB, Freetown.
April 13th	Team Leader departed for UK.
April/May	Report Preparation.

N.B. Except where indicated above, the team was based in Freetown; numerous visits were made to Government departments, banks, local businessmen and many other organisations as can be seen from Appendix 3.

APPENDIX 3

LIST OF ALL THOSE MET AND WITH WHOM DISCUSSIONS HELD

APPENDIX 3

LIST OF ALL THOSE MET AND

WITH WHOM DISCUSSIONS HELD

The range of people whom we met and with whom we held "on" and "off the record" discussions came from all stratas of Sierra Leone society. This enabled us to obtain a really broad view of all facets of the fruit growing and fruit processing industries and the markets for their products.

The list for ease of reference has been put into alphabetical order.

We would like to thank all for their full and frankly expressed views which have helped us in our task, and if anyone has been omitted we would apologise.

Mr. S.E. Aboke-Cole	-	MAF - Gberia Fatombu
Mr. Ahmed Aker Ahmed	-	Senior Industrial Officer - Planning - MTI
Mr. S. Ali	-	UNIDO - Senior Industrial Engineer MTI
Mr. M.B. Alpha	-	Chief Agricultural Officer (Ag)
Mr. P. Bailey	-	Credit and Extension Officer NWIADP
Mr. S. Baird	-	Resident Partner Parnell Kerr Forster
Mr. James Bangura	-	Deputy Permanent Secretary Ministry of Finance
Mr. S. Bangura	-	Project Manager NWIADP
Mr. B. Basma	-	Sierra Leone Sugar Marketing Co Ltd
Mr. K.E. Benjamin	-	Government Chief Statistician
Mr. M.J. Blell	-	Managing Director Building Engineering & Construction Limited (Beacon)
E.W. Bolle Jones	-	FAO Representative
Mr. Franz Braun	-	General Manager - Freetown Cold Storage Co Ltd (Carbonated Drinks Bottles)
Mr. Brian Brewer	-	Land Planning Officer - EIADP
Hon Abbas Bundu	-	Minister of Agriculture
Ms M. Chinnery Hesse	-	UNDP - Head of Mission
Mr. J.A. Clarkson	-	Deputy Director (Ag.) Meteorological Department
Mr. Reynold A. Cole	-	Assistant Director of Finance NDB
Mr. S. Conteh	-	Dep PM Magbass Sugar Project
Mr. Santos Conteh	-	Operations Director NDB
Mr. C. Cooper	-	UK High Commission
Mr. J. Cowper	-	Livestock Officer NIADP
Dr. H.T. Dahniya	-	Head of Botany Njala University
Hon. Dr. Danya	-	Minister of the Interior
Mr. Eugene Davies	-	Permanent Secretary MTI
Mr. M. Dean	-	Freetown Office Manager NWIADP
Mr. R. De Crousaz	-	Finance Manager - Freetown Cold Storage Co Ltd (Carbonated Drink Bottles)
Mr. G.P. Denny	-	General Manager S.L. Brewery Ltd

Mr. P. Desmond	-	Workshop Manager MAF
Dr. L.F. Elliott	-	UNDP - formerly Assistant General Manager - MFF
Mr. Alistair Farquharson	-	Tree Crop Agronomist EIADP
Mr. A.A. Fofona	-	NDB representative based in Makeni
Mr. R.S. Freeman	-	Senior Assistant Secretary Northern Region Makeni
Dr. Joseph George	-	Senior Lecturer Chartora
Mr. Osmond L.A. Gordon	-	Director Land & Water Development Division MAF
Mr. J.L. Gordijn	-	Project Manager NIADP
Mrs. S. Green	-	Deputy Permanent Secretary MTI
Mr. P.E. Greenrod	-	General Manager Barclays Bank of Sierra Leone
Mr. V. Goxhale	-	Maintenance Engineer, Chamrai Chemide
Mr. J. Hamelberg	-	Irrigation Engineer Land & Water Development Division MAF
Mr. Ian Hancock	-	Chief Agronomist NIADP
Mr. Sahid Hugruge	-	Citrus Farmer South of Makeni
Mr. Lennox Hutchinson	-	UNDP Administrative Officer
Mr. M. Jalloh	-	Agronomist Land & Water Development Division MAF
Ms. Jette A. Jensen	-	UNDP
Mrs. Jibatti	-	Major farmer in Kabala District
Mr. Raymond A.B. Johnson	-	Senior Development & Planning Officer, Ministry of D & Econ Planning
Mr. D.Q.B. Kamara	-	Assistant to 1st Vice President
Professor J. Kamara	-	Principal Njala University
Dr. Raymond Kamara	-	PM - Koinadugu IADP
Mrs. S.S. Kamara	-	Foreign Exchange Department Bank of Sierra Leone
Mr. S.S. Kamara	-	MTI on secondment from Ministry of Planning and Economic Development
Mr. M.L. Kargbo	-	National Authorising Office, Office of the President
Mr. J.A.M. King	-	Principal Industrial Development Officer MTI
Mr. I. Kirk	-	EEC Delegation, Freetown
Mr. S. Koroma	-	Engineer NIADP - formerly with MFF
Mr. E. Koopmans	-	Head of Mission EEC
Mr. Foday Kargbo	-	Principal Agricultural Officer MAF - Kenema
Mr. Pierre Kupelian	-	Raymond Garage
Mr. Ahmed Labi	-	Divisional Manager, National Motors Limited (L/Rover Agents)
Mr. Songa Lamin	-	Agro-climatologist Land & Water Development Division MAF
Mr. P. Long	-	Agricultural Engineer NWIADP
Mr. J.S. McFoy	-	Administrative Officer - Koinadugu IADP
Mr. S.O. Macarthy	-	Personal Assistant to the Directors - Bank of Sierra Leone
Mr. D. Maclure	-	Project Co-ordinator MAF

Mr. A. Maling	-	FAO Fishery Consultant
Hon. B.S. Massaquoi	-	Resident Minister for Eastern Region
Mr. S. Moir	-	Resident Partner Pannell Kerr Forster
Dr. A.D. Monteiro	-	UNIDO - Chief Technical Adviser MTI
Mr. John A.G. Morris	-	Independent Chartered Surveyor
Mr. Ahmed Nasser	-	Head of Lebanese Community Kenema
Mr. H.M. Nelson Okarfur	-	Admin Officer NDB (see MFF)
Mr. Patel	-	Sierra Leone Sugar Marketing Co Ltd
Mr. G. Papazian	-	Managing Director Commercial Enterprises Limited (Massey Ferguson Agent)
Mr. E.S. Pearce	-	Managing Director NDB
Mr. S. Perry	-	Chief of Police Kenema
Mr. M.J. Pieh	-	District Officer, Kambia
Mr. M. Pooley	-	ODA - Bull ploughing Project
Mr. J. Pratt	-	Climatologist Meteorological Department
Mr. David Rayburn	-	EEC Fisheries Project
Mr. Z.A. Richards	-	General Manager Palm Kernel Oil Mill (SLPMB)
Mr. Rogers	-	Assistant District Officer Kabala
Mr. R. Schroeder	-	EEC Delegation, Freetown
Dr. N. Singh	-	Professor of Botanical Sciences Fourah Bay College
Mr. G. Sjostrom	-	Regional Agro-Industries Office FAO Accra, Ghana.
Mr. J. Sode	-	Resident EEC Agricultural Officer
Mr. M. So-Kagbo	-	Dep PM - Koinaduju IADP
Mr. A. Sprake	-	UK High Commission
Mrs. O. Taylor	-	Legal Adviser NDB
Mr. Thulla	-	Senior Assistant Secretary Northern Region Makeni
Mr. M.A. Tunis	-	Small Scale Industries Officer - MTI
Mr. K. Turay	-	General Manager NAPCO
Mr. L. Turey	-	National Authorising Office, Office of the President
Mr. Turey	-	Deputy Project Manager NIADP
Mr. Wolf Ventzki	-	Industrial Engineer - MRU
Mr. Falla Walan	-	Planning Officer MTI
Dr. Harry Will	-	Project Manager EIADP
Mr. John Williams	-	Director and General Manager Blackwood Hodge
Miss Hawa Wurie	-	Agronomist Land & Water Development Division MAF

APPENDIX 4

TECHNICAL DETAILS OF SERVICES PLANT AND EQUIPMENT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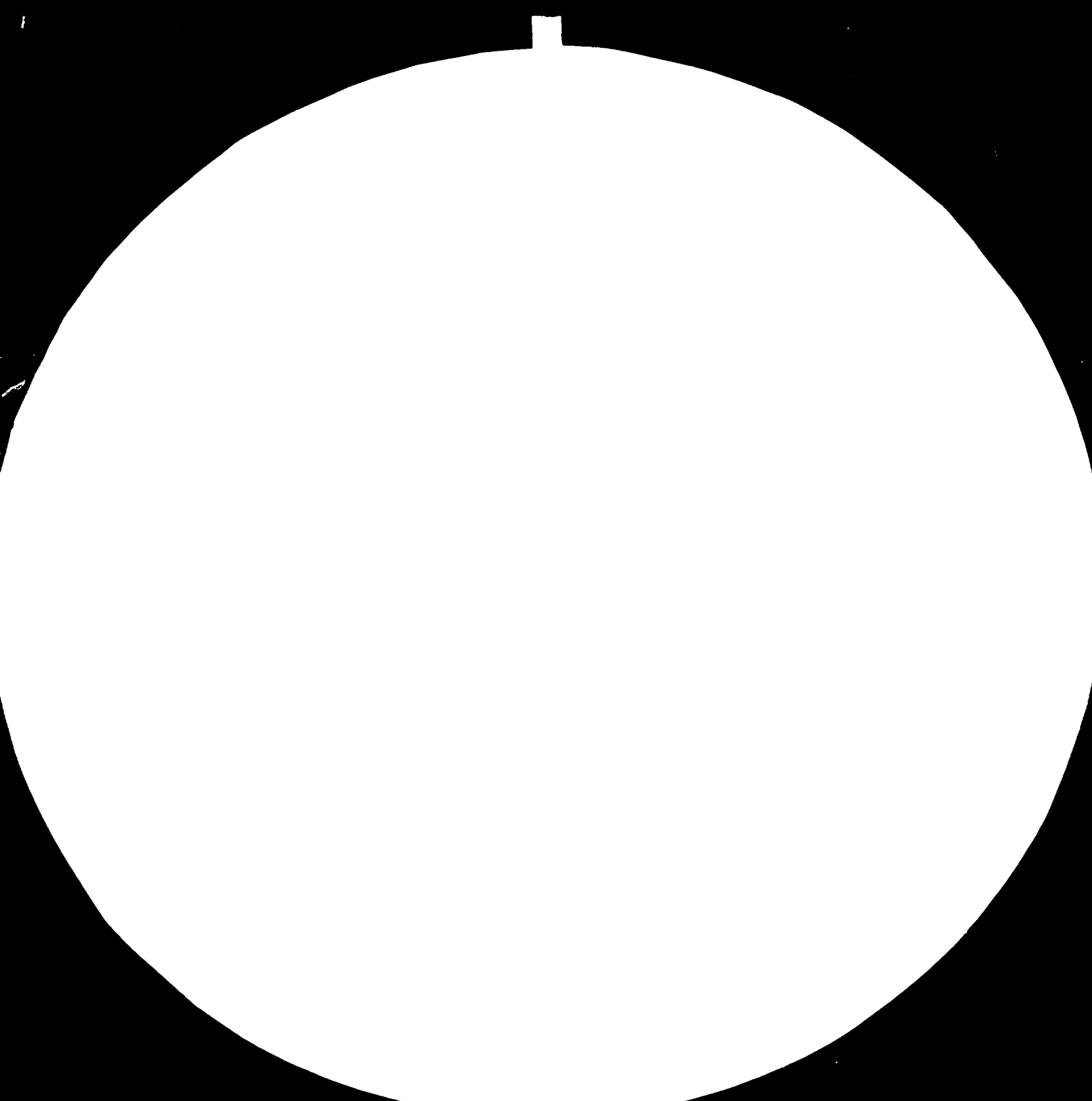
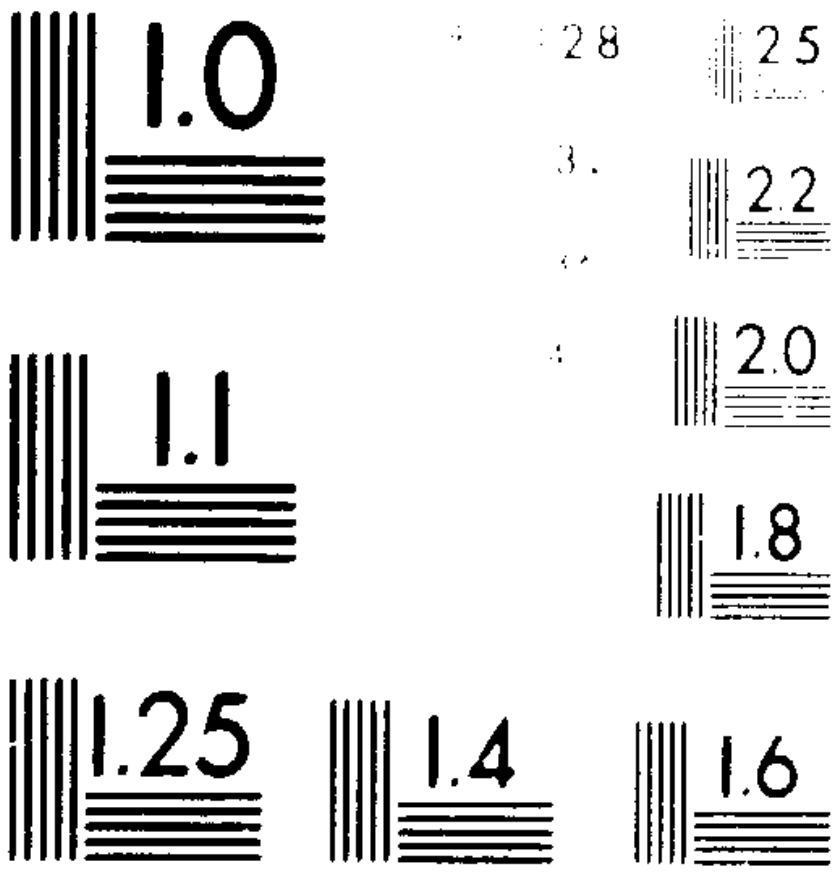




APPENDIX 4

TECHNICAL DETAILS OF SERVICES PLANT AND EQUIPMENT

DIESEL POWERED ELECTRICITY GENERATING SETS

GENERATOR NO. 1

Manufacturer:	Ewart Technien
Alternator:	Made to BS3 2613
Serial Number:	D2256
Type:	C434A
Voltage:	380/220
KVA:	150
Rotor Insulation Class:	F
Stator Insulation Class:	E
Output Current:	227A
Exciter:	38V
Frequency:	50 HZ
Rating:	Continuous
Current:	1.15A
Ambient Temperature:	40°C
Prime Mover:	Diesel
Seroa; Mi,ner:	78523
KVA Output:	150
Speed:	1,500 RPM
Power Factor:	0.6

GENERATOR NO. 2

Manufacturer:	Zwart Technien
Alternator:	Wa Ukesha Genuine Parts
	Engine to BSS 2613
Serial Number:	40187/1
Type:	090

Voltage:	380/220
KVA Output:	50
Rotor Insulation Class:	F
Stator Insulation Class:	D
Output Current:	75.9A
Exciter:	25V
Frequency:	50 HZ
Rating:	Continuous
Current:	0.89A
Ambient Temperature:	40°C
Prime Mover:	Diesel
Serial Number:	78598
KVA Output:	50
Speed:	1,500 RPM

SWITCHGEAR AND CONTROL PANEL

Both generators are provided with a switchgear and automatic control panel and fully equipped instrument panel comprising of:

Ammeter 3 No.	0-500A
Frequency Meter 1 No.	47-53 HZ
Voltmeter 1 No.	0-500V
Operation Meter 1 No.	Digital Type
Lamp Indicator 2 No.	'Mains on'
	'Generator on'
Control Switch 1 No.	3-way
Synchronising Switch 1 No.	Generator 1 and 2
	Mains
Ammeter Switch 1 No.	Rotary Type
Oil Pressure Meter 1 No.	
Engine Temperature Meter 1 No.	

DISTRIBUTION BOARD

Power house distribution board: Consists of two 250 ampere air circuit breakers with out-feeds to the factory and office and one 25 ampere isolator switch connecting up to a 4-way consumer control that provides supply for the power house and water treatment plant located in the plant room.

Factory shop floor distribution board: Consists of one 250A incoming Klocknen Moeller air circuit breaker, three phase four by 250 ampere bus-bar chamber, three 63 ampere air circuit breakers with out-feeds to water purification, wasting pressing station and staff quarters. Also provided are two three phase 40 and 20 ampere consumer control units, one automatic security lighting switch and a 63 ampere air circuit breaker with out-feed to water treatment control panel.

WATER TREATMENT PLANT

The treatment plant comprises the following:

Two raw water intake pumps

A sectionalised water tank that provides for raw water settlement, chemical dosing and potable water storage

Two 11 m^3/hour pressure sand filters

Two calcium hypochorite and two aluminium sulphate dosing PVC units fitted with stirrers each with a drive motor - Adam Boamoll Gmbh Marktredwitz/Bayern Type DBF/56a - 4 S1288 3.3 kw 220/380 V.

Two hydro-foil pumps:	Vonic Serial No. 162709 8.15/4.7A, 200/380 V 2,820 RPM
Backwash Pump:	Serial No. 2788719 Class E 9A 1,430 RPM
Two Booser Pumps:	Serial No. 27755 22 kw 220/380 V Class E 2,660 RPM
Air Scour Pump:	Serial No. 277555 09036 49 4 kw 6.8/11.7A Class D 1,440 RPM

STEAM GENERATION PLANT:

SMD (B.V. Ducosto), Leeuwarden, Holland

Capacity:	1,650 kg st/hour
Pressure:	8 bar
Model:	1978 Serial 1978 T.I.

Burner:	Weishampl Monarch
Type:	DK 2 - 23ph, 2.6 kw, 2,800 L/Min 220/380V, Serial No. 1556706
Boiler Feed Water Tank:	SMD B.V.
Boiler Water Chemical Softener Unit:	Benckiser Wasserentharter

COLD STORE EQUIPMENT:

Copelamatic (Wall Unit)

Compressor Model:	9RC1/1010/TMD 200 P/M, 3 HP, 1,460 RPM Serial No. 78B, 19163 RL/ 21.1/21.1 LR/ 104/104
Evaporator:	Two motors by Kramer

APPENDIX 5

TECHNICAL DETAILS OF PROCESSING EQUIPMENT

FOR JUICE/JAM MANUFACTURE

APPENDIX 5

TECHNICAL DETAILS OF PROCESSING EQUIPMENT

FOR JUICE/JAM MANUFACTURE

JUICE PROCESSING	SPECIFICATIONS
Press:	Fimet Torino, Italy
Type:	R3dx, MUT90L4
Drive:	2 HP Motor, Serial No. G636 12 50 Hz, 380/220V, 3.5/2A
Pulper Refiner:	
Positive Pump:	MEZ Mohelnice Czechoslovakia 1.1 Kw Motor, Serial No. 61636, 50 Hz, 380/220 V, E 231459090 - 3/801
2 Mixing Tanks and 2 Stirrers:	
Drive:	Tarnado Bijweco Spuistratz, Amsterdam, Dietz Motor Kig 4.5/5.5 kw Motors, Serial No. 1323/4.2, 50 Hz, 380/220 V
Waste Screw Conveyor/Pulveriser:	
Drive:	Dragt 'H' Dieking 2.57A Motor, Serial No. 2572145
Horizontal Conveyor:	
Drive:	Victor Annd RGODT 711D/114 0.37 Kw, Serial No. 29617 - 2, 50 Hz, 380/220 V.
Elevator:	Lunzen Barneveld, Holland
Drive:	Van dar Groof B.V., Bollenroue, Holland
Type:	DA905415T, Serial No. 14480/1.5/1.1 Kw Motor, 380/220 V, 50 Hz
Conveyor:	Machinefabrek En Consiructie Werkplaats Lunzen Barneveld, Holland
Pasteuriser/Flasher:	Schmidty, Sigma 16, Model 1978, 600L/L, 25°C bis, 90°C

Controls:	Negretti Temperature Meter 0-120°C range Pressure Control Switch Indicator Recorder
Flasher:	
Drive:	Ritz 5 m^3/h, 2,800 n/min
Type:	3102/0.75/2
Citrus Tray:	
Drive:	Victor Anndrijvings techniex, Rotterdam R40-VUC D7K6, Serial No. 98/36300, 0.15 Kw, 380/220 V, 50 Hz
Fruit Grader:	Hermes
JAM PROCESSING	
Jam Cooker:	
Positive Pump:	MEZ Mohelnice Czechoslovakia
Type:	Serial No. 9135382, 1.1 Kw/1.5 P.S., 380/220 V, 50 Hz
Jam Filling Machine:	Simplex
Drive:	Reliance, Duty Master AC Motor
Type:	CS/FR-P48/1 ph, Serial No. CUOE 310 48-XB 0.25 hp, 115/230 V, 50 Hz
Temperature Alarms:	Vonks
Scale:	Servo Balans
Type:	65LN100CLA Max: 100 kg e.d. 100 kg Serial No. 9024, A°1978
Scale:	Servo Balans
Type:	65LN1100 CLA Max: 250 kg e.d.250 g

APPENDIX 6

QUESTIONNAIRE

INTEGRATED AGRICULTURAL DEVELOPMENT PROJECT

NORTHERN AREA

MONITORING AND EVALUATION SECTION

APPENDIX 6

QUESTIONNAIRE

INTEGRATED AGRICULTURAL DEVELOPMENT PROJECT

NORTHERN AREA

MONITORING AND EVALUATION SECTION

Plantation No: .....

1. Name of Enumerator: .....

2. Name of Supervisor: .....

3. Area: ..... 6. Chiefdom: .....

5. Village: ..... 7. Owner's Name: .....

7. Owner's Principal Occupation: .....

8. How many orchard/plantation do you operate? .....

9. What type of orchard/plantation(s) are they? .....

Plantation	Type	
1.	Mixed	Pure Stand
2.	Mixed	Pure Stand
3.	Mixed	Pure Stand
4.	Mixed	Pure Stand

10. What number and type of trees do you have in your plantation(s)? .....

No	Tree Crop		Number	Number/Type			
				Local	Number	Improved	Number
1.*	Citrus			Local		Improved	
2.	Mango			Local		Improved	
3.	Guava			Local		Improved	
4.	Cashew			Local		Improved	
5.	Oil Palm			Local		Improved	
6.	Coffee			Local		Improved	
7.	Cocoa			Local		Improved	
8.	Coconut			Local		Improved	
9.	Banana			Local		Improved	
10.	Others	a.		Local		Improved	
11.		b.		Local		Improved	
12.		c.		Local		Improved	

* This will be broken down into other citrus - Lemon, tangerine, tangelo, grapefruit, lime etc.

11. Do you live on or near this orchard/plantation?

Yes No

12. How far? .....(metres)

13. What is the area of your orchard/plantation: .....(sq. m)

14. What is the spacing between individual trees? .....(metre/feet)
(Enumerators should visit field and measure spacing)

15. From what source did you get your seedlings?

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....
8. .....

16. What is the distance of your orchard/plantation from any permanent source of water? .....

17. What year did you plant your orchard/plantation? .....

No	Crop	1st	2nd	3rd	4th	5th
1						
2						
3						
4						
5						
6						
7						
8						

18. Have you encountered any labour shortage problem since you started your orchard/plantation?

Yes No

If yes how and when

.....

.....

.....

19. Did you encounter any other problem such as:

a) Disease
b) Pest
c) Draught Stress in dry season
d) Water logging in the rainy season
e) Fire Hazard
f) Others (specify) .....

.....

.....

.....

20. How often have you had a fire disaster? .....

21. Do you have a fire belt around your plantation: Yes No

If No

22. Have you ever thought of putting a fire break around your plantation?

Yes No

If No why: .....

.....

.....

23. Have you had any yield from your orchard/plantation?

Yes No

Crop	Remarks
.....	.....
.....	.....
.....	.....
.....	.....

If yes, what has been the yield per tree per annum?

No	Tree Crop	Wt/Bag	Local Measure
1.			
2.			
3.			
4.			

Specify No. of bags/bushels or three pence pans you received from trees. If tree was sold whole probe for estimation of cost of tree, cost of bag and number of bags/tree and number of trees.

24. What production techniques have you used in the past and presently?

Method	
Fertiliser	Yes/No
Mulching	Yes/No
Brushing	Yes/No
Pruning	Yes/No
Irrigation	Yes/No
Collaring	Yes/No

Other Specify a) .....

b) .....

c) .....

REMARKS:

.....

.....

.....

.....

.....

.....

.....

APPENDIX 7

CLIMATOLOGICAL INFORMATION

APPENDIX 7

CLIMATOLOGICAL INFORMATION

A major constraint to any feasibility study in any field in Sierra Leone is the very great difficulty in being able to obtain meaningful and up to date statistics - and we would suggest that this is certainly a contributory reason as to why potential investors/financiers and joint venture partners are loathe to come forward without having available to them certain basic statistics on which to form a judgement or take a view.

Normally with weather/climate statistics there is not a great variation over the years and we therefore feel able to quote hereunder certain meteorological statistics which can be considered meaninfgul and will show in particular the rainy and dry seasons, which obviously have a considerable effect on the fruit production calendar (see Appendix 7).

TABLE A7.01

MEAN MONTHLY AND MEAN YEARLY RAINFALL VALUES (IN INCHES), 1980-1982

Location	Month J	F	M	A	M	J	J	A	S	O	N	D	Year
Freetown	0.22	0.30	0.50	1.89	6.84	12.97	29.38	31.45	21.06	10.84	3.69	0.99	120.13
Makeni	0.21	0.38	0.72	3.66	8.87	16.21	20.88	29.12	22.69	16.43	8.20	1.11	128.48
Kabala	0.21	0.29	1.23	4.01	8.00	11.53	12.25	14.31	14.93	12.98	3.37	4.56	87.69

Source: Compiled from data provided by Meteorological Department, Freetown.

TABLE A7.02

MEAN MONTHLY AND MEAN YEARLY MINIMUM TEMPERATURES °F, 1980-1982

Location	Month J	F	M	A	M	J	J	A	S	O	N	D	Year
Freetown	75.60	75.80	76.50	77.30	76.40	75.10	73.80	73.50	73.70	74.30	75.90	76.10	75.33
Makeni	57.44	65.80	60.47	63.23	62.67	65.47	58.26	55.27	48.87	45.01	48.57	55.49	57.25
Kabala	61.90	64.20	68.90	71.10	70.40	70.80	68.50	67.40	68.90	67.40	64.10	61.70	67.09

Source: Compiled from data provided by Meteorological Department, Freetown.

TABLE A7.03

MEAN MONTHLY AND MEAN YEARLY MAXIMUM TEMPERATURES °F, 1980-1982

Location	Month J	F	M	A	M	J	J	A	S	O	N	D	Year
Freetown	85.80	86.20	87.10	87.10	87.10	86.30	83.50	82.10	83.00	85.90	85.90	86.30	85.48
Makeni	83.30	81.70	74.34	73.79	75.63	77.43	66.23	62.26	63.22	72.72	69.30	67.31	72.26
Kabala	90.10	92.30	95.40	92.00	87.50	84.30	82.20	79.80	83.70	84.60	88.20	89.10	87.43

Source: Compiled from data provided by Meteorological Department, Freetown.

APPENDIX 8

ALTERNATIVE PACKAGING FOR MABOLE FRUIT FACTORY PRODUCTS

APPENDIX 8

ALTERNATIVE PACKAGING FOR MABOLE FRUIT FACTORY PRODUCTS

Very few packaging containers are manufactured in Sierra Leone. Almost all containers, including bottles, jars, cans and their closures, caps etc. are imported. The value of imports of this type amounted to over Le 2 million per year during 1979-81.

LOCALLY AVAILABLE PACKAGING MATERIALS

Two plastic bag manufacturers operate in Freetown, and one further operation manufactures outer cartons from imported board. These materials could be used by MFF as outer containers for fruit juice packages, but offer no opportunities as primary packaging. A mineral-water bottling company manufactures its own blow-moulded PVC bottles but these are considered unsuitable for fruit drinks due to the inadequate barrier properties of PVC.

It will therefore be necessary to import all the primary packaging materials for the Mabole Fruit Factory.

TYPE OF PACKAGING MOST SUITED TO MFF'S PRODUCTS

As Sierra Leone is a tropical country, the general demand is for cold drinks. Bottled soft drinks are normally cooled by vendors in small kerosene-fuelled refrigerators. It would be advantageous if the MFF fruit juices were packaged in such a way that they could be stored and sold alongside cold bottled soft drink (with which they will compete).

Four different packaging materials have been considered for use by MFF. These are discussed individually.

GLASS BOTTLES

For a small-scale operation such as MFF, returnable glass bottles are not considered viable as a packaging for fruit juice. Quite apart from the logistical problems associated with the collection of used bottles, expensive bottle washing, handling and storage facilities are required.

Non returnable bottles are not recommended because of their cost (£40-50 per 1,000) and the logistic problems of obtaining regular imported supplies and storing sufficient quantity of bottles to ensure that bottling operations are not held up by shortage of containers.

PLASTIC BOTTLES

Plastics such as PVC, high and low density polythene and polystyrene are unsatisfactory for MFF's use. The barrier properties of these plastics are inadequate, permitting the ingress of oxygen into the product with resulting flavour loss.

The only plastic material considered suitable for fruit drinks is PET (polyethylene terephthalate). This is currently used in sizes of one litre or

larger for carbonated drinks as at these sizes it is cheaper to use than glass. PET's non breakable qualities favour its use in the United States and the United Kingdom in the manufacture of 250 ml bottles for children's drinks.

Although the technology exists to ship half-formed PET bottles, thereby reducing the bulk and shipping costs, the price of 250 ml bottles (£60-80 per 1,000) is considered prohibitive for a small operation such as MFF. An additional drawback to the use of PET bottles is the reduced shelf-life of the fruit juice (six months, in a tropical environment).

Plastic and glass bottles suffer from the disadvantages that they require secondary closures and labels, (unless they are printed), and should be tinted to prevent discolouration and loss of vitamin C from the contents, due to the effect of UV light. Plastic bottles do not have the necessary rigidity to withstand the partial vacuum developed from hot filling techniques employed for pasteurised products.

CANS

Cans are used extensively for fruit juices and drinks. They can be used in conjunction with hot filling techniques which are not appropriate with plastic bottles (which soften when filled with hot juice).

The use of ready made cans at Mabole cannot be recommended as they cost £60-70 per 1,000 (170 ml size) and unless printed and lacquered are prone to rusting in the humid tropics.

A can making line, costing at a minimum £1-1.5 million, is clearly not feasible for the small MFF operation. Reformed cans cannot be recommended as the protective lacquer is frequently damaged during the reforming process and rapid corrosion at the point of damage results in metallic taints and swollen cans due to released hydrogen.

CARTONS

The use of aseptically-filled laminated cartons has a number of advantages:

(a) Cheaper than any of the above alternatives at £14-20 per 1,000, for a minimum order of 500,000.

(b) Made up from the reel in the factory. Storage and transportation of the material is therefore cheaper.

(c) Contents have a long shelf life, usually up to 6 months, which can be extended to 9-12 months with the use of suitable preservatives, in ambient conditions. Even after the optimum shelf life, the contents do not go bad, merely discolour and develop slight taints.

(d) Do not break, rust or corrode.

(e) Do not require closures.

(f) Can be pre-printed and do not require labels.

(g) Are opaque, thus preventing the contents from being affected adversely by ultra-violet light.

It is therefore recommended that the Mabole Fruit Factory installs a juice filler which employs this type of carton of the Tetrapak design. Although the initial capital outlay of £60,000 for the lease is high, annual payments of £1 per 2,000 units (depending on throughput) are reasonable. A filler of this type can cope with 3,600 - 7,200 units per hour.

The more recent Tetrabrik machine, which forms rectangular packages, could be installed at a later date, when Mabole was operating profitably. Current cost is £120,000 for machine running at 4,500 packages/hour. During the first five years, a trade in allowance could be negotiated for the Tetrapak machine.

APPENDIX 9

EXCHANGE RATE AND CURRENCY MOVEMENTS

AGAINST THE LEONE

APPENDIX 9

EXCHANGE RATE AND CURRENCY MOVEMENTS

AGAINST THE LEONE

Date	£ Sterling	US$	Dutch Guilder
30.6.76	0.5	0.89	2.4335
30.6.77	0.5	0.8665	2.1345
30.6.78	0.5	0.9285	2.0715
30.6.79	0.437695	0.94433	1.91225
30.6.80	0.410325	0.967335	1.85658
30.6.81	0.432020	0.89310	2.230325
30.6.82	0.460835	0.796210	2.178285
From 17.12.82 to 30.6.83 two rates operated as und ::			
Date	£ Sterling	US$	Dutch Guilder
Official Market Rate	0.512030	0.781105	2.226705
Commercial Rate	0.261170	0.398415	1.135765
6.7.83	0.260700	0.398415	1.145909
18.1.84	0.278655	0.398415	1.23312

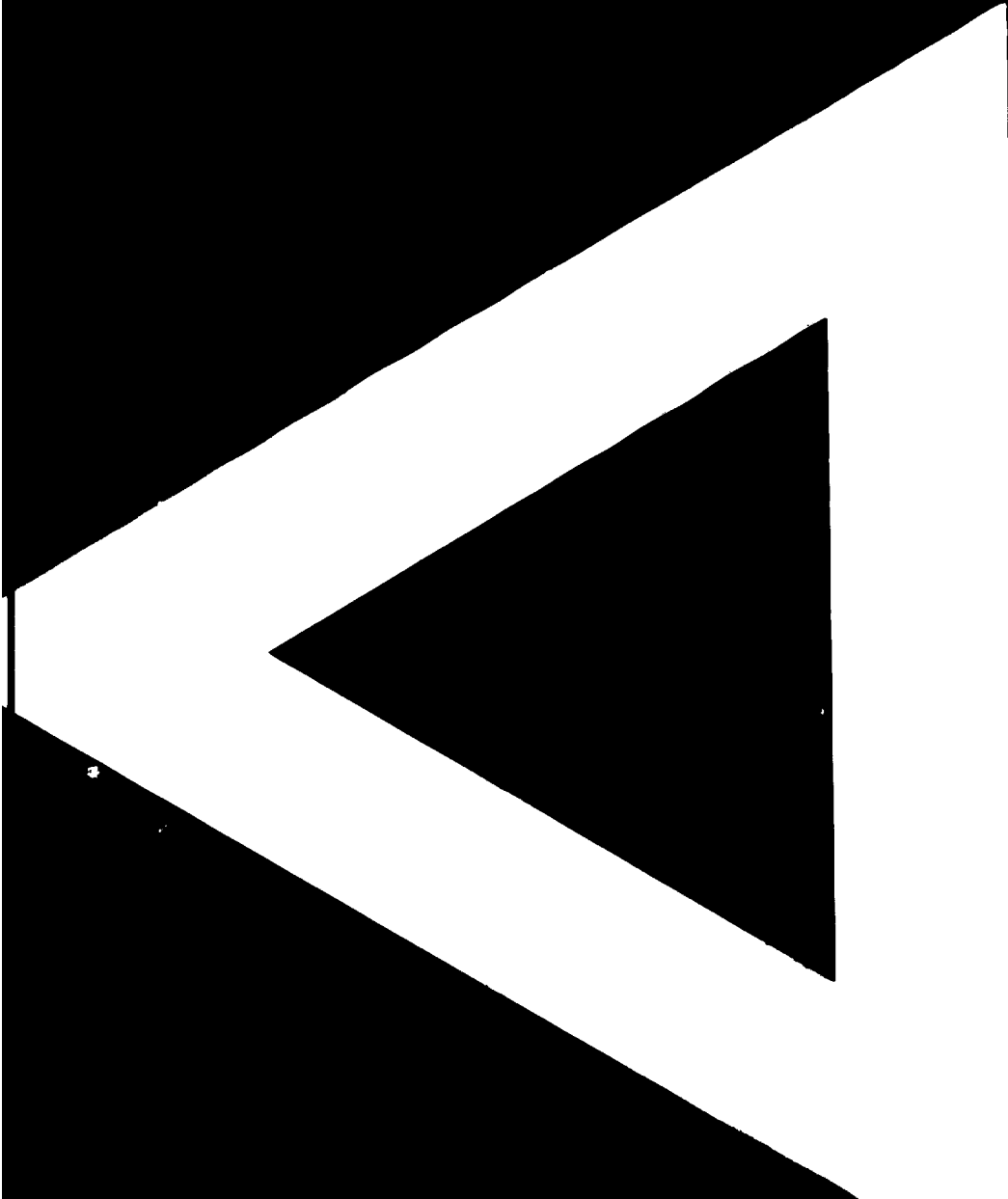
Notes

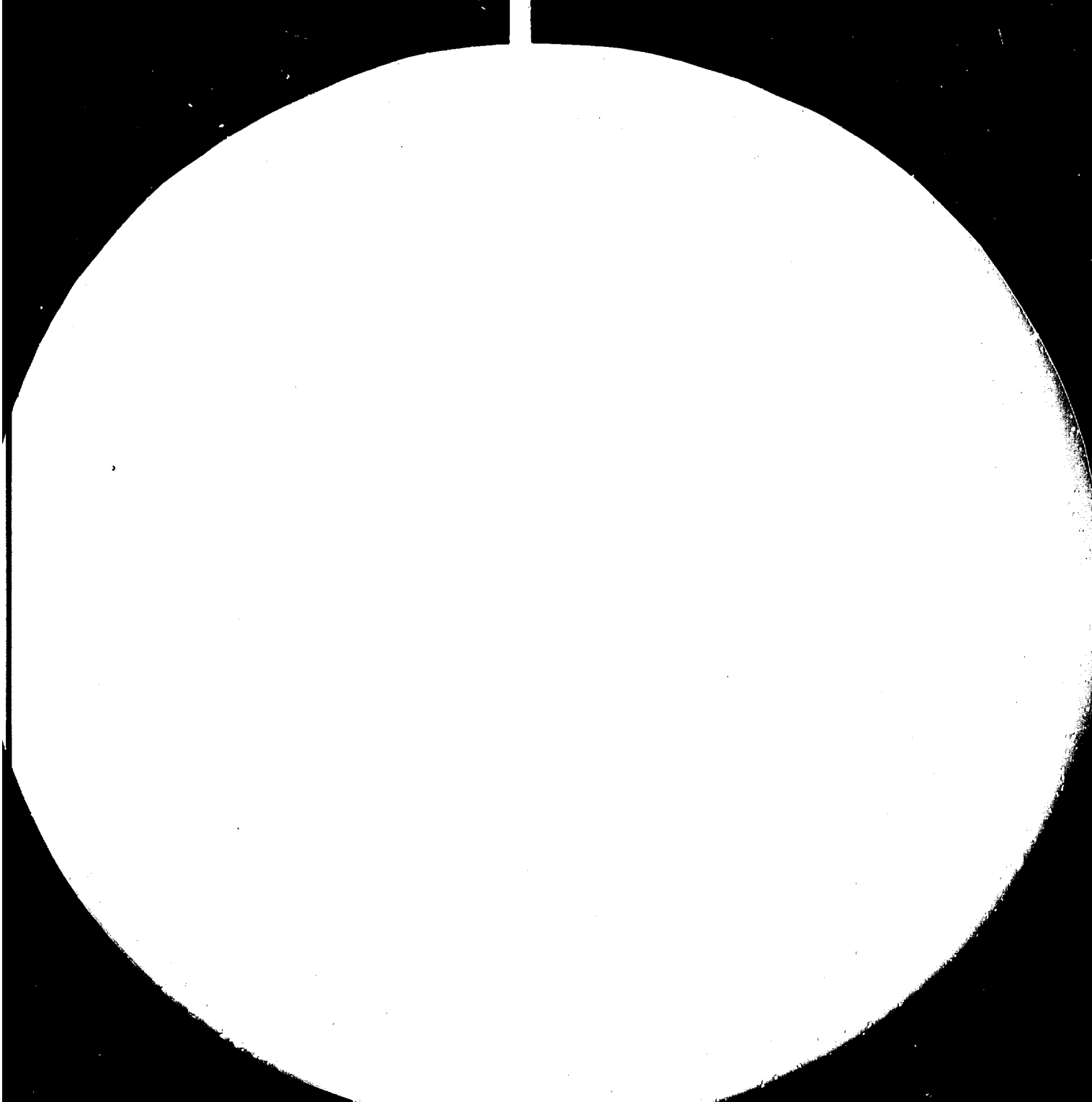
1. In November 1978 an approximate 5 percent devaluation took place, when the Leone moved from being fixed against sterling and floated against the SDR (Special Drawing Rate) set by the IMF based on a 'basket' of currencies.

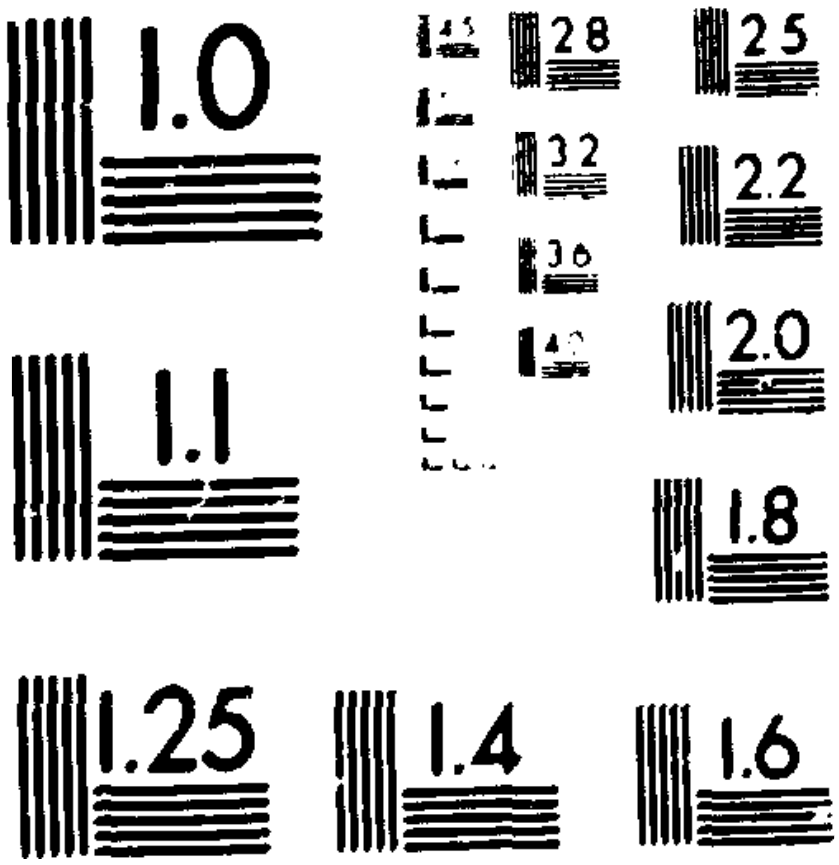
2. When the 2-tier system was abandoned with effect from 1.7.83, a foreign exchange arrangement and adjustment was made - effectively a 50 percent devaluation.

3. Since 1.7.83 the Leone has been fixed against the US Dollar at 0.398415.

The above figures obtained from the Bank of Sierra Leone (Foreign Exchange Department - Mrs. S.S. Kamara) and Mr. S.O. Macarthy, Personal Assistant to the Director of the Bank.







UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION

THE GOVERNMENT OF THE REPUBLIC OF SIERRA LEONE

INDUSTRIAL, DIAGNOSTIC AND MANAGEMENT SERVICES FOR FRUIT PROCESSING INDUSTRY - SIERRA LEONE (Project No. SI/SIL/83/801)

FINAL REPORT
Contract 83/96/hq
Amendment No 1

14035 (2 of 2)

MABOLE FRUIT COMPANY LIMITED

MINSTER
AGRICULTURE
LIMITED

55

SL.032
5.86

INDUSTRIAL, DIAGNOSTIC AND MANAGEMENT SERVICES FOR FRUIT PROCESSING INDUSTRY SIERRA LEONE

(Project No. SI/SIL/83/801)
Contract No. 83/96

FINAL
ADDENDUM TO FINAL REPORT

Prepared by:

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CONTENTS

ABBREVIATIONS AND ASSUMPTIONS USED

ABBREVIATIONS AND ASSUMPTIONS USED

Throughout the report a number of abbreviations, and assumptions on such matters as exchange rates, have been used. These are as follows:

ABBREVIATIONS

ADB	African Development Bank
CFTC	Commonwealth Finance and Technical Cooperation
CID	Centre for Industrial Development, Brussels
FMO	Netherlands Finance Company for Developing Countries
GSL	Government of Sierra Leone
HVA-HAI	Holland Agro Industries
JTI	Jutland Technological Institute (Hansen report)
KIADP	Koinadugu Integrated Agricultural Development Programme
MAF	Ministry of Agriculture and Forests
MFC	Mabole Fruit Company
MFF	Mabole Fruit Factory
MRU	Mano River Union
NDB	National Development Bank
NIADP	Northern Integrated Agricultural Development Project, Makeni
PEMSU	Project Evaluation and Monitoring Service Unit
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organisation

EXCHANGE RATES

US$ 1 = Leones 13.75
(The reason for this figure being used is discussed in the Report).

0.0 SUMMARY

0.0 SUMMARY

0.1 This report presents the financial evaluation of the MFF. It is an addendum to, and should be read in conjunction with, findings and recommendations made in the main report (Project No. SI/SIL/83.801).

0.2 The analysis has been conducted on the basis that MFF remains under NDB ownership, but that a new company is formed for the rehabilitation thereby becoming eligible for exemption from taxation and import duties under the Development of Industries Act 1983.

0.3 The terms of reference do not require recommendations on financing the rehabilitation, therefore the evaluation assumes investment is financed solely through equity.

0.4 Currency movements and inflation have made it necessary to up-date all costings presented in the main report. For the same reasons it has been decided to present the financial evaluation in US dollars. Two scenarios have been run with regards to exchange rates - one at the unofficial rate of US $ = Le 13.75 (Option 1) and another at the official window of US $ = Le 6 (Option 3).

0.5 The recommended production strategy involves a 6 month pre-production period building-up to full capacity at an output of 5.1 million cartons by year 3 of operations.

0.6 Considerable detail must be given to the pricing policy adopted by the MFF for output to compete effectively with imported juices in the domestic market and to penetrate potential export markets.

0.7 The importance of export markets cannot be over-emphasised if the project is to finance its annual foreign exchange operating requirements. Local inputs are comprised chiefly of fruit and labour, but sugar and packaging materials must be imported and place significant demand on scarce foreign exchange resources.

0.8 Project capital investment costs total US $820,000 largely falling in the initial 6 month pre-production period, requiring some US $630,000 in foreign exchange.

0.9 Operating expenditure totals some US $3.2 million over the 10 year period. Annual recurrent expenditure stabilises in year 6 of project operations totalling US $0.3 million with a foreign exchange requirement of US $0.1 million. It is assumed that company taxation only becomes payable in year 6. A second scenario has been run on the assumption that foreign technical assistance costs are reduced by half (Option 2).

0.10 Pricing policy is central to the project's success. The evaluation has been conducted at a price of Le 2 (US $0.15) per pack which, assuming total production is absorbed by domestic and overseas markets, produces project returns totalling some US $7 million over the 10 year period. MFF should aim to export 25 percent of production in order to generate US $200,000 annually to meet the foreign exchange requirements on inputs. Option 3 presents returns assuming an exchange rate of US $ = Le 6, therefore a selling price of US $0.34 per carton.

0.11 The project achieves a rate of return of 31.15 percent and a net present value of £1,060.22 at a discount factor of 12 percent. Pay-back occurs in the fifth year of project operation. All measures of project worth indicate the benefits of rehabilitation, but considerable effort must be placed on marketing output in order to achieve the required returns. Sensitivity tests indicate the vulnerability of the project particularly to a shortfall in projected revenues.

1.0 INTRODUCTION AND APPROACH

1.0 INTRODUCTION AND APPROACH

This report presents the financial evaluation of the rehabilitation of the Mabole Fruit Factory (MFF). It is an addendum to, and should be read in conjunction with, findings and recommendations presented in the main report (Project No SI/SIL/83/801). Terms of reference were agreed by exchange of letters and telexes copies of which are attached in Appendix 3. The report consists of 5 main sections. This first section discussed the approach and assumptions that lie behind the financial analysis. Sections 2.0, 3.0 and 4.0 detail capital costs, recurrent costs and project returns respectively, and Section 5.0 presents the financial results and conclusions and are supported by detailed tables in Appendix 1.

This report discusses results relating to 3 options which are briefly summarised as follows:

- Option 1 presents the costs and returns of the financial analysis assuming an exchange rate of US $ = Le 13.75 which represents the alternative/parallel market rate now recognised by the government (see below).

- Option 2 following presentation of the draft of this report it was requested that an analysis should be conducted assuming that foreign technical assistance is only half the levels assumed necessary in Option 1.

- Option 3 presents the same analysis as Option 1 but assuming an exchange rate of US $ = Le 6 as requested following submission of the draft of this report.

Internal rates of return on capital investment have been calculated for all three options, but a full financial evaluation has only been applied for Option 1.

The expressed NDB policy is to rehabilitate the MFF before selling the enterprise to the private sector. The following financial evaluation has therefore been made on the basis that there is no change in ownership of the MFF and consequently no value has been placed on existing assets. However outstanding loan (principal and interest) repayments have been incorporated in the financial analysis as an annual cost payable at an annual interest rate of 11 percent.

The main report recommends that the MFF should be established as a new company at the point of rehabilitation. It is assumed that this is enacted thereby allowing the MFF a new enterprise status eligible for exemption from company tax and customs duties on imports for the first 5 years of operation as stated in the Development of Industries Act 1983. Company taxation has been included in the financial analysis at 55 percent of net profit plus an additional surtax of 20 percent of company tax from year 6 of project operations.

The terms of reference do not require the consultants to make recommendations on financing the rehabilitation. It has therefore been assumed for the present evaluation that initial investment costs are financed

solely through equity. Should any part of the investment costs be financed by loan capital account should be taken of the annual loan repayments. Working capital costs have been incorporated at 100 percent of pre-production operating costs and at 50 percent of annual operating costs in production years.

Currency movements and rapid inflation in Sierra Leone have invalidated all costings presented in the main report. Therefore a further visit to Sierra Leone was made in November 1985 to collect up-to-date costings information. During the visit it was decided that financial projections should be shown in US dollars to reduce some of the problems encountered by changing currency values. This approach was agreed with UNIDO representatives in Freetown.

All items available locally have been converted to a US dollar equivalent for the analysis. The official exchange rate in November 1985 stood at US$ = Le 5.35 (this compares with a rate of US$ = Le 2.5 on completion of the main report). However an unofficial alternative/parallel market rate exists which is now recognised by the authorities in Sierra Leone which stood at US$ = Le 13.75 in November 1985. Many commercial enterprises which will be supplying inputs to the factory (payable by the MFF in local currency) are buying foreign currency at the unofficial rate which was therefore used in the financial analysis. Hence, all local costs have been converted to a US dollar equivalent at US$ = Le 13.75. This approach emphasis the cost difference in local and imported goods.

On submission of the draft addendum to final report UNIDO representatives requested that the analysis should also be conducted at an exchange rate of US $ = Le 6. This is referred to as Option 3 in the report and detailed tables of this Option are presented in Appendix 3.

Technical recommendations made in the main report remain unaltered. The market for fruit juices in Sierra Leone has been estimated at some 10.6 million units (Section 2.6.3 of the main report) and a production strategy has been presented (from Section 2.7.3 of the main report) to meet approximately half of this reaching 5.1 million 250 ml cartons at full capacity. An initial six month pre-production period will be necessary to purchase and install all equipment and employ the necessary staff. Full production capacity should be achieved by year 3 of operations.

Pricing policy is key to the success of the project and should be examined closely by the commercial manager during the first year of project operations. In order to capture up to 50 percent of the domestic market output should be both quality and price competitive when compared with imported products currently supplying the market. An imported 170 ml pack of juice is retailing at Le 6.5 per pack, and is used as a guideline to the suggested pricing policy discussed in Section 5.0 of this report. Clearly these price levels can only be absorbed by the foreign community and the highest paid Sierra Leone nationals. Close consideration must be given to the price/market volume relationship to establish the correct marketing policy.

Similar consideration must be given to the export potential of the project. Approximately 25 percent of total production should be exported to meet the foreign exchange requirements of annual project operating costs

(Section 4.0). Unless foreign exchange can be obtained from overseas sales the MFF will be faced with the additional problems and costs of buying foreign exchange most probably at the inflated unofficial exchange rate. It is believed that there are strong possibilities of sales to Liberia paid for in US dollars.

If foreign exchange requirements cannot be met through MFF export earnings further consideration should be given to means of reducing these requirements. Purchasing vehicles and vehicle spares through local agents and thereby paying in local currency, albeit at inflated rates, is one consideration. Another is to specialise in juices requiring the smaller volumes of sugar which has to be imported. Clearly these aspects can only be detailed following comprehensive investigations of export markets by the Commercial Manager.

Raw material availability and supply is discussed in considerable detail in Section 2.5 of the main report. It is considered that sufficient oranges and pineapples are available of the correct variety and quality to enable the factory to run for 6-7 months of the year. Processing other fruits will extend the active period of the factory by a further 2 months. Details of the variety and location of tree crops is limited but will become available with the results of the tree crop survey conducted by the PEMSU. Supply and cost of local fruits are unlikely to pose problems to the MFF but the need to employ a fruit procurement officer with sufficient experience of the business must be emphasised.

The only other major raw material required by the MFF is sugar. Local supplies are insufficiently refined to be considered for use by the MFF and it will be necessary therefore to import sugar. This imposes significant foreign exchange requirements on the MFF. This requirement can be met if sufficient volumes of exports are achieved, but prospects to diversify MFF operations to produce jams are restricted because the ratio of sugar to fruit is prohibitive.

Other inputs such as additives are not produced locally. Quantities are small but still present foreign exchange problems. Similarly, although outer packaging materials are available locally, tetrapak inner packaging must be imported. Imported items will not experience the same inflation problems as local supplies but are highly sensitive to fluctuations in foreign exchange availability and cost.

Capital investment totalling some US $820,000 occur chiefly in the six month pre-production period and comprise mainly factory equipment and transport costs. Although no major new infrastructure facilities are required, costs will be incurred to upgrade existing facilities. It is assumed that all imported items will be exempt from import duties.

The main report discussed the need to improve the road from Pamlap to the factory, a distance of some 11 kms. Although this is not the responsibility of the MFF the importance of upgrading the standard of the road must be emphasised if the factory is to operate effectively as was increasingly apparent in the latest visit to Sierra Leone made during the wet season. The financial evaluation assumes road conditions are brought up to required standards.

The project has been evaluated over a life of 10 years with an initial six month pre-production period to purchase and install machinery to upgrade infrastructure to an operational standard and to employ the necessary staff.

The project analysis has been worked in constant prices on the assumption that inflation will affect costs and prices equally. Locally provided goods will be affected by rapid domestic inflation while imported goods, although not influenced by the same inflation will effectively rise in price as the Leone devalues. The devaluation of the Leone is to some extent linked to inflation hence the assumption that inflation will affect all costs and prices equally. Therefore it should be noted that absolute (or money) values of costs and benefits in later years are understated but the general relations remain unaltered so the measures of project worth discussed in Section 5.0 remain valid. Sensitivity tests have been conducted to account for potential cost increases or return decreases.

2.0 CAPITAL COSTS

2.0 CAPITAL COSTS

Capital investment costs for Options 1 and 2 total US $820,000 chiefly falling in the first 3 years of the projected period of which US $630,000 will be required in foreign exchange. Option 3 presents capital investment costs, assuming an exchange rate of US $ = Le 6, which total US $902,000 with US $630,000 required in foreign exchange. It has been assumed that all directly imported equipment and materials will be exempt from import duties.

Investment costs have been revised from those presented in the main report to account for inflation and currency movements as discussed in the introduction. Revised costs are presented in Tables 2.1 to 2.4 while detailed tables are presented in Appendix 1 and 2.

Investment costs are comprised chiefly of repairs to existing infrastructure, (no new infrastructure is required) factory and transport equipment but also include required management training, as recommended in Section 3.3 (page 37) of the main report. A six month training period for two of the management personnel has been costed on the basis that machinery manufacturers will provide training courses free of charge. The costs incurred therefore comprise of two return airfares to London and six months' per diem allowances (UNDP rates for the UK) for both personnel. Working capital has been costed at 100 percent of pre-production recurrent costs and, from point of production, at 50 percent of annual operating costs.

Contingency allowances for all investment requirements have been inserted at 15 percent of total investment costs. A local transport/delivery cost has been included for all imported goods and is itemised in Table A.1. All major machinery expenditure includes installation by the manufacturers. However, an additional $7,500 should be allowed for further costs associated with installation of machinery.

No value has been included for the existing factory facilities as it is assumed there will be no change in ownership of the MFF.

TABLE 2.1

REVISED COSTED LIST OF IMPROVEMENTS TO INFRASTRUCTURE AND SERVICES

Description	Requirements	Unit Cost	Cost (Le)	Total Cost (US$ Le 13.75 Option 1 and 2)	Total Cost (US$ (Option 3 Assuming $1 = Le 6)	Foreign Exchange % of Total Cost
Resurfacing of hardstanding surrounding MFF and linking to public road	1,000 sq.yds.		82,500	6,000	13,750	0
Repairs to fencing			7,500	545	1,250	0
Tiling of factory floor			217,500	15,818	36,250	0
Modifications to ventilation system of factory			12,500	910	2,083	0
Installation of fruit reception bay			13,750	1,000	2,292	0
Fruit storage bin			47,500	3,455	7,917	0
Internal modifications to factory (boiler room, toilets and changing room facilities)			12,500	910	2,083	0
General paintwork and repairs to factory and accommodation complex			22,500	1,636	3,750	0
Maintenance workshop with vehicle inspection pit			62,500	4,545	1,042	0
Cooling tower for additional chilled water			25,000	1,818	4,167	0
Transport Vehicles (cif prices):						
Tractor 65 HP	1	10,830		10,830		100
Trailers, 4½ ton	2	1,398		2,795		100
Lorry, 5 ton tipper	1	15,697		15,697		100
Saloon cars	2	8,600		17,200		100
Pick-up	1	4,750		4,750		100
4 wheel drive vehicles	2	9,675		19,350		100
Motorcycles	3	645		1,935		100
Electricity generator (50 kva)	1	11,750		11,750		100

Note:

1. Local costs have been converted to US$ at US$ 1= Le 13.75
2. It is assumed all equipment imported directly by the MFF will be given exemption from all import duties.
3. A local delivery cost has been incorporated in total costings (Table A1.1).

TABLE 2.2

ADDITIONAL PROCESSING EQUIPMENT COSTS (REVISED)

Description	Cost (US$)	Foreign Exchange % of Total
Fruit washer	5,456	100
Inspection trimming belt	6,235	100
Vacuum de-oiler	46,763	100
Helicoidal juice refiner	29,616	100
Cooker crusher	30,396	100
Homogeniser	28,837	100
Pasteuriser	38,969	100
Tetrapak machine	93,525	100
Miscellaneous valves, pipework, fillings for modifications	7,794	100
TOTAL	287,591	100

TABLE 2.3

LABORATORY EQUIPMENT COSTS

Description	Estimated Cost (US$)	Foreign Exchange % of Total
Portable pH meters (2)	468	100
Water still	390	100
Sugar refractometers (2)	234	100
Equipment for essential oil determination	156	100
Drying oven	429	100
Analytical balance	468	100
Assorted glassware and chemicals	195	100
TOTAL	2,340	100

3.0 RECURRENT COSTS

3.0 RECURRENT COSTS

Operating costs for Option 1 are detailed in Tables A1.7 to A1.12 in Appendix 1. Over the projected 10 year period recurrent expenditure totals some US $3.2 million of which US $1.2 million is required in foreign exchange. The 6 month pre-production period and the initial 3 years operation demand a higher level of operating expenditure and foreign exchange because of the need to employ expatriates on the MFF staff list. From year 6 of the project, annual operating expenditure evens out at some US $300,130 with foreign exchange totalling some US $95,110. Products requiring foreign exchange are itemised in the main report and summarised in Table A1.8.

Major cost items are fruit and sugar inputs, vehicle running costs and operating costs for factory equipment.

Option 2 follows a request by UNIDO representatives to analyse the project assuming a 50 percent reduction in expatriate costs. On this basis recurrent costs over the 10 years period fall to US $3.0 million of which US $1.0 million is required in foreign exchange. Detailed tables are presented in Appendix 2

3.1 FRUIT AND OTHER INPUT COSTS

Details of input requirements were given in Section 4.4 of the main report with a calculation of unit costs presented in Table 4.5. This table is reproduced below (Table 3.1) with revised input costs to account for inflation and currency changes and Table 3.1A presents calculations on the basis of US $ = Le 6 for Option 3.

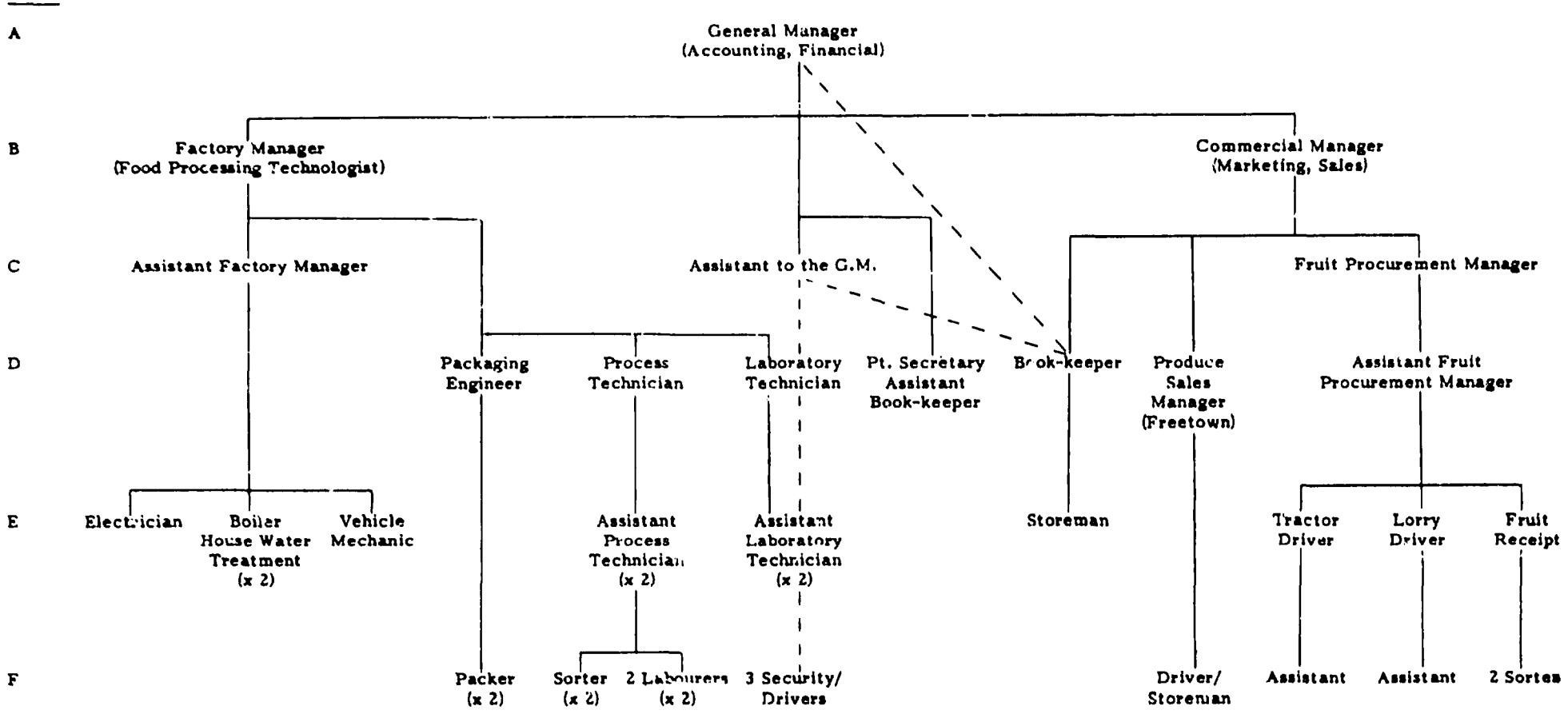
3.2 STAFF COSTS

Manpower requirements are detailed in Figure 3.1 (lifted from the main report) and Table 3.2 presents the associated costs. In the first two years of project operations, a single shift for the juice extraction department will be sufficient to meet projected output. Once the factory reaches full capacity in Year 3 of production a second shift will be required in this department. Option 2 and 3 calculations can be found in Appendix 2 and 3 respectively.

A Board of Directors, comprising five members, will be required for the six month pre-production period and continuing through Years 1 to 10 of factory operations. It is also envisaged that expatriates filling the posts of General Manager and Factory Manager will be required through the six month pre-production period. The General Manager will be required for a total of two years, the Factory Manager for three years and the Commercial Manager will be required for the first year of factory production to launch all commercial operations. Option 2 (detailed in Appendix 2) assumes foreign assistance at 50 percent of recommended levels. Sierra Leone management staff replacing the expatriate staff should also be employed from the first year of factory operations as are all other staff. At the point of full production (Year 3) a double shift will be introduced for the juice extraction department.

FIGURE 3.1

BOARD OF DIRECTORS



Notes

1. Within each grade there will be salary scales to take account of all factors of individual filling the post.
2. Three expatriate positions: General Manager (2 yrs), Commercial Manager (1 yr), Factory Manager (3 yrs).
3. Position of Assistant to the G.M. is optional.

TABLE 3.1

QUANTITIES OF FRUIT REQUIRED AND RAW MATERIAL COSTS TO PREPARE 1,000 LITRES FRUIT DRINK PER HOUR (4,000 x 250 ml CARTONS)

	Oranges		Grapefruit		Lemon/Lime		Pineapple		Guava		Mango	
	Le	$	Le	$	Le	$	Le	$	Le	$	Le	$
Fruit costs	750.0		390.0		125.0		1,500.0		213.75		417.0	
Sugar at $700/tonne		23.8		44.8		75.6		16.8		67.2		74.9
Water at Le 2/1,000 lt.	0.6		1.0		1.6		0.4		1.4		1.6	
Preservatives Citric acid		0.3		0.4		0.5		0.3		0.5		0.6
Per 1,000 litres (4,000 cartons)	750.6	24.1	393.0	45.2	126.6	76.2	1,500.4	17.1	215.3	67.7	418.7	75.5
Packaging cartons		12.0		12.0		12.0		12.0		12.0		12.0
Outer cartons	50.0		50.0		50.0		50.0		50.0		50.0	
TOTAL	800.6	36.1	443.0	57.2	176.6	88.2	1,550.4	29.1	265.3	79.7	468.7	87.5
TOTAL US$	58.2	36.1	32.2	57.2	12.8	88.2	112.8	29.1	19.3	79.7	34.1	87.5
TOTAL US$	94.3		89.4		101.0		141.9		99.0		121.6	
% Foreign exchange	(38.3)		(64.0)		(87.3)		(20.5)		(80.5)		(72.0)	
Cost per carton US$	0.0236		0.0224		0.025		0.036		0.025		0.030	
Allow 5% processing and filling costs												
NET COST	0.03		0.02		0.02		0.04		0.03		0.03	

TABLE 3.1A

(AS TABLE 3.1 BUT AT EXCHANGE RATE US $ = Le 6 FOR OPTION 3)

(At Exchange Rate $ = Le 6)

	Oranges		Grapefruit		Lemon/Lime		Pineapple		Guava		Mango	
	Le	$	Le	$	Le	$	Le	$	Le	$	Le	$
TOTAL COST (Table 3.1)	800.6	36.1	443.0	57.2	176.6	88.2	1,550.4	29.1	265.3	79.7	468.7	87.5
TOTAL COST FOR OPTION 3	133.4	36.1	73.8	57.2	29.4	88.2	258.4	29.1	44.2	79.7	78.1	87.5
TOTAL COST IN US $	169.5		131.0		177.6		287.5		123.9		165.6	
Foreign Exchange %	(21.3)		(43.7)		(75)		(10.1)		(64.3)		(52.8)	
Cost per carton US$	0.0424		0.0328		0.0294		0.0719		0.0310		0.0414	

TABLE 3.2

STAFFING COSTS

	Number		Unit Cost p.a. Le	Unit Cost p.a. US$	% Foreign Exchange
Board of Directors	5			500	-
General Manager	1			35,000	100
Factory Manager	1			30,000	100
Commercial Manager	1			25,000	100
Grade C	3		6,500		-
Grade D	7		5,500		-
Grade E	9	(12)	3,000		-
Grade F	7	(11)	1,900		-

Note:

Numbers in brackets denote increased staff required at full production to staff two shifts.

TABLE 3.3

ESTIMATED ANNUAL FUEL REQUIREMENTS

Vehicle	Annual Mileage (km)	Fuel Consumption (km/lt)	Annual Fuel Needs	Cost	Number of Units	Total Cost (US$)
Tractor	10,000	5	2,000	800	1	800
Lorry	50,000	6	8,500	3,500	1	3,500
Saloon car	15,000	30	500	300	2	600
Pick-up	20,000	8	2,500	1,000	1	1,000
4 wheel drive	15,000	6	2,500	1,000	2	2,000
Motorcycles	10,000	40	250	150	3	450
Other fuel and lubricant costs						4,000
Sub Total						12,350
Contingency (30%)						4,150
TOTAL						16,500

3.3 VEHICLE RUNNING COSTS

Operating costs for vehicles are presented in Table 3.3 and include spares, fuel and lubricant costs. Spares equal to 15 percent of total vehicle value should be purchased at the time of vehicle procurement, and an element of 5 percent of the original vehicle values is written in for spares each year. Vehicle life is assumed to average 5 years, therefore an annual depreciation factor of 20 percent of vehicle value is included in the final cash flow analysis. Estimates for fuel and lubricant costs are given in Table 3.3

A cost of $16,500 has been incorporated per annum for fuel and lubricants. Fuel and lubricants can be obtained locally and hence there are no foreign exchange implications, but it should be noted that this item is highly sensitive to currency fluctuations in financial terms.

3.4 OPERATING COSTS FOR FACTORY AND PROCESSING EQUIPMENT

A comprehensive review of the services required and their estimated running costs is presented in Section 4.4.4 of the main report. All services are paid for in Leones and an update of costs is presented in the following table.

TABLE 3.4

SERVICES AND RUNNING COSTS

Total maximum services cost per day	Le US$	4,305 320
Estimated total days operation		212.8
Total annual costs	US$	68,096
Contingency (15%)	US$	10,214
TOTAL	US$	78,310

Depreciation on equipment and spares have been written in annually at 4 percent of purchase value in the final cash flow analysis.

3.5 MARKETING COSTS

Recommendations were made in the main report (Section 2.7.2) to implement a proper marketing strategy to be initiated by the Commercial Manager. An annual budget is required for advertising to launch/promote sales of factory product. Quotations given by local promotions agencies estimated that a cost of some Le 21,000 p.a. (US$ 1,500) would be sufficient for required promotions. It is envisaged that promotional effort to launch products in the first year of operation would require double this annual expenditure. This should include a visit to Liberia to launch the export aspect of sales.

Further recommendations were made to establish a distribution centre in Freetown. An annual rental cost - estimated at Le 33,000 (US$ 2,400) has been included for this purpose.

3.6 OVERHEADS

Overheads to include administration, insurance, sickness pay etc. have been incorporated equal to the local wage bill. In addition, expatriate costs have been doubled to account for local pay, family accommodation, schooling allowances etc. Airfares, assuming each expatriate family is composed of a wife and two children, have been accounted for in Years 0 to 2 as required.

4.0 PROJECT RETURNS

4.0 PROJECT RETURNS

Detailed project returns are given in Table A1.7 to A1.9 for Options 1 and 2 and in Tables A3.7 to A3.9 for Option 3.

4.1 PRICING POLICY

Pricing policy is central to the success of MFF operations. Inflation and currency devaluations have distorted any previous pricing guidelines so, for the purposes of this analysis price selection is somewhat arbitrary. However sensitivity tests illustrate that the price per pack of juice cannot fall much below Le 2.0 (US $0.15 for Option 1 and 2 and US $0.34 for Option 3).

Clearly, even at the ex factory price of Le 2 per pack the potential market segment will largely be comprised of the expatriate community and high paid nationals. Part of this market is currently being served by imported fruit juices that are retailing at Le 6.5 for a 170 ml pack. Assuming that MFF output is competitive with imported product in quality terms an ex-Freetown store price should prove competitive even on the basis of a 100 to 150 percent retail mark-up - ie retailing at around Le 4-6 per 250 ml pack. From previous marketing studies the retail trade in general only commands a 25-30 percent mark-up, and on this basis MFF juices would compete very favourably with imports. Similarily the equivalent product is sold in Liberia (the main potential export market for MFF output) for $0.35-0.40 per pack. An fob price of $0.15 per 150 ml pack will, after transport and retail mark-up costs, retail at some $0.35-0.40 per 250 ml pack and should therefore penetrate the Liberian market. Both domestic and overseas markets should be examined closely by the Commercial Manager in the first year of operation in order to adopt the correct pricing strategy. Option 3 indicates that retail levels will be US $0.34 per carton which may not achieve desired export levels.

4.2 DOMESTIC AND EXPORT MARKETS

For the present purposes all fruit juices have been equally priced, but it should be written into the Commercial Manager's brief to examine individually the pricing policy for each fruit juice.

In order to allow for full market penetration, the production strategy proposed builds up factory output over the first two years to reach full capacity by Year 3 of project operations. At this time output will total some 5.1 million 250 ml packs of juice. The share between juices is given in Table A1.7 in Appendix 1. At full production, annual returns (assuming an ex Freetown store/fob price of US $0.15) are almost US $800,000 per annum and, over the ten year project period the project generates US $700,000. Of this total, domestic sales are anticipated to generate US $600,000 per annum in local currency.

Similarly, a close examination of potential export markets will be required. It is anticipated that export markets can be found for up to 25 percent of annual production. This generates an annual return in foreign exchange of some US $200,000 at full capacity, or US $1.7 million over the ten year project period. This is sufficient to cater for foreign exchange requirements on factory operating costs which total US $1.2 million over the ten year period and even out at some US $95,000 per annum by Year 4 of project operations.

However, foreign exchange requirements are somewhat higher in the first 3 years of project operations because of the need to employ expatriate staff.

5.0 FINANCIAL APPRAISAL AND CONCLUSIONS

5.0 FINANCIAL APPRAISAL AND CONCLUSIONS

Tables 5.1 to 5.3 summarise the financial evaluations of each of the 3 Options. Rate of return calculations on capital investment are presented for the 3 Options but alternative measures of project worth are only analysed for Option 1.

5.1 FINANCIAL INTERNAL RATE OF RETURN

Option 1

Assuming a policy is adopted (and can be sustained by domestic and export markets), to price output at Le 2 (US $0.15) per 250 ml pack the project will achieve a rate of return of 31.15 percent, illustrated in Table 5.1. Given that rates of interest on existing loan repayments run at 11 percent per annum the project is attractive. If project returns fall or costs increase by 5 percent the IRR decreases to 28. A 10 percent project cost increase and return decrease reduces the IRR to 25 percent.

Option 2

With expatriate input reduced by 50 percent the rate of return on capital investment increases of 36 percent as indicated in Table 5.2.

Option 3

Table 5.3 summarises the project costs and benefits at an exchange rate of US $ = Le 6. The rate of return on capital investment is calculated to be 71 percent.

Table 5.4 presents project benefits net of financing outstanding loans, net of depreciation allowances, and finally net of income tax for Option 1.

5.2 NET PRESENT VALUE

The net present value of the project at a discount factor of 12 percent is £1,060.22, which illustrates the benefits of implementing the project.

5.3 PAY-BACK PERIOD

The project does not achieve pay-back in the projected period year of operations but would achieve pay-back in year 11.

5.4 SIMPLE RATE OF RETURN

The simple rate of return has been calculated on investment expenditure and is calculated at 18.3 percent.

5.5 BREAK-EVEN ANALYSIS

The break-even point of the project exists where output is priced at US $0.10 per 250 ml pack. This must be calculated without inclusion of company taxation which varies with net profit. At a price of US $0.10 per pack a zero rate of return is achieved, and costs equal benefits over the 10 year project period.

Constant US$(000s)

		Year 1
Cashflows with Basic Assumptions		
Project Costs and Returns		
Project Capital Costs	605.60	148.19
Project Recurrent Costs	87.67	342.44
TOTAL PROJECT COSTS	693.27	490.63
Project Cost Recovery		255.00
PROJECT CASHFLOW	(693.27)	(235.63)
TOTAL FINANCIAL CASHFLOW	(693.27)	(235.63)
FINANCIAL IRR (Percent)	31.15	
Sensitivity Analysis		
Cost Increases of 5 Percent		
TOTAL FINANCIAL CASHFLOW	(727.93)	(260.16)
FINANCIAL IRR (Percent)	28.27	
Cost Increases of 10 Percent		
TOTAL FINANCIAL CASHFLOW	(762.59)	(284.69)
FINANCIAL IRR (Percent)	25.56	
Return Decreases of 5 Percent		
TOTAL FINANCIAL CASHFLOW	(693.27)	(248.38)
FINANCIAL IRR (Percent)	28.13	
Return Decreases of 10 Percent		
TOTAL FINANCIAL CASHFLOW	(693.27)	(261.13)
FINANCIAL IRR (Percent)	24.99	

TABLE 5.1
OPTION 1
FINANCIAL ANALYSIS

Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
3.73	(6.08)	(18.81)		86.60					819.23
349.91	337.73	306.13	300.13	300.13	300.13	300.13	300.13	300.13	3,218.65
353.64	331.65	261.32	300.13	386.73	300.13	300.13	300.13	300.13	4,037.86
576.00	765.00	765.00	765.00	765.00	765.00	765.00	765.00	765.00	6,951.00
223.37	433.35	483.68	464.87	378.27	464.87	464.87	464.87	464.87	2,913.13
223.37	433.35	483.68	464.87	378.27	464.87	464.87	464.87	464.87	2,913.13
204.68	416.77	469.61	449.86	356.93	449.86	449.86	449.86	449.86	2,711.23
187.00	400.19	455.55	434.86	339.60	434.86	434.86	434.86	434.86	2,509.34
193.57	395.10	445.43	426.62	340.02	426.62	426.62	426.62	426.62	2,565.58
164.77	356.85	407.18	388.37	301.77	388.37	388.37	388.37	388.37	2,218.03

Constant US$(000s)

		Year 1
Cashflows with Basic Assumptions		
Project Costs and Returns		
Project Capital Costs	605.60	148.19
Project Recurrent Costs	55.17	252.44
TOTAL PROJECT COSTS	660.77	400.63
Project Cost Recovery		255.00
PROJECT CASHFLOW	(660.77)	(145.63)
TOTAL FINANCIAL CASHFLOW	(660.77)	(145.63)
FINANCIAL IRR (Percent)	36.08	
Sensitivity Analysis		
Cost Increases of 5 Percent		
TOTAL FINANCIAL CASHFLOW	(693.80)	(165.66)
FINANCIAL IRR (Percent)	33.01	
Cost Increases of 10 Percent		
TOTAL FINANCIAL CASHFLOW	(726.84)	(185.69)
FINANCIAL IRR (Percent)	30.13	
Return Decreases of 5 Percent		
TOTAL FINANCIAL CASHFLOW	(660.77)	(158.38)
FINANCIAL IRR (Percent)	32.84	
Return Decreases of 10 Percent		
TOTAL FINANCIAL CASHFLOW	(660.77)	(171.13)
FINANCIAL IRR (Percent)	29.52	

TABLE 5.2
OPTION 2
FINANCIAL ANALYSIS

Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
3.73	16.081	(18.81)		86.60					619.23
302.41	322.73	300.13	300.13	300.13	300.13	300.13	300.13	300.13	3,033.65
306.14	316.65	281.32	300.13	386.73	300.13	300.13	300.13	300.13	3,052.88
576.00	765.00	765.00	765.00	765.00	765.00	765.00	765.00	765.00	6,951.00
269.87	448.35	483.68	464.87	378.27	464.87	464.87	464.87	464.87	3,098.13
269.87	448.35	483.68	464.87	378.27	464.87	464.87	464.87	464.87	3,098.13
254.56	432.51	469.61	449.86	358.93	449.86	449.86	449.86	449.86	2,905.48
239.25	416.69	455.55	434.86	339.60	434.86	434.86	434.86	434.86	2,712.84
241.07	410.10	445.43	426.62	340.02	426.62	426.62	426.62	426.62	2,750.58
212.27	371.85	407.18	388.37	301.77	388.37	388.37	388.37	388.37	2,403.03

Constant US$(000s)

		Year 1	Year 2
Cashflows with Basic Assumptions			
Project Costs and Returns			
Project Capital Costs	683.99	152.99	3.73
Project Recurrent Costs	115.96	475.42	539.62
TOTAL PROJECT COSTS	799.95	628.41	543.35
Project Cost Recovery		578.00	1,305.60
PROJECT CASHFLOW	(799.95)	(50.41)	762.25
TOTAL FINANCIAL CASHFLOW	(799.95)	(50.41)	762.25
FINANCIAL IRR (Percent)	71.11		
Sensitivity Analysis			
Cost Increases of 5 Percent			
TOTAL FINANCIAL CASHFLOW	(839.94)	(81.83)	735.08
FINANCIAL IRR (Percent)	66.62		
Cost Increases of 10 Percent			
TOTAL FINANCIAL CASHFLOW	(879.94)	(113.25)	707.92
FINANCIAL IRR (Percent)	62.48		
Return Decreases of 5 Percent			
TOTAL FINANCIAL CASHFLOW	(799.95)	(79.31)	696.97
FINANCIAL IRR (Percent)	66.36		
Return Decreases of 10 Percent			
TOTAL FINANCIAL CASHFLOW	(799.95)	(108.21)	631.69
FINANCIAL IRR (Percent)	61.60		

TABLE 5.3

OPTION 3

FINANCIAL ANALYSIS

Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
(6.08)	(18.81)		86.60					902.42
561.02	513.42	513.42	513.42	513.42	513.42	513.42	513.42	5,265.96
554.94	494.61	513.42	600.02	513.42	513.42	513.42	513.42	6,186.36
1,734.00	1,734.00	1,734.00	1,734.00	1,734.00	1,734.00	1,734.00	1,734.00	15,755.60
1,179.06	1,239.39	1,220.58	1,133.98	1,220.58	1,220.58	1,220.58	1,220.58	9,567.23
1,179.06	1,239.39	1,220.58	1,133.98	1,220.58	1,220.58	1,220.58	1,220.58	9,567.23
1,151.31	1,214.66	1,194.91	1,103.98	1,194.91	1,194.91	1,194.91	1,194.91	9,257.81
1,123.57	1,189.93	1,169.24	1,073.98	1,169.24	1,169.24	1,169.24	1,169.24	8,948.39
1,092.36	1,152.69	1,133.88	1,047.23	1,133.88	1,133.88	1,133.88	1,133.88	8,779.45
1,005.66	1,065.99	1,047.18	969.58	1,047.18	1,047.18	1,047.18	1,047.18	7,991.67

TABLE 5.4

PROJECT BENEFITS NET OF FINANCING, DEPRECIATION AND TAXATION

		Year 0	1	2	3	4	5	6	7	8	9	10
Inflow												
Revenue		-	255	576	765	765	765	765	765	765	765	765
Outflow												
Capital Investment		605.6	148.2	3.7	(6.1)	(18.8)	86.6	-	-	-	-	-
Recurrent Costs		87.67	342.4	349.9	337.73	300.13	300.13	300.13	300.13	300.13	300.13	300.13
NET BENEFIT BEFORE FINANCING		(693.27)	(235.63)	222.37	433.35	483.68	464.87	378.27	464.87	464.87	464.87	464.87
Financing												
Outstanding Loans:												
Loan from ADB via NDP	principal	-	-	-	-	79.04	79.04	79.04	79.04	79.04	-	-
	interest	-	43.5	43.5	43.5	43.5	34.8	26.1	17.4	8.7	-	-
Loan from NDB	principal	-	-	-	-	4.4	-	-	-	-	-	-
	interest	-	0.5	0.5	0.5	0.5	-	-	-	-	-	-
TOTAL		-	44	44	44	127.44	113.84	105.14	96.44	87.74	-	-
NET BENEFIT AFTER FINANCING		(693.27)	(279.63)	178.37	389.35	356.24	351.03	273.13	368.43	377.13	464.87	464.87
Depreciation												
Depreciation of vehicles		-	17.32	13.86	11.08	8.87	7.09	23.0	18.4	14.72	11.77	9.42
Depreciation on equipment		-	18.5	17.58	16.7	15.86	15.67	14.31	13.6	12.92	12.27	11.67
TOTAL DEPRECIATION		-	35.82	31.44	27.78	24.73	22.16	37.31	32	27.64	24.04	21.09
NET INCOME AFTER DEPRECIATION AND FINANCING		(693.27)	(315.45)	146.93	361.57	331.51	328.87	235.82	336.43	349.49	440.83	443.78
INCOME TAX												
= 55% Net Profit		-	-	-	-	-	-	129.7	185.04	192.22	242.46	244.01
Surtax (20% of Company tax)		-	-	-	-	-	-	25.9	37.0	38.44	48.49	48.82
		-	-	-	-	-	-	155.6	222.04	230.66	290.95	292.89
NET BENEFIT AFTER FINANCING AND TAX		(693.27)	(315.45)	146.93	361.57	331.51	328.87	80.22	114.39	118.83	149.88	150.89

Notes:

1. Loans: It has been assumed that both outstanding loans from the NDB are financed through this project. Interest payments on both loans have been capitalised. It is assumed principal on the ADB loan will be repaid in 5 equal installments after a 3 year grace period. Interest is at 11 percent. The NDB loan is assumed to be paid in a single installment after a 3 year grace period. Interest all 11 percent.

TABLE 5.5

PAY-BACK PERIOD

Year	Cash flow	Accumulated Net Benefit
0	(693.27)	(693.27)
1	(315.45)	(1,008.72)
2	146.93	(861.79)
3	361.57	(500.22)
4	331.57	(168.65)
5	328.87	160.22
6	80.22	240.44
7	114.39	354.83
8	118.83	473.66
9	149.88	623.54
10	150.89	774.43

5.6 SENSITIVITY ANALYSIS

Sensitivity tests have been conducted by increasing costs by 5 and 10 percent and reducing returns by the same percentages. In all cases a positive return on investment is still achieved by the project - and results have been summarised in Tables 5.1 to 5.3.

5.7 CONCLUSIONS

The measures of project worth clearly indicate the benefits of rehabilitating the MFF. Positive returns can be achieved even in the face of 10 percent rise in costs or shoftfall in revenue. However, the results of this analysis must be interpreted in the context of the existing commercial environment in Sierra Leone. Two aspects in particular must be considered:

(i) The problems of investing and operating business profitably under the prevailing inflation and changing currency conditions. The foreign exchange requirements of the MFF can present problems and add to rising costs if these scarce resources can only be obtained through unofficial channels.

(ii) There must be some uncertainties relating to the potential size of the market for fruit juices which are considered to be luxury items by many Sierra Leone nationals particularly retailing at prices of Le 2.5 or more per pack. Strong emphasis must be placed on the need to market output if it is to compete effectively with imported product for the remaining consumer demand, and if it is to penetrate export markets which are essential for securing foreign exchange required to purchase inputs.

APPENDIX 1

FINANCIAL ANALYSIS TABLES

FOR OPTION 1

APPENDIX 1

FINANCIAL ANALYSIS TABLES

FOR OPTION 1

This section presents calculations of the financial analysis in tabulated form. A list of contents is given.

TABLE

TABLE A1.1

OPTION 1

TOTAL PROJECT FOREIGN AND LOCAL FINANCIAL CAPITAL COSTS

Years 0 to 10

Constant US$('000s)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Infrastructure Costs												
Hardstanding - resi. & ext.	6.0	-	-	-	-	-	-	-	-	-	-	6.0
Fencing & gateway	5.5	-	-	-	-	-	-	-	-	-	-	5.5
Factory floor	16.0	-	-	-	-	-	-	-	-	-	-	16.0
Factory ventilation	0.9	-	-	-	-	-	-	-	-	-	-	0.9
Paint & repairwork	1.7	-	-	-	-	-	-	-	-	-	-	1.7
Internal modifications	0.9	-	-	-	-	-	-	-	-	-	-	0.9
Telecommunications	7.5	-	-	-	-	-	-	-	-	-	-	7.5
Generator	12.0	-	-	-	-	-	-	-	-	-	-	12.0
Contingency	8.0	-	-	-	-	-	-	-	-	-	-	8.0
SUB-TOTAL	58.5	-	-	-	-	-	-	-	-	-	-	58.5
Production Facilities												
Fruit reception bay	1.0	-	-	-	-	-	-	-	-	-	-	1.0
Fruit storage bin	3.5	-	-	-	-	-	-	-	-	-	-	3.5
Cooling tower	2.0	-	-	-	-	-	-	-	-	-	-	2.0
Maintenance workshop	4.6	-	-	-	-	-	-	-	-	-	-	4.6
Contingency	2.2	-	-	-	-	-	-	-	-	-	-	2.2
Delivery of proc. equip	15.0	-	-	-	-	-	-	-	-	-	-	15.0
Installation contng.	7.5	-	-	-	-	-	-	-	-	-	-	7.5
SUB-TOTAL	35.8	-	-	-	-	-	-	-	-	-	-	35.8
Transport												
Tractor	10.8	-	-	-	-	-	10.8	-	-	-	-	21.6
Trailers	2.8	-	-	-	-	-	2.8	-	-	-	-	5.6
Lorry	15.7	-	-	-	-	-	15.7	-	-	-	-	31.4
Saloon cars	17.2	-	-	-	-	-	17.2	-	-	-	-	34.4
Pick-up	4.8	-	-	-	-	-	4.8	-	-	-	-	9.6
4 w/d vehicles	19.4	-	-	-	-	-	19.4	-	-	-	-	38.8
Motorcycle	1.8	-	-	-	-	-	1.8	-	-	-	-	3.6
Local delivery	3.5	-	-	-	-	-	3.5	-	-	-	-	7.0
Contingency	10.6	-	-	-	-	-	10.6	-	-	-	-	21.2
SUB-TOTAL	86.6	-	-	-	-	-	86.6	-	-	-	-	173.2
Processing Equipment												
Fruit washer	5.5	-	-	-	-	-	-	-	-	-	-	5.5
Trimming belt	6.3	-	-	-	-	-	-	-	-	-	-	6.3
Vacuum de-oiler	47.0	-	-	-	-	-	-	-	-	-	-	47.0
Helicoidal refiner	30.0	-	-	-	-	-	-	-	-	-	-	30.0
Cooker crusher	30.4	-	-	-	-	-	-	-	-	-	-	30.4
Homogeniser	29.0	-	-	-	-	-	-	-	-	-	-	29.0
Pasteuriser	39.0	-	-	-	-	-	-	-	-	-	-	39.0
Tetrapak machine	94.0	-	-	-	-	-	-	-	-	-	-	94.0
Misc. equip for modifications	6.0	-	-	-	-	-	-	-	-	-	-	6.0
Contingency	45.0	-	-	-	-	-	-	-	-	-	-	45.0
SUB-TOTAL	334.2	-	-	-	-	-	-	-	-	-	-	334.2
Recommended Equipment												
PH meters	0.5	-	-	-	-	-	-	-	-	-	-	0.5
Water still	0.4	-	-	-	-	-	-	-	-	-	-	0.4
Sugar refractometers	0.2	-	-	-	-	-	-	-	-	-	-	0.2
Essential oil determination e	0.2	-	-	-	-	-	-	-	-	-	-	0.2
Drying oven	0.4	-	-	-	-	-	-	-	-	-	-	0.4
Analytical balance	0.5	-	-	-	-	-	-	-	-	-	-	0.5
Assorted glassware and chemic	0.2	-	-	-	-	-	-	-	-	-	-	0.2
Local delivery	0.1	-	-	-	-	-	-	-	-	-	-	0.1
Contingency	0.4	-	-	-	-	-	-	-	-	-	-	0.4
SUB-TOTAL	2.8	-	-	-	-	-	-	-	-	-	-	2.8
Manpower Training												
Airfares	-	3.8	-	-	-	-	-	-	-	-	-	3.8
Per diems & months	-	22.8	-	-	-	-	-	-	-	-	-	22.8
SUB-TOTAL	-	26.6	-	-	-	-	-	-	-	-	-	26.6
WORKING CAPITAL												
Working capital	87.7	121.6	3.7	(6.1)	(18.8)	-	-	-	-	-	-	188.1
SUB-TOTAL	87.7	121.6	3.7	(6.1)	(18.8)	-	-	-	-	-	-	188.1
TOTAL	605.6	148.2	3.7	(6.1)	(18.8)	-	86.6	-	-	-	-	819.2

TABLE A1.2

OPTION 1

PROJECT FOREIGN FINANCIAL CAPITAL COSTS

Years 0 to 10

Constant US$ ('000s)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Infrastructure Costs												
Telecommunications	7.5	-	-	-	-	-	-	-	-	-	-	7.5
Generator	12.0	-	-	-	-	-	-	-	-	-	-	12.0
Contingency	3.2	-	-	-	-	-	-	-	-	-	-	3.2
SUB-TOTAL	22.7	-	-	-	-	-	-	-	-	-	-	22.7
Production Facilities												
Transport												
Tractor	10.8	-	-	-	-	-	10.8	-	-	-	-	21.6
Trailers	2.8	-	-	-	-	-	2.8	-	-	-	-	5.6
Lorry	15.7	-	-	-	-	-	15.7	-	-	-	-	31.4
Saloon cars	17.2	-	-	-	-	-	17.2	-	-	-	-	34.4
Pick-up	4.8	-	-	-	-	-	4.8	-	-	-	-	9.6
4 w/d vehicles	19.4	-	-	-	-	-	19.4	-	-	-	-	38.8
Motorcycle	1.8	-	-	-	-	-	1.8	-	-	-	-	3.6
Local delivery	3.5	-	-	-	-	-	3.5	-	-	-	-	7.0
Contingency	10.1	-	-	-	-	-	10.1	-	-	-	-	20.1
SUB-TOTAL	86.1	-	-	-	-	-	86.1	-	-	-	-	172.1
Processing Equipment												
Fruit washer	5.5	-	-	-	-	-	-	-	-	-	-	5.5
Trimming belt	6.3	-	-	-	-	-	-	-	-	-	-	6.3
Vacuum de-oiler	47.0	-	-	-	-	-	-	-	-	-	-	47.0
Helicoidal refiner	30.0	-	-	-	-	-	-	-	-	-	-	30.0
Cooker crusher	30.4	-	-	-	-	-	-	-	-	-	-	30.4
Homogeniser	29.0	-	-	-	-	-	-	-	-	-	-	29.0
Pasteuriser	39.0	-	-	-	-	-	-	-	-	-	-	39.0
Tetrapak machine	94.0	-	-	-	-	-	-	-	-	-	-	94.0
Misc. equip for modifications	8.0	-	-	-	-	-	-	-	-	-	-	8.0
Contingency	45.0	-	-	-	-	-	-	-	-	-	-	45.0
SUB-TOTAL	334.2	-	-	-	-	-	-	-	-	-	-	334.2
Recommended Equipment												
PH meters	0.5	-	-	-	-	-	-	-	-	-	-	0.5
Water still	0.4	-	-	-	-	-	-	-	-	-	-	0.4
Sugar refractometers	0.2	-	-	-	-	-	-	-	-	-	-	0.2
Essential oil determination e	0.2	-	-	-	-	-	-	-	-	-	-	0.2
Drying oven	0.4	-	-	-	-	-	-	-	-	-	-	0.4
Analytical balance	0.5	-	-	-	-	-	-	-	-	-	-	0.5
Assorted glassware and chemic	0.2	-	-	-	-	-	-	-	-	-	-	0.2
Contingency	0.3	-	-	-	-	-	-	-	-	-	-	0.3
SUB-TOTAL	2.7	-	-	-	-	-	-	-	-	-	-	2.7
Manpower Training												
Per diems & months	-	22.8	-	-	-	-	-	-	-	-	-	22.8
SUB-TOTAL	-	22.8	-	-	-	-	-	-	-	-	-	22.8
WORKING CAPITAL												
Working capital	35.1	48.6	1.5	(2.4)	(7.5)	-	-	-	-	-	-	75.2
SUB-TOTAL	35.1	48.6	1.5	(2.4)	(7.5)	-	-	-	-	-	-	75.2
TOTAL	480.7	71.4	1.5	(2.4)	(7.5)	-	86.1	-	-	-	-	629.8

TABLE A1.3

OPTION 1

PROJECT LOCAL FINANCIAL CAPITAL COSTS

Years 0 to 10

Constant US$ ('000s)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Infrastructure Costs												
Hardstanding - resf. & ext.	6.0	-	-	-	-	-	-	-	-	-	-	6.0
Fencing & gateway	5.5	-	-	-	-	-	-	-	-	-	-	5.5
Factory floor	16.0	-	-	-	-	-	-	-	-	-	-	16.0
Factory ventilation	0.9	-	-	-	-	-	-	-	-	-	-	0.9
Paint & repairwork	1.7	-	-	-	-	-	-	-	-	-	-	1.7
Internal modifications	0.9	-	-	-	-	-	-	-	-	-	-	0.9
Contingency	4.8	-	-	-	-	-	-	-	-	-	-	4.8
SUB-TOTAL	35.8	-	-	-	-	-	-	-	-	-	-	35.8
Production Facilities												
Fruit reception bay	1.0	-	-	-	-	-	-	-	-	-	-	1.0
Fruit storage bin	3.5	-	-	-	-	-	-	-	-	-	-	3.5
Cooling tower	2.0	-	-	-	-	-	-	-	-	-	-	2.0
Maintenance workshop	4.6	-	-	-	-	-	-	-	-	-	-	4.6
Contingency	2.2	-	-	-	-	-	-	-	-	-	-	2.2
Delivery of proc. equip	15.0	-	-	-	-	-	-	-	-	-	-	15.0
Installation contig.	7.5	-	-	-	-	-	-	-	-	-	-	7.5
SUB-TOTAL	35.8	-	-	-	-	-	-	-	-	-	-	35.8
Transport												
Contingency	0.5	-	-	-	-	-	0.5	-	-	-	-	1.1
SUB-TOTAL	0.5	-	-	-	-	-	0.5	-	-	-	-	1.1
Processing Equipment												
Recommended Equipment												
Local delivery	0.1	-	-	-	-	-	-	-	-	-	-	0.1
Contingency	0.0	-	-	-	-	-	-	-	-	-	-	0.0
SUB-TOTAL	0.1	-	-	-	-	-	-	-	-	-	-	0.1
Manpower Training												
Airfares	-	3.8	-	-	-	-	-	-	-	-	-	3.8
SUB-TOTAL	-	3.8	-	-	-	-	-	-	-	-	-	3.8
WORKING CAPITAL												
Working capital	52.6	73.0	2.2	(3.6)	(11.3)	-	-	-	-	-	-	112.9
SUB-TOTAL	52.6	73.0	2.2	(3.6)	(11.3)	-	-	-	-	-	-	112.9
TOTAL	124.9	76.8	2.2	(3.6)	(11.3)	-	0.5	-	-	-	-	189.4

TABLE A1.4

OPTION 1

TOTAL PROJECT FOREIGN AND LOCAL FINANCIAL RECURRENT COSTS

Years 0 to 10

Constant US$ ('000s)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Staff												
Board of Directors	1.25	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	26.25
General Manager	17.50	35.00	17.50	-	-	-	-	-	-	-	-	70.00
Factory Manager	15.00	30.00	30.00	15.00	-	-	-	-	-	-	-	90.00
Commercial Manager	-	25.00	-	-	-	-	-	-	-	-	-	25.00
Grade C	-	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	15.00
Grade D	-	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	28.00
Grade E	-	1.80	1.80	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	22.80
Grade F	-	0.70	0.70	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	10.20
SUB-TOTAL	33.75	99.30	56.80	25.30	10.30	10.30	10.30	10.30	10.30	10.30	10.30	287.25
Fruit and other input costs												
Orange juice inputs	-	19.80	46.50	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	546.30
Grapefruit juice inputs	-	3.40	7.60	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	91.00
Pineapple juice inputs	-	16.00	36.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00	436.00
Guava juice inputs	-	9.00	20.40	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	245.40
Other citrus juice inputs	-	5.10	11.40	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	136.50
SUB-TOTAL	-	53.30	121.90	160.00	160.00	160.00	160.00	160.00	160.00	160.00	160.00	1,455.20
Vehicle running costs												
Spares for vehicles	12.99	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	56.29
Fuel and lubricants	0.83	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	165.83
Contingency	-	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	40.00
SUB-TOTAL	13.82	24.83	24.83	24.83	24.83	24.83	24.83	24.83	24.83	24.83	24.83	262.12
Operating costs for factory and processing equipment												
Fuel for processing equipment	-	25.91	58.82	78.50	78.50	78.50	78.50	78.50	78.50	78.50	78.50	712.78
Maintenance/spares for equipm	-	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	148.00
Maintenance of buildings	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	10.00
SUB-TOTAL	-	41.71	74.68	94.30	94.30	94.30	94.30	94.30	94.30	94.30	94.30	870.78
Marketing costs												
Advertising campaign	-	3.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	16.50
Freetown store	-	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	24.00
SUB-TOTAL	-	5.40	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	40.50
Additional cost for expatriate staff												
Airfares	7.60	22.80	15.20	7.60	-	-	-	-	-	-	-	53.20
General Manager	17.50	35.00	17.50	-	-	-	-	-	-	-	-	70.00
Factory Manager	15.00	30.00	30.00	15.00	-	-	-	-	-	-	-	90.00
Commercial Manager	-	25.00	-	-	-	-	-	-	-	-	-	25.00
Overheads/Admin	-	5.10	5.10	6.80	6.80	6.80	6.80	6.80	6.80	6.80	6.80	64.60
SUB-TOTAL	40.10	117.90	67.80	29.40	6.80	6.80	6.80	6.80	6.80	6.80	6.80	302.80
TOTAL	87.67	342.44	349.91	337.73	300.13	300.13	300.13	300.13	300.13	300.13	300.13	3,218.65

TABLE A1.5

OPTION 1

PROJECT FOREIGN FINANCIAL RECURRENT COSTS

Years 0 to 10

Constant US$ (000s)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Staff												
General Manager	17.50	35.00	17.50	-	-	-	-	-	-	-	-	70.00
Factory Manager	15.00	30.00	30.00	15.00	-	-	-	-	-	-	-	90.00
Commercial Manager	-	25.00	-	-	-	-	-	-	-	-	-	25.00
SUB-TOTAL	32.50	90.00	47.50	15.00	-	-	-	-	-	-		185.00
Fruit and other input costs												
Orange juice inputs	-	7.52	17.67	22.80	22.80	22.80	22.80	22.80	22.80	22.80	22.80	207.59
Grapefruit juice inputs	-	2.18	4.86	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	58.24
Pineapple juice inputs	-	3.36	7.56	10.08	10.08	10.08	10.08	10.08	10.08	10.08	10.08	91.56
Guava juice inputs	-	7.29	16.52	21.87	21.87	21.87	21.87	21.87	21.87	21.87	21.87	198.77
Other citrus juice inputs	-	4.44	9.92	13.05	13.05	13.05	13.05	13.05	13.05	13.05	13.05	118.76
SUB-TOTAL	-	24.79	56.54	74.20	74.20	74.20	74.20	74.20	74.20	74.20	74.20	674.92
Vehicle running costs												
Spares for vehicles	12.34	4.11	4.11	4.11	4.11	4.11	4.11	4.11	4.11	4.11	4.11	53.48
Contingency	-	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	20.00
SUB-TOTAL	12.34	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	73.48
Operating costs for factory and processing equipment												
Maintenance/spares for equipm	-	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	148.00
SUB-TOTAL	-	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	148.00
Marketing costs												
Additional cost for expatriate staff												
General Manager	8.75	17.50	8.75	-	-	-	-	-	-	-	-	35.00
Factory Manager	7.50	15.00	15.00	7.50	-	-	-	-	-	-	-	45.00
Commercial Manager	-	12.50	-	-	-	-	-	-	-	-	-	12.50
SUB-TOTAL	16.25	45.00	23.75	7.50	-	-	-	-	-	-	-	92.50
TOTAL	61.09	180.70	148.70	117.61	95.11	95.11	95.11	95.11	95.11	95.11	95.11	1,173.99

TABLE A1.6

OPTION 1

PROJECT LOCAL FINANCIAL REQUIREMENT COSTS

Years 0 to 10

Constant US$ (000s)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Staff												
Board of Directors	1.25	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	26.25
Grade C	-	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	15.00
Grade D	-	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	28.00
Grade E	-	1.80	1.80	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	22.80
Grade F	-	0.70	0.70	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	10.20
SUB-TOTAL	1.25	9.30	9.30	10.30	10.30	10.30	10.30	10.30	10.30	10.30	10.30	102.25
Fruit and other input costs												
Orange juice inputs	-	12.26	28.83	37.20	37.20	37.20	37.20	37.20	37.20	37.20	37.20	338.71
Grapefruit juice inputs	-	1.32	2.74	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	32.76
Pineapple juice inputs	-	12.64	26.44	37.92	37.92	37.92	37.92	37.92	37.92	37.92	37.92	344.44
Guava juice inputs	-	1.71	3.89	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	46.63
Other citrus juice inputs	-	0.66	1.46	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	17.75
SUB-TOTAL	-	28.51	65.36	85.80	85.80	85.80	85.80	85.80	85.80	85.80	85.80	780.28
Vehicle running costs												
Spares for vehicles	0.65	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	2.81
Fuel and lubricants	0.82	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	165.82
Contingency	-	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	20.00
SUB-TOTAL	1.47	18.72	18.72	18.72	18.72	18.72	18.72	18.72	18.72	18.72	18.72	188.64
Operating costs for factory and processing equipment												
Fuel for processing equipment	-	25.91	58.88	78.50	78.50	78.50	78.50	78.50	78.50	78.50	78.50	712.78
Maintenance of Buildings	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	10.00
SUB-TOTAL	-	26.91	59.88	79.50	79.50	79.50	79.50	79.50	79.50	79.50	79.50	722.78
Marketing costs												
Advertising campaign	-	3.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	16.50
Freetown store	-	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	24.00
SUB-TOTAL	-	5.40	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	40.50
Additional cost for expatriate staff												
Airfares	7.60	22.80	15.20	7.60	-	-	-	-	-	-	-	53.20
General Manager	8.75	17.50	8.75	-	-	-	-	-	-	-	-	35.00
Factory Manager	7.50	15.00	15.00	7.50	-	-	-	-	-	-	-	45.00
Commercial Manager	-	12.50	-	-	-	-	-	-	-	-	-	12.50
Overheads/Admin	-	5.10	5.10	6.80	6.80	6.80	6.80	6.80	6.80	6.80	6.80	64.60
SUB-TOTAL	23.85	72.90	44.05	21.90	6.80	6.80	6.80	6.80	6.80	6.80	6.80	210.30
TOTAL	26.57	161.73	201.21	220.12	205.02	205.02	205.02	205.02	205.02	205.02	205.02	2,044.75

APPENDIX 2

FINANCIAL ANALYSIS TABLES

FOR OPTION 2

APPENDIX 2

FINANCIAL ANALYSIS TABLES

FOR OPTION 2

Note: Capital cost and Project return tables are the same as Option 1.

TABLE

TABLE A2.1
OPTION 2

TOTAL PROJECT FOREIGN AND LOCAL FINANCIAL RECURRENT COSTS

Years 0 to 10

Constant US$ (000s)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Staff												
Board of Directors	1.25	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	26.25
General Manager	8.75	17.50	8.75	-	-	-	-	-	-	-	-	35.00
Factory Manager	7.50	15.00	15.00	7.50	-	-	-	-	-	-	-	45.00
Commercial Manager	-	12.50	-	-	-	-	-	-	-	-	-	12.50
Grade C	-	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	15.00
Grade D	-	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	28.00
Grade E	-	1.80	1.80	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	22.80
Grade F	-	0.70	0.70	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	10.20
SUB-TOTAL	17.50	54.30	33.05	17.80	10.30	10.30	10.30	10.30	10.30	10.30	10.30	194.75
Fruit and other input costs												
Orange juice inputs	-	19.80	46.50	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	546.30
Grapefruit juice inputs	-	3.40	7.60	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	91.00
Pineapple juice inputs	-	16.00	36.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00	436.00
Guava juice inputs	-	9.00	20.40	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	245.40
Other citrus juice inputs	-	5.10	11.40	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	136.50
SUB-TOTAL	-	53.30	121.90	160.00	160.00	160.00	160.00	160.00	160.00	160.00	160.00	1,455.20
Vehicle running costs												
Spares for vehicles	12.99	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	56.29
Fuel and lubricants	0.83	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	165.83
Contingency	-	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	40.00
SUB-TOTAL	13.82	24.83	24.83	24.83	24.83	24.83	24.83	24.83	24.83	24.83	24.83	262.12
Operating costs for factory and processing equipment												
Fuel for processing equipment	-	25.91	58.86	78.50	78.50	78.50	78.50	78.50	78.50	78.50	78.50	712.78
Maintenance/spares for equipm	-	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	148.00
Maintenance of buildings	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	10.00
SUB-TOTAL	-	41.71	74.68	94.30	94.30	94.30	94.30	94.30	94.30	94.30	94.30	870.78
Marketing costs												
Advertising campaign	-	3.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	16.50
Freetown store	-	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	24.00
SUB-TOTAL	-	5.40	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	40.50
Additional cost for expatriate staff												
Airfares	7.60	22.80	15.20	7.60	-	-	-	-	-	-	-	53.20
General Manager	8.75	17.50	8.75	-	-	-	-	-	-	-	-	35.00
Factory Manager	7.50	15.00	15.00	7.50	-	-	-	-	-	-	-	45.00
Commercial Manager	-	12.50	-	-	-	-	-	-	-	-	-	12.50
Overheads/Admin	-	5.10	5.10	6.80	6.80	6.80	6.80	6.80	6.80	6.80	6.80	64.60
SUB-TOTAL	23.85	72.90	44.05	21.90	6.80	6.80	6.80	6.80	6.80	6.80	6.80	210.30
TOTAL	55.17	252.44	302.41	322.73	300.13	300.13	300.13	300.13	300.13	300.13	300.13	3,033.65

TABLE A2.2
OPTION 2

PROJECT FOREIGN FINANCIAL RECURRENT COSTS

Years 0 to 10

Constant US$ (000s)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Staff												
General Manager	8.75	17.50	8.75	-	-	-	-	-	-	-	-	35.00
Factory Manager	7.50	15.00	15.00	7.50	-	-	-	-	-	-	-	45.00
Commercial Manager	-	12.50	-	-	-	-	-	-	-	-	-	12.50
SUB-TOTAL	16.25	45.00	23.75	7.50	-	-	-	-	-	-	-	92.50
Fruit and other input costs												
Orange juice inputs	-	7.52	17.07	22.80	22.80	22.80	22.80	22.80	22.80	22.80	22.80	207.59
Grapefruit juice inputs	-	2.18	4.86	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	58.24
Pineapple juice inputs	-	3.36	7.56	10.08	10.08	10.08	10.08	10.08	10.08	10.08	10.08	91.56
Guava juice inputs	-	7.29	16.52	21.87	21.87	21.87	21.87	21.87	21.87	21.87	21.87	198.77
Other citrus juice inputs	-	4.44	9.92	13.05	13.05	13.05	13.05	13.05	13.05	13.05	13.05	118.76
SUB-TOTAL	-	24.79	56.54	74.20	74.20	74.20	74.20	74.20	74.20	74.20	74.20	674.92
Vehicle running costs												
Spares for vehicles	12.34	4.11	4.11	4.11	4.11	4.11	4.11	4.11	4.11	4.11	4.11	53.48
Contingency	-	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	20.00
SUB-TOTAL	12.34	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	73.48
Operating costs for factory and processing equipment												
Maintenance/spares for equipm	-	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	148.00
SUB-TOTAL	-	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	148.00
Marketing costs												
Additional cost for expatriate staff												
General Manager	4.38	8.75	4.38	-	-	-	-	-	-	-	-	17.50
Factory Manager	3.75	7.50	7.50	3.75	-	-	-	-	-	-	-	22.50
Commercial Manager	-	6.25	-	-	-	-	-	-	-	-	-	6.25
SUB-TOTAL	8.13	22.50	11.88	3.75	-	-	-	-	-	-	-	46.25
TOTAL	36.72	113.20	113.07	106.36	95.11	95.11	95.11	95.11	95.11	95.11	95.11	1,035.15

TABLE A2.3
OPTION 2

PROJECT LOCAL FINANCIAL RECURRENT COSTS

Years 0 to 10

Constant US$ ('000s)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Staff												
Board of Directors	1.25	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	26.25
Grade C	-	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	15.00
Grade B	-	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	28.00
Grade E	-	1.80	1.80	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	22.80
Grade F	-	0.70	0.70	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	10.20
SUB-TOTAL	1.25	9.30	9.30	10.30	10.30	10.30	10.30	10.30	10.30	10.30	10.30	102.25
Fruit and other input costs												
Orange juice inputs	-	12.28	28.83	37.20	37.20	37.20	37.20	37.20	37.20	37.20	37.20	338.71
Grapefruit juice inputs	-	1.22	2.74	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	32.76
Pineapple juice inputs	-	12.64	28.44	37.92	37.92	37.92	37.92	37.92	37.92	37.92	37.92	344.44
Guava juice inputs	-	1.71	3.88	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	46.63
Other citrus juice inputs	-	0.66	1.48	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	17.75
SUB-TOTAL	-	28.51	65.36	85.80	85.80	85.80	85.80	85.80	85.80	85.80	85.80	780.28
Vehicle running costs												
Spares for vehicles	0.65	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	2.81
Fuel and lubricants	0.83	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	165.83
Contingency	-	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	20.00
SUB-TOTAL	1.47	18.72	18.72	18.72	18.72	18.72	18.72	18.72	18.72	18.72	18.72	186.64
Operating costs for factory and processing equipment												
Fuel for processing equipment	-	25.91	59.86	78.50	78.50	78.50	78.50	78.50	78.50	78.50	78.50	712.78
Maintenance of Buildings	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	10.00
SUB-TOTAL	-	26.91	59.86	79.50	79.50	79.50	79.50	79.50	79.50	79.50	79.50	722.78
Marketing costs												
Advertising campaign	-	3.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	16.50
Freetown store	-	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	24.00
SUB-TOTAL	-	5.40	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	40.50
Additional cost for expatriate staff												
Airfares	7.60	22.80	15.20	7.60	-	-	-	-	-	-	-	53.20
General Manager	4.38	8.75	4.38	-	-	-	-	-	-	-	-	17.50
Factory Manager	3.75	7.50	7.50	3.75	-	-	-	-	-	-	-	22.50
Commercial Manager	-	6.25	-	-	-	-	-	-	-	-	-	6.25
Overheads/Admin	-	5.10	5.10	6.80	6.80	6.80	6.80	6.80	6.80	6.80	6.80	64.60
SUB-TOTAL	15.73	50.40	32.18	18.15	6.80	6.80	6.80	6.80	6.80	6.80	6.80	184.05
TOTAL	18.45	139.23	189.33	216.37	205.02	205.02	205.02	205.02	205.02	205.02	205.02	1,998.50

APPENDIX 3

FINANCIAL ANALYSIS TABLES

FOR OPTION 3

APPENDIX 3

FINANCIAL ANALYSIS TABLES

FOR OPTION 3

TABLE

TABLE A3.1
OPTION 3

TOTAL PROJECT FOREIGN AND LOCAL FINANCIAL CAPITAL COSTS

Years 0 to 10

Constant US$(000s)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Infrastructure Costs												
Hardstanding - resr. & ext.	13.8	-	-	-	-	-	-	-	-	-	-	13.8
Fencing & gateway	1.3	-	-	-	-	-	-	-	-	-	-	1.3
Factory floor	36.3	-	-	-	-	-	-	-	-	-	-	36.3
Factory ventilation	2.1	-	-	-	-	-	-	-	-	-	-	2..
Paint & repairwork	3.7	-	-	-	-	-	-	-	-	-	-	3.7
Internal modifications	2.1	-	-	-	-	-	-	-	-	-	-	2.1
Telecommunications	7.5	-	-	-	-	-	-	-	-	-	-	7.5
Generator	12.0	-	-	-	-	-	-	-	-	-	-	12.0
Contingency	12.1	-	-	-	-	-	-	-	-	-	-	12.1
SUB-TOTAL	90.8	-	-	-	-	-	-	-	-	-	-	90.8
Production Facilities												
Fruit reception bay	2.3	-	-	-	-	-	-	-	-	-	-	2.3
Fruit storage bin	8.0	-	-	-	-	-	-	-	-	-	-	8.0
Cooling tower	4.6	-	-	-	-	-	-	-	-	-	-	4.6
Maintenance workshop	10.3	-	-	-	-	-	-	-	-	-	-	10.3
Contingency	5.0	-	-	-	-	-	-	-	-	-	-	5.0
Delivery of proc. equip	34.4	-	-	-	-	-	-	-	-	-	-	34.4
Installation conting.	17.2	-	-	-	-	-	-	-	-	-	-	17.2
SUB-TOTAL	81.8	-	-	-	-	-	-	-	-	-	-	81.8
Transport												
Tractor	10.8	-	-	-	-	-	10.8	-	-	-	-	21.6
Trailers	2.8	-	-	-	-	-	2.8	-	-	-	-	5.6
Lorry	15.7	-	-	-	-	-	15.7	-	-	-	-	31.4
Saloon cars	17.2	-	-	-	-	-	17.2	-	-	-	-	34.4
Pick-up	4.8	-	-	-	-	-	4.8	-	-	-	-	9.6
4 w/d vehicles	19.4	-	-	-	-	-	19.4	-	-	-	-	38.8
Motorcycle	1.8	-	-	-	-	-	1.8	-	-	-	-	3.6
Local delivery	3.5	-	-	-	-	-	3.5	-	-	-	-	7.0
Contingency	10.6	-	-	-	-	-	10.6	-	-	-	-	21.2
SUB-TOTAL	86.6	-	-	-	-	-	86.6	-	-	-	-	173.2
Processing Equipment												
Fruit washer	5.5	-	-	-	-	-	-	-	-	-	-	5.5
Trimming belt	6.3	-	-	-	-	-	-	-	-	-	-	6.3
Vacuum de-oiler	47.0	-	-	-	-	-	-	-	-	-	-	47.0
Helicoidal refiner	30.0	-	-	-	-	-	-	-	-	-	-	30.0
Cooker crusher	30.4	-	-	-	-	-	-	-	-	-	-	30.4
Homogeniser	29.0	-	-	-	-	-	-	-	-	-	-	29.0
Pasteuriser	39.0	-	-	-	-	-	-	-	-	-	-	39.0
Tetrapak machine	94.0	-	-	-	-	-	-	-	-	-	-	94.0
Misc. equip for modifications	8.0	-	-	-	-	-	-	-	-	-	-	8.0
Contingency	45.0	-	-	-	-	-	-	-	-	-	-	45.0
SUB-TOTAL	334.2	-	-	-	-	-	-	-	-	-	-	334.2
Recommended Equipment												
PH meters	0.5	-	-	-	-	-	-	-	-	-	-	0.5
Water still	0.4	-	-	-	-	-	-	-	-	-	-	0.4
Sugar refractometers	0.2	-	-	-	-	-	-	-	-	-	-	0.2
Essential oil determination e	0.2	-	-	-	-	-	-	-	-	-	-	0.2
Drying oven	0.4	-	-	-	-	-	-	-	-	-	-	0.4
Analytical balance	0.5	-	-	-	-	-	-	-	-	-	-	0.5
Assorted glassware and chemic	0.2	-	-	-	-	-	-	-	-	-	-	0.2
Local delivery	0.3	-	-	-	-	-	-	-	-	-	-	0.3
Contingency	0.4	-	-	-	-	-	-	-	-	-	-	0.4
SUB-TOTAL	3.0	-	-	-	-	-	-	-	-	-	-	3.0
Manpower Training												
Airfares	-	8.6	-	-	-	-	-	-	-	-	-	8.6
Per diems & months	-	22.8	-	-	-	-	-	-	-	-	-	22.8
SUB-TOTAL	-	31.4	-	-	-	-	-	-	-	-	-	31.4
WORKING CAPITAL												
Working capital	87.7	121.6	3.7	(6.1)	(18.8)	-	-	-	-	-	-	188.1
SUB-TOTAL	87.7	121.6	3.7	(6.1)	(18.8)	-	-	-	-	-	-	188.1
TOTAL	604.0	153.0	3.7	(6.1)	(18.8)	-	86.6	-	-	-	-	902.4

TABLE A3.2
OPTION 3

PROJECT FOREIGN FINANCIAL CAPITAL COSTS

Years 0 to 10

Constant US$ (000s)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Infrastructure Costs												
Telecommunications	7.5	-	-	-	-	-	-	-	-	-	-	7.5
Generator	12.0	-	-	-	-	-	-	-	-	-	-	12.0
Contingency	4.8	-	-	-	-	-	-	-	-	-	-	4.8
SUB-TOTAL	24.3	-	-	-	-	-	-	-	-	-	-	24.3
Production Facilities												
Transport												
Tractor	10.8	-	-	-	-	-	10.8	-	-	-	-	21.6
Trailers	2.8	-	-	-	-	-	2.8	-	-	-	-	5.6
Lorry	15.7	-	-	-	-	-	15.7	-	-	-	-	31.4
Saloon cars	17.2	-	-	-	-	-	17.2	-	-	-	-	34.4
Pick-up	4.8	-	-	-	-	-	4.8	-	-	-	-	9.6
4 w/d vehicles	19.4	-	-	-	-	-	19.4	-	-	-	-	38.8
Motorcycle	1.8	-	-	-	-	-	1.8	-	-	-	-	3.6
Local delivery	3.5	-	-	-	-	-	3.5	-	-	-	-	7.0
Contingency	10.1	-	-	-	-	-	10.1	-	-	-	-	20.1
SUB-TOTAL	86.1	-	-	-	-	-	86.1	-	-	-	-	172.1
Processing Equipment												
Fruit washer	5.5	-	-	-	-	-	-	-	-	-	-	5.5
Trimming belt	6.3	-	-	-	-	-	-	-	-	-	-	6.3
Vacuum de-oiler	47.0	-	-	-	-	-	-	-	-	-	-	47.0
Helicoidal refiner	30.0	-	-	-	-	-	-	-	-	-	-	30.0
Cocker crusher	30.4	-	-	-	-	-	-	-	-	-	-	30.4
Homogeniser	29.0	-	-	-	-	-	-	-	-	-	-	29.0
Pasteuriser	39.0	-	-	-	-	-	-	-	-	-	-	39.0
Tetrapak machine	94.0	-	-	-	-	-	-	-	-	-	-	94.0
Misc. equip for modifications	8.0	-	-	-	-	-	-	-	-	-	-	8.0
Contingency	45.0	-	-	-	-	-	-	-	-	-	-	45.0
SUB-TOTAL	334.2	-	-	-	-	-	-	-	-	-	-	334.2
Recommended Equipment												
PH meters	0.5	-	-	-	-	-	-	-	-	-	-	0.5
Water still	0.4	-	-	-	-	-	-	-	-	-	-	0.4
Sugar refractometers	0.2	-	-	-	-	-	-	-	-	-	-	0.2
Essential oil determination e	0.2	-	-	-	-	-	-	-	-	-	-	0.2
Drying oven	0.4	-	-	-	-	-	-	-	-	-	-	0.4
Analytical balance	0.5	-	-	-	-	-	-	-	-	-	-	0.5
Assorted glassware and chemic	0.2	-	-	-	-	-	-	-	-	-	-	0.2
Contingency	0.3	-		-	-	-	-	-	-	-	-	0.3
SUB-TOTAL	2.7	-	-	-	-	-	-	-	-	-	-	2.7
Manpower Training												
Per diems 6 months	-	22.8	-	-	-	-	-	-	-	-	-	22.8
SUB-TOTAL	-	22.8	-	-	-	-	-	-	-	-	-	22.8
WORKING CAPITAL												
Working capital	35.1	48.6	1.5	(2.4)	(7.5)	-	-	-	-	-	-	75.2
SUB-TOTAL	35.1	48.6	1.5	(2.4)	(7.5)	-	-	-	-	-	-	75.2
TOTAL	482.4	71.4	1.5	(2.4)	(7.5)	-	86.1	-	-	-	-	631.4

TABLE A3.3
OPTION 3

PROJECT LOCAL FINANCIAL CAPITAL COSTS

Years 0 to 10

Constant US$ (000s)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Infrastructure Costs												
Hardstanding - resf. & ext.	13.8	-	-	-	-	-	-	-	-	-	-	13.8
Fencing & gateway	1.3	-	-	-	-	-	-	-	-	-	-	1.3
Factory floor	36.3	-	-	-	-	-	-	-	-	-	-	36.3
Factory ventilation	2.1	-	-	-	-	-	-	-	-	-	-	2.1
Paint & repairwork	3.7	-	-	-	-	-	-	-	-	-	-	3.7
Internal modifications	2.1	-	-	-	-	-	-	-	-	-	-	2.1
Contingency	7.3	-	-	-	-	-	-	-	-	-	-	7.3
SUB-TOTAL	66.4	-	-	-	-	-	-	-	-	-	-	66.4
Production Facilities												
Fruit reception bay	2.3	-	-	-	-	-	-	-	-	-	-	2.3
Fruit storage bin	8.0	-	-	-	-	-	-	-	-	-	-	8.0
Cooling tower	4.6	-	-	-	-	-	-	-	-	-	-	4.6
Maintenance workshop	10.3	-	-	-	-	-	-	-	-	-	-	10.3
Contingency	5.0	-	-	-	-	-	-	-	-	-	-	5.0
Delivery of proc. equip	34.4	-	-	-	-	-	-	-	-	-	-	34.4
Installation contig.	17.2	-	-	-	-	-	-	-	-	-	-	17.2
SUB-TOTAL	81.8	-	-	-	-	-	-	-	-	-	-	81.8
Transport												
Contingency	0.5	-	-	-	-	-	0.5	-	-	-	-	1.1
SUB-TOTAL	0.5	-	-	-	-	-	0.5	-	-	-	-	1.1
Processing Equipment												
Recommended Equipment												
Local delivery	0.3	-	-	-	-	-	-	-	-	-	-	0.3
Contingency	0.0	-	-	-	-	-	-	-	-	-	-	0.0
SUB-TOTAL	0.3	-	-	-	-	-	-	-	-	-	-	0.3
Manpower Training												
Airfares	-	8.6	-	-	-	-	-	-	-	-	-	8.6
SUB-TOTAL	-	8.6	-	-	-	-	-	-	-	-	-	8.6
WORKING CAPITAL												
Working capital	52.6	73.0	2.2	(3.6)	(11.3)	-	-	-	-	-	-	112.9
SUB-TOTAL	52.6	73.0	2.2	(3.6)	(11.3)	-	-	-	-	-	-	112.9
TOTAL	201.6	81.6	2.2	(3.6)	(11.3)	-	0.5	-	-	-	-	271.0

TABLE A3.4
OPTION 3

TOTAL PROJECT FOREIGN AND LOCAL FINANCIAL RECURRENT COSTS

Years 0 to 10

Constant US$ (000s)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Staff												
Board of Directors	2.88	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	60.38
General Manager	17.50	35.00	17.50	-	-	-	-	-	-	-	-	70.00
Factory Manager	15.00	30.00	30.00	15.00	-	-	-	-	-	-	-	90.00
Commercial Manager	-	25.00	-	-	-	-	-	-	-	-	-	25.00
Grade C	-	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	34.50
Grade D	-	6.44	6.44	6.44	6.44	6.44	6.44	6.44	6.44	6.44	6.44	64.40
Grade E	-	4.14	4.14	5.52	5.52	5.52	5.52	5.52	5.52	5.52	5.52	52.44
Grade F	-	1.61	1.61	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	23.46
SUB-TOTAL	35.38	111.39	68.89	38.69	23.69	23.69	23.69	23.69	23.69	23.69	23.69	420.18
Fruit and other input costs												
Orange juice inputs	-	26.40	62.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00	728.40
Grapefruit juice inputs	-	5.10	11.40	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	136.50
Pineapple juice inputs	-	28.00	63.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	763.00
Guava juice inputs	-	9.00	20.40	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	245.40
Other citrus juice inputs	-	5.10	11.40	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	136.50
SUB-TOTAL	-	73.60	168.20	221.00	221.00	221.00	221.00	221.00	221.00	221.00	221.00	2,009.80
Vehicle running costs												
Spares for vehicles	12.99	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	56.29
Fuel and lubricants	1.89	37.80	37.80	37.80	37.80	37.80	37.80	37.80	37.80	37.80	37.80	379.89
Contingency	-	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	50.00
SUB-TOTAL	14.88	47.13	47.13	47.13	47.13	47.13	47.13	47.13	47.13	47.13	47.13	486.18
Operating costs for factory and processing equipment												
Fuel for processing equipment	-	59.40	135.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	1,634.40
Maintenance/spares for equipm	-	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	148.00
Maintenance of Buildings	-	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	23.00
SUB-TOTAL	-	76.50	152.10	197.10	197.10	197.10	197.10	197.10	197.10	197.10	197.10	1,805.40
Marketing costs												
Advertising campaign	-	6.80	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	37.40
Freetown store	-	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	55.00
SUB-TOTAL	-	12.30	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	92.40
Additional cost for expatriate staff												
Airfares	17.60	52.80	35.20	17.60	-	-	-	-	-	-	-	123.20
General Manager	17.50	35.00	17.50	-	-	-	-	-	-	-	-	70.00
Factory Manager	15.00	30.00	30.00	15.00	-	-	-	-	-	-	-	90.00
Commercial Manager	-	25.00	-	-	-	-	-	-	-	-	-	25.00
Overheads/Admin	15.60	11.70	11.70	15.60	15.60	15.60	15.60	15.60	15.60	15.60	15.60	163.80
SUB-TOTAL	65.70	154.50	94.40	48.20	15.60	15.60	15.60	15.60	15.60	15.60	15.60	472.00
TOTAL	115.96	475.42	539.62	561.02	513.42	513.42	513.42	513.42	513.42	513.42	513.42	5,285.96

TABLE A3.5
OPTION 3

PROJECT FOREIGN FINANCIAL RECURRENT COSTS

Years 0 to 10

Constant US$ (000s)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Staff												
General Manager	17.50	35.00	17.50	-	-	-	-	-	-	-	-	70.00
Factory Manager	15.00	30.00	30.00	15.00	-	-	-	-	-	-	-	90.00
Commercial Manager	-	25.00	-	-	-	-	-	-	-	-	-	25.00
SUB-TOTAL	32.50	90.00	47.50	15.00	-	-	-	-	-	-	-	185.00
Fruit and other input costs												
Orange juice inputs	-	5.62	13.21	17.04	17.04	17.04	17.04	17.04	17.04	17.04	17.04	155.15
Grapefruit juice inputs	-	2.23	4.98	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	59.65
Pineapple juice inputs	-	2.83	6.36	8.48	8.48	8.48	8.48	8.48	8.48	8.48	8.48	77.06
Guava juice inputs	-	5.79	13.12	17.36	17.36	17.36	17.36	17.36	17.36	17.36	17.36	157.79
Other citrus juice inputs	-	3.83	8.55	11.25	11.25	11.25	11.25	11.25	11.25	11.25	11.25	102.38
SUB-TOTAL	-	20.29	46.22	60.69	60.69	60.69	60.69	60.69	60.69	60.69	60.69	552.03
Vehicle running costs												
Spares for vehicles	12.34	4.11	4.11	4.11	4.11	4.11	4.11	4.11	4.11	4.11	4.11	53.46
Contingency	-	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	25.00
SUB-TOTAL	12.34	6.61	6.61	6.61	6.61	6.61	6.61	6.61	6.61	6.61	6.61	78.46
Operating costs for factory and processing equipment												
Maintenance/spares for equipm	-	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	148.00
SUB-TOTAL	-	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	148.00
Marketing costs												
Additional cost for expatriate staff												
General Manager	8.75	17.50	8.75	-	-	-	-	-	-	-	-	35.00
Factory Manager	7.50	15.00	15.00	7.50	-	-	-	-	-	-	-	45.00
Commercial Manager	-	12.50	-	-	-	-	-	-	-	-	-	12.50
SUB-TOTAL	16.25	45.00	23.75	7.50	-	-	-	-	-	-	-	92.50
TOTAL	61.09	176.71	138.88	104.60	82.10	82.10	82.10	82.10	82.10	82.10	82.10	1,056.01

TABLE A3.6
OPTION 3

PROJECT LOCAL FINANCIAL RECURRENT COSTS

Years 0 to 10

Constant US$ (000s)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Staff												
Board of Directors	2.88	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	60.38
Grade C	-	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	34.50
Grade D	-	6.44	6.44	6.44	6.44	6.44	6.44	6.44	6.44	6.44	6.44	64.40
Grade E	-	4.14	4.14	5.52	5.52	5.52	5.52	5.52	5.52	5.52	5.52	52.44
Grade F	-	1.61	1.61	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	23.46
SUB-TOTAL	2.88	21.39	21.39	23.69	23.69	23.69	23.69	23.69	23.69	23.69	23.69	235.18
Fruit and other input costs												
Orange juice inputs	-	20.78	48.79	62.96	62.96	62.96	62.96	62.96	62.96	62.96	62.96	573.25
Grapefruit juice inputs	-	2.87	6.42	8.45	8.45	8.45	8.45	8.45	8.45	8.45	8.45	78.85
Pineapple juice inputs	-	25.17	56.64	75.52	75.52	75.52	75.52	75.52	75.52	75.52	75.52	685.94
Guava juice inputs	-	3.21	7.28	9.64	9.64	9.64	9.64	9.64	9.64	9.64	9.64	87.61
Other citrus juice inputs	-	1.28	2.85	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	34.13
SUB-TOTAL	-	53.31	121.98	160.31	160.31	160.31	160.31	160.31	160.31	160.31	160.31	1,457.77
Vehicle running costs												
Spares for vehicles	0.65	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	2.81
Fuel and lubricants	1.89	37.80	37.80	37.80	37.80	37.80	37.80	37.80	37.80	37.80	37.80	379.89
Contingency	-	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	25.00
SUB-TOTAL	2.54	40.52	40.52	40.52	40.52	40.52	40.52	40.52	40.52	40.52	40.52	407.70
Operating costs for factory and processing equipment												
Fuel for processing equipment	-	59.40	135.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	1,634.40
Maintenance of Buildings	-	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	23.00
SUB-TOTAL	-	61.70	137.30	182.30	182.30	182.30	182.30	182.30	182.30	182.30	182.30	1,657.40
Marketing costs												
Advertising campaign	-	6.80	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	37.40
Freetown store	-	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	55.00
SUB-TOTAL	-	12.30	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	8.90	92.40
Additional cost for expatriate staff												
Airfares	17.60	52.80	35.20	17.60	-	-	-	-	-	-	-	123.20
General Manager	8.75	17.50	8.75	-	-	-	-	-	-	-	-	35.00
Factory Manager	7.50	15.00	15.00	7.50	-	-	-	-	-	-	-	45.00
Commercial Manager	-	12.50	-	-	-	-	-	-	-	-	-	12.50
Overheads/Admin	15.60	11.70	11.70	15.60	15.60	15.60	15.60	15.60	15.60	15.60	15.60	163.80
SUB-TOTAL	49.45	109.50	70.65	40.70	15.60	15.60	15.60	15.60	15.60	15.60	15.60	379.50
TOTAL	54.86	298.71	400.74	456.42	431.32	431.32	431.32	431.32	431.32	431.32	431.32	4,229.95

TABLE A3.7
OPTION 3

TOTAL PROJECT FOREIGN AND LOCAL FINANCIAL SALES REVENUE

Years 0 to 10

Constant US$('000s)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Fruit juice sales												
Orange juice	-	224.40	510.00	680.00	680.00	680.00	680.00	680.00	680.00	680.00	680.00	6,174.40
Grapefruit juice	-	57.80	129.20	170.00	170.00	170.00	170.00	170.00	170.00	170.00	170.00	1,547.00
Pineapple juice	-	136.00	306.00	408.00	408.00	408.00	408.00	408.00	408.00	408.00	408.00	3,706.00
Guava juice	-	102.00	231.20	306.00	306.00	306.00	306.00	306.00	306.00	306.00	306.00	2,761.20
Other citrus juice	-	57.80	129.20	170.00	170.00	170.00	170.00	170.00	170.00	170.00	170.00	1,547.00
SUB-TOTAL	-	578.00	1,305.60	1,734.00	1,734.00	1,734.00	1,734.00	1,734.00	1,734.00	1,734.00	1,734.00	15,755.60
TOTAL	-	578.00	1,305.60	1,734.00	1,734.00	1,734.00	1,734.00	1,734.00	1,734.00	1,734.00	1,734.00	15,755.60

TABLE A3.8
OPTION 3

PROJECT FOREIGN FINANCIAL SALES REVENUE

Years 0 to 10

Constant US$(000s)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Fruit juice sales												
Orange juice	-	56.10	127.50	170.00	170.00	170.00	170.00	170.00	170.00	170.00	170.00	1,543.60
Grapefruit juice	-	14.45	32.30	42.50	42.50	42.50	42.50	42.50	42.50	42.50	42.50	386.75
Pineapple juice	-	34.00	76.50	102.00	102.00	102.00	102.00	102.00	102.00	102.00	102.00	926.50
Guava juice	-	25.50	57.80	76.50	76.50	76.50	76.50	76.50	76.50	76.50	76.50	695.30
Other citrus juice	-	14.45	32.30	42.50	42.50	42.50	42.50	42.50	42.50	42.50	42.50	386.75
SUB-TOTAL	-	144.50	326.40	433.50	433.50	433.50	433.50	433.50	433.50	433.50	433.50	3,938.90
TOTAL	-	144.50	326.40	433.50	433.50	433.50	433.50	433.50	433.50	433.50	433.50	3,938.90

TABLE A3.9
OPTION 3

PROJECT LOCAL FINANCIAL SALES REVENUE

Years 0 to 10

Constant US$(000us)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Fruit juice sales												
Orange juice	-	168.30	382.50	510.00	510.00	510.00	510.00	510.00	510.00	510.00	510.00	4,430.80
Grapefruit juice	-	43.35	96.90	127.50	127.50	127.50	127.50	127.50	127.50	127.50	127.50	1,160.25
Pineapple juice	-	102.00	229.50	306.00	306.00	306.00	306.00	306.00	306.00	306.00	306.00	2,779.50
Guava juice	-	76.50	173.40	229.50	229.50	229.50	229.50	229.50	229.50	229.50	229.50	2,085.90
Other citrus juice	-	43.35	96.90	127.50	127.50	127.50	127.50	127.50	127.50	127.50	127.50	1,160.25
SUB-TOTAL	-	433.50	979.20	1,300.50	1,300.50	1,300.50	1,300.50	1,300.50	1,300.50	1,300.50	1,300.50	11,816.70
TOTAL	-	433.50	979.20	1,300.50	1,300.50	1,300.50	1,300.50	1,300.50	1,300.50	1,300.50	1,300.50	11,816.70

APPENDIX 4

M.P. TINNE ITINERARY

APPENDIX 4

M.P. TINNE ITINERARY

Discussions were held with:

UNIDO Officers

Mr. A. Makovets	UNIDO, Vienna
Mr. A. Quan	UNIDO, Vienna
Mr. Makonnen Alemayehu	Senior Industrial Development Field Adviser, UNIDO, c/o UNDP Freetown
Mr. B. Westgaard	UNIDO (UNDP Freetown)
Dr. A. Monteiro	Chief Technical Adviser, Ministry of Trade and Industry, Freetown, Sierra Leone
Mr. S.S. Kamara	Ministry of Trade and Industry

NIADP

Mr. D.A. Turay	Project Manager, Northern ADP, Makeni
Mr. Paul Koroma	Deputy Project Manager, Makeni
Mr. Aloysius Kanu	Commercial Services Manager, Makeni
Mr. Moses Lahai	Monitoring and Evaluation Officer, Makeni
Mr. A.R. Wurie	Deputy Monitoring and Evaluation Officer, Makeni
Mr. R.B. Mansaray	Superintendent of M & E Office
Mr. M.A.K. Koroma	Mechanical Engineer
Mr. A.M. Bangura	Administration Officer
Mr. M. Vickers	Tree Crop Agronomist (newly appointed to NIADP)

Others

Mr. Yusuf Sesay	Senior Manager, Technical, National Insurance Company
Mr. David Challis A.D.	Deputy Manager, Barclays Bank of Sierra Leone Limited
Mrs. Olive Taylor	Legal Adviser, NDB - Acting General Manager
Mr. M.M. Nelson-Okarfur	Administration Officer, NDB
Mrs. Khadija Kamara	Assistant Director of Operations, NDB
Mr. Tucker	NDB Representative in Makeni

The above list is not comprehensive and during team member's stay in Sierra Leone, discussions were held and views taken from a wide number of people.

We again cannot thank all concerned enough for their friendly co-operation and openness in discussing the problems and giving of their valuable time.