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PROMOTION AND DEVELOPMENT OF SMALL AND MEDIUM SCALE INDUSTRIES (PHASE II)

DP/SOI/90/007

SOLOMON ISLANDS

Technical report: Food processing*

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

Based on the work of Olu Omosaiye,
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* Mention of firm names and commercial products does not imply the endorsement of the United Nations Industrial Development Organization (UNIDO). This document has not been edited.

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The mission, which lasted from August 2, 1992 to January 1, 1993, focussed on providing the technical expertise and training required in the setting up of small scale commercial food processing. The mission is part of the activities of Project SOI/90/007 - Promotion and Development of Small and Medium Scale Industries (Phase II). The promotion and development of small-medium scale food industry is a priority of government.

Small-scale food processing industries in the Solomons are developing although slowly. The slow pace of development is due to a number of factors commonly found in any developing country. These include inconsistency in the supply of raw materials, low level of nationwide infrastructural development, transportation and distribution problems, small and undeveloped markets and lack of manpower and appropriate technological information for food processing among others.

Against this background, the low-cost approach to the development of small scale food processing businesses was chosen especially in the area of equipment sourcing and infrastructural requirements. The equipment should be low-cost and appropriate to the tasks at hand. Secondly, facilities should also be cost-effective while ensuring good manufacturing practice.

Consequently, entrepreneurs are emerging with businesses such as peanut roasting and peanut butter, chips production, fresh fruit juice, fruit drying and preserves, such as jams, jellies and marmalades. The development is akin to the birth of a new baby that must be nurtured.

Therefore, continued technical assistance from UNIDO Project Personnel and Business/Management support from the Business Development Unit are required to see these enterprises to fruition.

I. BACKGROUND

A mission was undertaken to Solomon Islands on August 2, 1992 - January 1, 1993 to provide the technical expertise and training required in the setting up of small scale commercial food processing. The mission is part of PROJECT DP/SOI/90/007/11-53 titled "Promotion and Development of Small and Medium Scale Industries" (Phase II), project of the Government of Solomon Islands.

The project is intended to promote the development of small and medium-scale industrial ventures within the Solomon Islands and thereby contribute to additional employment and income in both urban and rural areas, particularly emphasizing Provincial Industrial Development.

Food processing is a targeted industry in the project. It has the potential to contribute significantly to rural employment, to import substitution and export trade. The wealth of food items grown in the Solomon Islands could be used as the basis for cottage food processing enterprises. Surveys in Solomon Islands indicate that women are responsible for about 65% of agriculture work. Therefore, the significant contribution that women make in food processing, which is generally underestimated, is targeted for assistance under the project.

Consequently, there is a need to develop both entrepreneurial technical knowledge about these industrial sectors as well as entrepreneurial capacity to manage the industry as a business. Thus, the Ministry of Commerce and Primary Industry needs technical assistance in promoting and developing these industries.

The Terms of Reference, which is a modified form of the job description are as follows:

1. To provide technical expertise in the small scale, commercial processing of local fruits, nuts and vegetables.

2. To identify appropriate food items for small scale processing, identify machinery, and methods of production as well as advising on packaging etc.

3. Other crops to be worked on include mango, papaya, pineapple, banana, coconut, ngali nut, coffee, chillie, tumeric, honey.

4. Small-scale processing of cocoa.

5. Identification of other possible items for processing. Items of potential include honey coated ngali nuts, roasted groundnuts, peanut butter, small-scale fruit juicing, coconut chips and other products, fruit jams and dried fruits. There is an abundance of marine resources such as reef fish, tuna fish, shell fish etc.

The main theme - technical advise and training, as stipulated in the job description, also formed part of the activities during the mission.

II. ACTIVITIES CARRIED OUT

Following briefings by the CTA, initial contacts with key personnel in the Ministry of Commerce and Primary Industry working with the Project and other government institutions, a work plan, presented in bar chart was formulated (Annex II.1). Details of the work plan are presented in Annex II.2.

To have a clearer picture of the macro-economic environment and legal framework in which the small-medium industries (SMI) in food processing operate, it became necessary, as part of the familiarization efforts to discuss government development objectives with respect to SMI's in food processing. This was followed by the evaluation of problems and constraints hindering the achievement of stated government development objectives and the impact of policies on SMIs. Institutions and infrastructural facilities in support of Industry were visited. These include public institutions such as Dodo Creek Research Station, Commodity Export Marketing Authority (CEMA), the Ministry of Agriculture and Lands (MAL), Livestock Development Authority (LDA), some finance houses, and Solomon Islands College of Higher Education (SICHE) for Human Resources Development.

A market survey was undertaken to have an idea of market organisation, size, types of foods for sale in the domestic market, sources and prices. The survey gave a general idea of the National food basket. Retail and Supermarket shops were visited to note the variety of goods, their sources, turn-over rates and consumer reaction generally.

Some large and small scale food industries and service industries were visited. Palm oil production for exports by Solomon Islands Plantations Limited (SIPL), is a key foreign exchange earner for the government. The possibility of the local consumption of fresh palm oil was discussed since the quality of the finished products meets international standards. Currently, the consumption of palm oil in local diets has not been introduced and is very much unknown.

A & A Brothers, producers of banana, tapioca and kumara chips, and Varivao Holdings, processors of Coffee and Spices, who had been assisted under this project were also visited. Efforts are being intensified by CEMA to promote the marketing of Ngali nuts in addition to their roles in promoting the marketing and exports of copra and cocoa.

It became necessary to visit Dodo Creek Research Station to observe Ngali nut processing which includes labour-intensive cracking between two stones, removal of kernel from testa, roasting and packing. There are on-going initiatives to develop ngali nuts into snack foods and other high value products with export potential, in addition to marketing to generate foreign exchange.

The Honey Producers Association is a good example of a successfu co-operative producing and marketing honey. The Co-operative is currently looking for markets overseas. R & R Engineering is an advanced group of engineers involved mainly with boat building. They have local capacity for general engineering and steel fabrication. The project looks forward to R & R Engineering to fabricate basic cost-effective and reliable food processing equipment or replicate them as and when required.

Betikama High School offers opportunities in both academic and professional/ technical knowledge to her students. The school is involved in agricultural development and teaching programme in fruits and vegetables and is the only place in the Solomons where fresh pasteurized dairy milk is produced in small quantities. The consultant assisted Betikama in sourcing equipment for a mini-dairy for the school.

Although discussions were held with all donor agencies listed in the work plan, only two of these have on-going projects directly related to this project. These are:

(i) FAO root crop processing project for Vanuatu, Tonga and Solomon Islands; with the objective of increasing the ability of home kitchen in processing root crops for the benefit of a household unit to enhance the capacity to produce more root crops for marketing in urban centres so as to create conditions to become self sufficient and self-reliant in food production.

(ii) New Zealand High Commission provided the cash grant of SOI$70,000 as part of its miscellaneous Technical Assistance to the Ministry of Commerce and Primary Industry for the Local Food Processing Entrepreneurs Development Project. The emphasis of the commission is on women participation in the project, that has been established to help Solomon Islanders establish small scale businesses that process locally grown foods for sale throughout the country and possibly overseas.

On the other hand, the EEC funds the Smallholder Development Programme (SDP). The objective is to raise productivity of the small holder sector, and encourage diversification from main cash crops. This is likely to contribute to increased agricultural production of food crops on the long run. By the same token, the Embassy of the Republic of China funds and provides technical assistance for rice and vegetable production project in Honiara.

The Development Bank of Solomon Islands plays a vital role in promoting and supporting emerging enterprises engaged in manufacturing and processing. From agriculture to industry, commerce and services, more than 154 commercial enterprises have been assisted with funds in excess of $4 million.

The commercial banks and the Central Bank of Solomon Islands through its Small Loan Guarantee Scheme, have largely contributed.

During the mission, the consultant demonstrated the potential uses of fresh palm oil to a group of women at the Women Interest Centre and co-operated with the FAO in conducting a workshop on Root Crops Processing. At the workshop, the consultant also demonstrated derived food products from cassava and cassava leaves.

A very important component of the activities was the training workshop conducted for existing and potential entrepreneurs in small-scale food processing. This had a positive impact in that more entrepreneurs are now interested in going into small-scale food processing as a business.

III. FINDINGS

A. The Food Processing Sector : An Overview

1. Solomon Islands is basically an agrarian country with the bulk of its population living in the rural areas. The pattern of distribution of the population is highly fragmented over a wide dispersion of islands. The population is engaged in subsistence level of food production, cultivating food crops such as sweet potato, (which predominates) yams, taro, cassava, cabbage, maize, melons, beans, shallots, peanuts, tomatoes, tobacco, bananas, pineapple, sugarcane and papaya. When yields are good, the excess supply is sold to rural markets and urban centres including Honiara.

Rice production declined after cyclone Namu devastated the land, followed by complications such as frequent breakdowns of planting equipment, lack of well-trained operators and labour and the high incidence of pests and diseases. The Republic of China (Taiwan) currently assists the government in rehabilitating the rice production programme.

Food production, and the logistic problems associated with collection and transporting to urban markets, has necessitated an ever growing need to import most foodstuff. The value of food imported suggests considerable opportunities for expanding food production to meet demand.

As yet, there are no production surplusses to provide a reliable and continuing supply of raw materials for food processing, and no production statistics to reflect the level of production. The principal plantation crops, or cash crops grown in the Solomons are coconuts, oil palm and cocoa. The primary production statistics is shown in table III.1.

Table III.1

PRIMARY PRODUCTION OF CASH CROPS
(TONS unless otherwise indicated).

	1990	1991	% Change
Copra	34,306	25,133	-26.7
Coconut oil	2,693	2,717	0.9
Palm oil	22,104	22,518	1.9
Palm kernel	5,051	4,992	-1.2
Cocoa	3,895	4,615	18.5
Fish catch	25,986	42,704	64.3
Cattle slaughtered (no)	420	295	-18.0
Timber logs ($000m^3$)	346	245	-29.2

SOURCE: EIU Country Report No. 2 1992. The Economic Intelligence Unit.

2. Food Consumption Pattern

Food civilization revolves around energy-giving root crops (the main staple) such as sweet potatoes, taro, yam, pana, cassava, bananas, rice and coconuts, and protecting foods such as fruits and vegetables. For body building, fish (fresh and canned) is commonly eaten as a source of protein while people in the higher income bracket consume in addition to fish and seafoods, meat and meat products derived from pork, beef and chicken. These are generally more expensive. Other processed items in the food basket include bread, butter, noodles, milk and derived products, coffee and cocoa based beverages. Most of these are imported.

In all cases, the consumption pattern is influenced by availability, price, employment status and eating habits.

The evening meal is heaviest consisting of a high proportion of energy staples. For people in the low income bracket, the meal is generally low in protein.

3. Though Solomon Islands abound in natural resources, very little processing of the local raw materials is done. Most of the food units are in the medium to large scale sector which is dependent on imported goods and services to a considerable extent. The small scale sector is confined to the production of chips, coffee, spices, bread, ice cream and ice block. The large scale sector operates in the fields of flour milling, fish processing, copra processing, palm oil extraction and cocoa beans for export.

The major foods being processed are shown in the following figure.

Major Processed Foods in Solomon Islands

1.	Wheat (imported)	→	Flour Bread Biscuits (also imported).
2.	Rice (paddy) (imported)	→	Milled (also imported) rice.
3.	Fruits	→	Processed products (imported)
4.	Fish	→	Frozen, canned fish, smoked, filleted
5.	Coffee	→	Coffee beans (arabica imported)
6.	Spices	→	Ground spices (also imported)
7.	Cocoa	→	Dried beans for export
8.	Palm oil	→	Red palm oil (exported) Palm kernel (exported) Palm kernel oil (some exported)
9.	Livestock	→	Dressed meat
10.	Peanuts	→	Roasted peanuts (also imported) Peanut oil (imported)
11.	Rootcrops	→	Chips. (also imported)
12.	Breadfruit (nambo)	→	Dried nambo chips
13.	Dairy milk	→	Fresh pasteurized milk (small scale) Most dairy products imported.
14.	Tobacco	→	Local tobacco for smoking. Other tobacco products imported.

4. Traditional Food Processing

Preservation techniques involve the use of the 'hot stone oven', bamboo cooking and sun drying. The main food processing and preservation adopted was limited to ngali nut (baking, charcoal fire drying, bamboo cooking), breadfruit (nambo) (baking, charcoal fire drying), and cassava or taro pudding (shelf life: 2 to 3 months). Traditionally, the Melanesian population engaged in very little food processing that would keep for more than a day or two. The Polynesian population engaged in fish and marine shell meat drying which would keep for a long time. The basic village technology could be upgraded so as to have applications in commercical food processing.

5. Mechanized Food Processing

5.1 Small-scale Food Processing Industries:

The promotion of small-scale food processing industries is a priority of government. As a result, the Local Food Processing Entrepreneurs Development Project (Annex III.1) was established to help Solomon Islanders establish small scale businesses that process locally grown foods for sale throughout the country and possibly overseas. To date the following industries have been established:

- two chips production factories. (utilising locally produced tapioca, kumara and banana)
- coffee processing facility; spice processing;
- peanut roasting facility.

Other small scale food processing factories are in various stages of development. These include small scale fruit juicing, the production of preserves and fruit drying.

There are other small scale food processing facilities not utilising locally produced raw materials. These include the production of ice cream and ice blocks, hot bread, fish fillets, and snack foods such as twisties.

Most of the processing industries except hot bread are located in Honiara. Fresh meat, pork and chicken processing are on a limited scale and requires expansion. Usually, rural people are not served. Betikama High School produces fresh milk in Honiara but sales is limited to a few retail outlets. Demand for fresh milk is high but supply cannot meet the demand.

5.2 Large Scale Food Processing:

This includes fish processing - the production of tuna (frozen, canned, and smoked) by Solomon Taiyo Limited, rice milling and polishing (Solrice), flour processing and biscuit manufacturing by Fielders Limited. Canned tuna is sold locally, while smoked tuna is primarily produced for overseas markets. Solomon Islands Plantation Limited is involved in oil processing and kernel extraction mainly for exports. Copra is produced by small holders and private plantations. However, oil extraction from copra is undertaken by Lever Solomons mainly for exports. A new brewery is expected to be commissioned in April 1993, by SOLBREW.

6. Importance of Food Processing in the Country's Economy

The economy is very much natural resource based with agriculture, including forestry, livestock and fisheries as the largest sector of the economy, accounting for over 50% of GDP.

6.1 Contribution to Export

The contribution of food processing to the economy is best appreciated from exports (Table III.2). In 1991, the contribution of food processing in value terms to total exports was 66.2%. The most important export earner representing 46.4% of all exports was fish products. Other relevant exports were palm oil products 8.82%, cocoa 5.6% and copra 4.55%.

6.2 Contribution to Employment

As in most developing countries, the food manufacturing sector is the predominant sector. It contributed almost 48% of the total number of jobs in the manufacturing sector of the country according to the Department of Statistics as at June 30 1991. (Table III.3).

Table III.2 Agro - Industries Export by Value ($'000) to Total Export

	1984	1985	1986	1987	1988	1989	1990	1991
Copra	32,199	23,471	1,961	8,328	15,656	20,974	10,936	10,369
Coconut Oil	-	-	-	-	-	-	2,467	1,886
Palm Oil Products	17,295	13,747	6,023	7,628	14,005	20,101	19,433	20,097
Cocoa	3,366	5,009	6,472	9,198	7,445	7,935	11,051	12,861
Total Agric.	52,860	42,227	18,456	25,154	37,106	49,010	43,887	45,213
Fish Products	28,800	31,955	52,928	54,580	78,403	65,293	53,185	105,708
Timber Products	30,058	24,744	35,727	37,173	39,789	41,322	60,812	53,557
Other Exports	6,845	4,883	7,788	11,391	15,276	15,633	19,427	23,292
Total Export	118,563	103,809	114,899	128,298	170,574	171,258	177,311	227,790
Cocoa as % Total Export	2.84	4.83	5.63	7.17	4.36	4.63	6.23	5.65
Cocoa as % Total Agric. Exports	6.37	11.86	35.07	36.57	20.06	16.19	25.18	28.45

SOURCE: STATISTICS OFFICE
HONIARA.

MARCH 1992

TABLE III.3

EMPLOYMENT BY INDUSTRIAL CLASSIFICATION. TYPE AND SEX

(at 30th June, 1991)

Food Manufacturing	885	85	5	0	6	0	981
Tobacco Manufacturing	72	10	1	0	2	1	86
Clothing Manufacturing	33	60	2	2	4	25	126
Sawmilling	154	2	1	0	2	0	159
Furniture Manufacturing	120	28	5	1	0	0	154
Print/Paper	62	26	0	0	3	1	92
Other Manufacturing	412	23	17	4	5	2	463
TOTAL MANUFACTURING	1738	234	31	7	22	29	2061

SOURCE: STATISTICS OFFICE
HONIARA.

MARCH 1992

III. B Government Development Objectives

1. Industrial Development

According to the National Development Plan 1990 - 1994; the industrial policy in broad terms relates to a framework for increasing industrial investment and development in the Solomon Islands; developing exports of processed or manufactured goods and import substitution.

1.1 Aims and Objectives

To optimise the potential for industrialization; the objectives of the industrial policy are to:

i. promote and establish local manufacturing and service industries by Solomon Islanders.

ii. provide relevant assistance to potential local entrepreneurs.

iii. provide necessary infrastructure to accommodate the development of industries.

iv. ensure maximum benefits are derived from local resources.

v. establish applicable incentives that are conducive to industrial development.

To achieve stated objectives: Government will ensure as far as possible that:

i. a literate and trained work force is available.

ii. to maximise employment, particular emphasis will be placed on agro-industry, through increased processing of raw materials such as timber and marine products and crops such as coffee, ngali nuts, cocoa, soursop, chillies, etc.

iii. import substitution to be achieved by developing local companies that can offer substitute goods at an economic price.

iv. development of local expertise (capacity) and participation in the industrial process by:

- introducing new products to the market e.g. local coffee and cocoa; and

- developing the capabilities of existing industries e.g construction, furniture, sheet metal etc.

2. Business Development: Commercial Policy

The government policy is to encourage the development of more Solomon Islander owned business and to increase the overall participation of Solomon Islanders at all levels in the Commercial economy.

2.1 Objectives

The objectives are stated inter alia:

i. to encourage the establishment and development of efficient small business in Solomon Islands.

ii. to increase the number and scope of Solomon Islands Businesses and more services to provide improved standard of living to the people through the advisory extension services provided by the Business Development Division.

iii. to provide training courses and organise business seminars and workshops for business enterprise owners in Honiara, in the provincial centres and in the rural areas to improve their business management and accounting skills.

The Promotion of Business Enterprises is one of the programmes mapped out to achieve the objectives and small-medium-scale food processing constitutes one of the new opportunity business areas identified

It is hoped that these objectives will also lead to:

i. the achievement and maintenance of self sufficiency in food production.

ii. increased cash income and increased number of entrepreneurs in small-scale food processing; and

iii. improved foreign exchange earnings.

III.C Problems and Constraints Hindering the Achievement of Governments Development Objectives.

1. Agro Ecological Constraints.

Like other Pacific Island countries, Solomon Islands suffers from constraints such as cyclones (e.g. Cyclone Namu) and other natural calamities which are especially devastating to agricultural production.

2. Potential Land Resources

The establishment of factories, the development of ports and private commercial development of agriculture is bedevilled by the traditional land tenure system which is riddled with complexities, necessitating long and often fruitless negotiation. It is a system which has aptly been described as the 'developer's curse', very frustrating to genuine developers.

3. Agricultural Production/Raw Materials for Processing

At the moment, certain raw materials (especially roots crops, vegetables and fruits, which are the traditional foods and the basis of the true subsistence sector) are not available in commercial quantities, at the right price and quality, regularly as and when required.

Commercial agricultural production is little developed. The farming system is characterised by vary small plots, where the crops are grown for subsistence and only harvested when needed. It is estimated that less than 10% of the national production is sold on the urban markets and prices of food staples like roots crops tend to be relatively high compared to imported foods like rice, noddles and wheat flour, thus necessitating a shift in urban consumption to imported foods.

4. Lack of Statistical Information on Agricultural Production.

There is a dearth of data on the production of certain raw materials for food processing. In fact there is a lack of serious data on the agriculture sector, with the exception of export production of cash crops. In the absence of data, production planning in food processing is difficult.

5. Processing

The development of food processing is still at the rudimentary stage in the Solomons. Thus, there is very little mechanised processing of the local raw materials, and most food units are in the large scale sector, dependent on imported goods and services to a considerable extent.

6. Technology

The country depends extensively on foreign sources for product, process, production, maintenance and information technology, as well as managerial know-how. The processing base is still low and technology development is inadequate. There is a lack of capital goods and engineering and machine tools industries thus aggravating the peoples' inability to master technology and know-how and adapt such technology to the needs of the country.

7. Human Resources

There is a general lack of skilled manpower at technical and managerial level due to the small population and the relatively small proportions of the work force which have availed themselves of higher education or technical training. Specialized personnel for the subsector is also lacking especially if high - quality production for export is aimed at.

8. Lack of Investors

There is a lack of genuine investors who have the necessary capital, technology and management expertise. Local investors' financial capacity is limited and their access to funds, appropriate technology know-how and foreign market connections is limited as well. Consequently, the Solomon Islands tend to look more to increased direct foreign investment for the development and processing of its food resources.

9. Infrastructure

There is inadequate development of infrastructure nationwide.

9.1 Transport Infrastructure

Transport is one of the major bottlenecks to the development of food production and distribution. Road and river transport suffer from problems such as inadequacy of the supporting services, poor maintenance, high cost of fuel and spare parts, poor planning and lack of Co-ordination. In fact, the least developed area of transport in Solomon Islands is the road network. The bulk of inter-island transport is by sea and services are often erratic. The non-availability of ships or boats to transport goods from production areas to markets in urban areas can be disastrous especially for perishable foods. On some islands, jetties and wharves are in a poor state of repair. All these add to increased marketing costs for raw materials for food processing as well as the distribution of finished products.

9.2 Marketing Infrastructure

Marketing of food products remains the weakest link in the process of food production and could generally be described as inadequate and inefficient. The internal markets are undeveloped. There is is a lack of market organisation, no information on prices and no guaranteed price stability of food products. Price varies from day to day, within markets and between markets.

However, information on export crop prices are broadcast twice weekly by the Ministry of Agriculture Information Unit but nothing is presented to farmers on the internal market. In addition, there are no attempts to co-ordinate or plan marketing at the local, provincial and national levels.

For industrial processing, fluctuating prices pose problems for production planning and the accumulation of stocks.

D. SUPPORT TO EXISTING FOOD PROCESSING BUSINESSES

D.1 AUDITING FACTORY OPERATIONS

D.1.1 A & A Enterprises Limited

a. Company Name and Contact Address: A & A EnterprisesLimited
P. O. Box 685, Honiara,
Solomon Islands.
Tel: 20527/23221

Ben. G. Ofoania
Manager.

b. Plant Site/Location: Hibiscus Avenue, Honiara,
Solomon Islands.

c. Title of Technology: Root Crops/Chips Processing

d. Installed Unit Operations: Peeling, slicing, washing, draining, deep frying, draining, salting, weighing, packing, sealing, casing.

e. Brief Description of Production Process:

Mature green cooking bananas, Kumara (sweet potatoes) young, tapioca (cassava), are peeled and sliced into oval or round thin shapes. The sliced components are washed to remove adhering starch, followed by draining excess water before deep frying. The product is ready when the colour is golden brown, light and crispy. The fried product is removed and the oil drained, cooled and salted before packing into 200 gm and 40 gm polyethylene plastic bags labelled and heat sealed.

Date Production Commenced: January, 1992

Number of Employees: 5 (Currently).

f. Level of Development:

Production started in January 1992 with a commercial deep frier (Q.C.C. Australia) two commercial slicers and a heat sealing machine. The initial plan was based on a requirement of 60kg of raw root crops and banana, per day - based on purchasing raw materials at current Honiara market prices.

At the moment, this is still the practice. However, banana raw material supply is in short supply because of competition with domestic demand. Consequently, banana chips production is irregular despite the fact that it is the product most preferred by consumers.

There are currently five workers at the factory and supervision/ bookkeeping is provided by the Manager. A & A Enterprises produces about 4 kg of chips a day, enough to saturate the Honiara market with fresh chips. Training of the workers is provided on the job.

After seven months of operation, only one supermarket in Honiara imports chips from overseas. Thus, the locally produced chips is a response to government's call to find local substitutes for imported foods.

g. The Audit:

The objective of auditing factory operations is to profile current activities, noting particular weaknesses and strengths and recommending action on how to proceed so as to improve productivity, increase profitability, remain in business and grow.

Essentially, for a manufacturing operation, the audit covers:-

- raw material availability, quantity, quality, price and regularity
- processing, process control, product quality control and assurance, good manufacturing practice (GMP), maintenance and repair schedules.
- packaging and product presentation
- pricing
- marketing strategy, market channels and promotional activities
- exports, and export quality requirements

h. A & A Enterprises Audit:

A factory operations audit was undertaken on September 4, 1992. Itemised below are the salient points arising from the observations:

1. Raw Materials:

There appears to be no control over the type and quality of raw materials purchased with respect to size, shape and maturity of the root crops. This in effect affected peeling quality and yield. An abnormal loss during peeling will affect the overal production output, and revenue to the factory. Therefore, it is critical to have a record of weights of raw material, the prices paid and the corresponding yields in terms of finished products.

2. Frying:

Deep frying in the new gas fired fryer is done by dipping a basket of chips in oil to detect when the oil is hot enough for frying. Dipping the whole lot of chips a couple of times in an oil bath not hot enough for frying results in chips getting soaked with oil. This obviously leads to loss of frying oil. By the same token, draining oil from fried chips in cardboard boxes results in inefficient oil recovery. The gas fired fryer has no temperature control. Draining of oil should be done in a corriander, over a container to recover excess oil from the chips after frying.

3. Product 'Give-aways'

It is difficult to detect prodcut 'give-aways' using the current weighing scale. Underweight packs (to a certain extent) are illegal, while any form of product 'give-away' is a loss to the company. Product give away refers to overweight packs.

i. Recommendation:

1. A & A Enterprises should arrange with out growers/farmers the supply of raw materials to the factory or pick-up at the growers farm by A&A. In the process, the outgrowers/farmers should be educated on the quality of raw materials viz - -size, shape, and maturity. In the absence of this arrangement, A&A should purchase raw materials selectively, realising that the quality of the finished product is as good as that of the raw materials.

It is also necessary to work as closely as possible towards a realistic yield figure (from peeling and slicing) achieved through practice over time.

2. The degree of hotness or readiness for frying of the oil in the gas fired deep fryer should be tested with one or two chips, repeatedly until the oil is hot enough for frying to avoid oil loss or oil soaked chips, rather than a whole basket of chips.

Draining of oil from fried chips should be done in a corriander (plastic or stainless steel) over a container to recover oil currently drained in cardboard boxes.

3. The weighing scale should be standardised/calibrated often with standard weights to avoid giving products away or selling under-weights. Ideally, a calibrated known weight should stand on one arm of the scale against which the product is weighed at all times.

4. <u>Hygiene and Safety: Good Manufacturing Practice</u>

a. filling fried chips into plastic polythene bags should not be done with naked hands. Hand gloves should be worn in the absence of mechanized packing.

b. chewing gums should be kept off the production floor at all times.

c. factory workers should wear aprons during processing.

d. an exhaust system should be installed to drive off fumes produced during the initial stage of frying and also reduce the heat generated in the deep drying room.

e. the slicer is now stained brown. Alternative cleaning detergents (food grade) should be employed to remove the stain.

f. the provision of a floor drain will enhance waste water disposal, when the factory floor is being scrubbed.

At the end of the audit, discussions were held with the Manager on each aspect of the observations and recommendations.

The Consultant worked with A & A operatives to improve technical proficiency. Some aspects of the recommendations had not been effected because facilities were not available locally. These include:

- loose weight balance scale (pan or flat tray) with standard weights
- hand gloves; during hot periods, hand gloves are uncomfortable; plastic scoops can be used to fill plastic bags
- the provision of a floor drain and exhaust in the frying room requires modification to the building.

j. Costing

The recent diagnostic study for A & A Brothers operations show rinsing costs for October 1992. A 30% increase in price is reflected when the new price is compared with the current selling price for all chips. (see attached). The market at this point cannot absorb a drastic 30% increase in selling price if consumer resistance and loss of confidence is to be avoided. If care is not taken, this might lead to loss of sales. However, the company is losing money on current operations. The cost of labour and inputs such as oil appear to have risen and therefore, there is the need to cut costs. For example, the number of employees has risen since the company started operations. Cutting costs is a major challenge if the company must grow and remain profitable. This issue was discussed and explained to the Manager. Costs are monitored monthly.

A & A Costing - October 1992

	A	B	C	D	E	F	G	H
1		A& A COSTING OCTOBER 192						
2			Purchases					
3		Kumara	Tapioca	Banana				
4	Jan							
5	Feb	$645	$460	$858				
6	Mar	$515	$180	$760				
7	April	$400	$320	$616				
8	May	$526	$122	$974				
9	June	$376	$280	$556				
10	July- Sept	$708	$312	$1,274				
11	Total	$3,170	$1,674	$5,038				
12								
13			Finished Goods - Units					
14		Kumara	Tapioca	Banana				
15	Jan							
16	Feb	1835	1671	2078				
17	Mar	1104	1072	1357				
18	April	733	816	1236				
19	May	482	461	830				
20	June	480	516	708				
21	July- Sept	1559	974	2391				
22	Total	6193	5510	8600				
23			Sales					
24		Kumara	Tapioca	Banana				
25	Jan							
26	Feb	1611	1439	1813				
27		$3,794	$3,417	$5,000				
28	Mar	881	963	1102				
29		$2,106	$2,302	$3,115				
30	April	893	675	1161				
31		$2,134	$1,846	$3,305				
32	May	830	461	482				
33		$1,176	$1,102	$2,310				
34	June	480	516	708				
35		$1,420	$1,455	$2,276				
36	July	745	649	1143				
37		$2,235	$1,947	$3,990				
38	August	882	389	1302				
39		$1,502	$601	$2,651				
40	September	1049	389	1698				
41		$1,771	$816	$3,152				
42	Aver Sales	819	609	1045.44				

A & A Costing - October 1992

	A	B	C	D	E	F	G	H
43	Aver Sale $	$1,793.11	$1,498.44	$2,866.55				
44	Direct Cost	Jan/Feb.	Mar	Apr	May	Jun .	Jul- Sep	Total
45	Oil	$1,198	$784	$592	$550	$500	$1,919	$5,543
46	Gas	$304	$232	$171	$171	$171	$513	$1,562
47	Labels	$713	$979	$1,437	$700			$3,829
48	Electricity		$458	$803	$843	$324	$926	$3,354
49	Wages	$1,910	$819	$830	$1,293	$888	$2,632	$8,372
50	Packaging	$528	$176	$600	$1,007	$1,126	$3,596	$7,033
51	Total	$4,653	$3,448	$4,433	$4,564	$3,009	$9,586	$29,693
52								
53	Overheads							
54	Rent	$1,400	$700	$700	$700	$700	$2,100	
55	Transport	$109	$178	$63	$88	$584	$403	
56	Stationery	$109	$201	$48	$90		$115	
57	Miscellaneo	$559	$157	$414	$280		$460	
58	Promotion	$110			$28			
59	Bank fees	$161			$40			
60	Advertising	$350		$180	$133	$785	$624	
61	Travel			$300	$75			
62	Water			$87	$22	$26		
63	Telephone			$546	$137		$88	
64	Insurance			$434	$109			
65	Interest	$500	$250	$250	$250	$250	$250	
66	Repairs	$296	$174	$92	$141		$385	
67	Totals	$3,584	$1,960	$2,814	$2,090	$2,345	$5,218	
68								
69		Kumara	Tapioca	Banana				
70	Material Co	$3,170	$1,674	$5,038				
71								
72	Divide by							Total Uni
73	Units Produ	6193	5510	8600				20303
74								
75	Material Cost							
76	Per Unit	$0.51	$0.30	$0.58				
77								
78								
79		Jan/Feb.	Mar	Apr	May	June	Jul-Sept.	
80	Direct cost	$4,653	3448	$4,433	$4,564	$3,009	$9,586	$29,693
81								
82	Direct Cost per							
83	Unit	$1.46	$1.46	1.46				$1.46
84								

A & A Costing - October 1992

	A	B	C	D	E	F	G	H
85	Indirect Co	$3,584	$1,960	$2,814	$2,090	$2,345	$5,218	$18,011
86	Indirect cost per							
87	Unit	0.88	0.88	0.88				$0.88
88								
89	Total Cost per							
90	200g Packe	2.85	2.64	2.92				
91								
92	Mark up	35%	35%	35%				
93								
94	Selling Pri	$3.85	$3.56	$3.92				
95								
96								
97		A&A PRICING 2 - OCTOBER 1992						
98			200g		40g			
99		Kumara	Tapioca	Banana	Kumara	Tapioca	Banana	
100	Raw Materi	$0.51	$0.30	$0.58	0.102	0.060	0.116	
101	Package	0.2	0.2	0.2	0.07	0.07	0.07	
102	label	0.53	0.53	0.53	0.106	0.106	0.106	
103	Oil	0.273	0.273	0.273	0.055	0.055	0.055	
104	Gas	0.076	0.076	0.076	0.0152	0.015	0.0152	
105	Electricity	0.165	0.165	0.165	0.033	0.033	0.033	
106	Wages	0.412	0.412	0.412	0.082	0.082	0.082	
107	Indirect Co	0.88	0.88	0.88	0.176	0.176	0.176	
108								
109	Total	3.046	2.836	3.116	0.6392	0.597	0.6532	
110	35% mark u	1.0661	0.9926	1.0906	0.2237	0.209	0.2286	
111								
112	Current Pri	3.15	2.95	3.25				
113	New price	4.12	3.83	4.21				
114	Increase	30%	29%	30%				

k. A & A Chips: Quality

The quality of chips has been consistent and the product enjoys consumer loyalty. Quality parameters to be monitored were discussed at length with the Manager. These include texture (crispy), flavour (absence of rancidity) colour (light, golden brown). Any change in these parameters is indicative of a problem.

To export the chips, international quality standards of the exporting country would have to be observed. There are on-going initiatives to improve current packaging, but shelf life studies would have to be undertaken to determine expiry or best before dates. In this case, the use of anti-oxidant, to prevent oxidative rancidity may be necessary.

D.1.2 Solomon Choice Coffee and Kolomola Spices.

a.	Company Name and Contact Address:	Solomon Choice and Kolomola Spices P. O. Box 146 Honiara Solomon Islands. Tel: 23849.
b.	Plant site and Location:	Ranadi Industrial Estate, Honiara
c.	Owners:	Kolomola Villagers
	Manager:	Gilbert Leamana
	Types of Business:	Coffee Roasting Milling, and Packing. Drying and Milling of Spices.
d.	Products Made:	Roasted and ground coffee, spices such as Turmeric, Chili, Cardamon.
e.	Form of Business:	Limited Company
f.	Date Production Commenced:	June 1990
g.	Number of Employees:	3

h. Installed Unit Operations:

- Roasting of coffee beans, blending of beans (Robusta and Arabica), grinding, weighing, bagging and heat sealing.
- drying and milling of spices.

i. Raw Materials:

About 0.5 ton so far of the robusta variety of coffee beans have been purchased from the main source - Ysabel farmers since the company started operation. Arabica, the other variety was purchased from Dodo Creek Research Station (100kg) and Doma Plantation, Guadalcanal (200kg). Total supplies to the factory up to the time of this study is 800kg of coffee beans.

j. Processing:

i. Coffee beans are picked when they are red (called cherries)

ii. The skin is removed by means of a pulper leaving green beans

iii. The green bean is dried in the sun, leaving the outer skin (parchment) still on the bean

iv. The parchment is removed by means of a huller whereby the beans are ready for roasting.

k. Roasting:

3kg of coffee beans are weighed into the Trentate coffee roaster which is a propane gas fired, electrically operated, perforated drum. (Trentate, Biggleswade, England). Roasting is by experience as the roaster lacks control devices to check temperature of roasting or stop the roaster when the beans are roasted. Roasting is normally stopped when snappy or cracky' noise is heard from the beans in the roaster (snappy when the bean is split into two or cracking noise in roaster). As roasting proceeded it was observed that smoke emanated from the roaster at about 30–40 minutes. The smoke was a strong irritant.

At the end of 40 minutes, roasting was stopped and the beans discharged into the cooling section of the roaster, followed by storage in plastic bags for blending with Arabica coffee before grinding.

l. Grinding:

One part Arabica and two parts Robusta are blended and ground in a Trentate counter grinder, fitted with adjustable and variable screen sizes. The coffee is ground to a specified particle size and packed into 200gm high density polythene bags.

m. <u>Problem Areas and Profered Solutions</u>

i. Raw materials: Arabica variety is not available readily in the Solomons as Dodo Creek and Doma Plantation cannot supply enough of these. On the other hand, the robusta variety is available only in Ysabel. The Arabica coffee plantation at Doma is not properly managed and is neglected. Rehabilitation efforts might be too expensive and could shoot up the price of Arabica locally since the plantation will need agricultural inputs such as weed killer, insecticide and fertiliser. The problem is complicated by imported Arabica coffee which is expensive and constitutes about 66% of the finished coffee blend. Variations in foreign exhange are also critical.

Thus, the final product price of Solomon Choice Coffee is rather high for local people. Therefore, if Arabica were locally produced, the price of coffee would go down considerably, becoming more affordable locally. Thus, government support is required in the concessions on import duty to reduce the cost of imported Arabica coffee, and the Ministry of agriculture should give the support necessary to rehabilitate the Doma plantation as well as encourage farmers to grow Arabica coffee, giving the fact that Solomon Choice Coffee is the first and only coffee factory in the country.

ii. Roasting and Grinding: The roaster is not energy efficient as it wastes a lot of heat. Moreover, its capacity (3kg/roast) is rather limited and leaves no room for expansion i.e. increased raw material processing at a later date. There are no spare parts in stock for either the roaster or grinder which means that any major breakdown requiring spare parts means a shutdown of operations. Therefore, there is the urgent need to buy spare parts. Since the equipment was donated by the British High Commission as an aid, the business ought to strive to buy spare parts. Under the circumstances, a physical control of the roasting regime is acceptable provided there is uniform roasting. This is not usually the case as the fresh coffee beans have varying moisture levels, and there is no temperature control device on the roaster. Some beans are over-roasted while some are under roasted.

It is therefore, strongly recommended for control purposes that a chart be set up as follows:

ROASTING RECORD

Date	Type of Coffee	Weight before Roasting	Weight after Roasting	Time Roasting Began	Time Roasting Ended	Roast Time

Such a record over time gives an average time that a proper roast is obtained. Over roasted or under-roasted coffee beans will lead to variations in organoleptic quality.

iii. Machine Maintenance: There is no maintenance schedule at the moment. It is recommended that a regular maintenance schedule is instituted to avoid costly repairs and downtimes. Efforts should be made to obtain the 'Operations Manual' on the equipment which did not arrive with the package.

iv. Marketing: A 200 gm pack of Solomon Choice Coffee sells for $7.00 while a competitive imported brand (Sunrise) sells for $3.45/50g. As far as product presentation is concerned, the Sunrise pack is more attractive, which justifies the cost. Solomon Choice could attract more customers by packing in 100gm lots for $3.50 - $4.00 This offers customers more choice as far as pack size is concerned. To attempt to pack at the same quality level as Sunrise would involve a lot of capital outlay in packaging and this will lead to higher prices. Solomon Choice does not produce enough coffee to justify sophisticated packaging. The company can cut cuts by reducing the current size of the 200gm pack by about 25%.

v. Quality Assurance/Good Manufacturing Practice:

The followings are recommended:

- That the company restructures the room where coffee is roasted so that fumes (caffeine) which are toxic irritants are exhausted from the room. At the peak of roasting, the room becomes engulfed with the irritant which by all standards, is a health and safety hazard.

- Factory operations need to wear hand gloves, aprons and head cover for good manufacturing purposes and the hygiene of the product.

- The scale used in weighing finished products should be calibrated using a standard loose balance weight daily to avoid underweights or product give away.

n. The Future

The future depends on being able to source the raw material (coffee beans) in the right quantity, at the right price and quality, regularly. The company cannot grow and expand profitably by relying on expensive imports of Arabica, which is 66% of the final product blend.

Having achieved that, the present roaster and grinder will become inadequate in being able to cope with roasting larger quantities of coffee beans. Therefore, a higher capacity roaster will be required, equipped with temperature control, having short roasting times, low energy requirements due to recirculation of the heating medium, therefore considerable energy savings, gentle heat transfer during the roasting process, uncomplicated design and easy maintenance, facility for exhaust air, and a cooling section.

o. The company had complied with some of the recommendations. Those requiring modification to the building and the purchase of new equipment had not been undertaken.

D.1.3 Kolomola Spices

a. The company faces serious problems in the processing and marketing of spices and chili.

i. it relies on FIELDERS (a flour mill) and LDA (Livestock Development Authority) to mill the spices and chillie.

ii. the milling process is inefficient, producing a lot of waste, thus making the venture unprofitable.

iii. keeping qualities are inadequate as the spices and chillies fade over time due to oxidative processes as a result of improper packaging and exposure to light.

iv. there are inadequate quantities of chillies and peppers for processing. Hence, investment in any expensive grinder makes the venture financially unviable. The business needs an AID in the form of donation of a grinder, so that the industry can survive.

b. Observation and Further Work.

Critical processing steps were not adhered to, and these were discussed with the Manager.

i. The moisture level of spices/chillies is a critical factor in processing. The products should be dried to 8-10% moisture to facilitate grinding. The spices may be dried in the sun or in heated rooms with temperature in the range of 50-60°C to prevent loss of volatile constituents and production of off flavours.

ii. The spices are thus ground using a hammer mill. In the manufacture of spice mixer, various spices are then blended using a cone type or twinshell blender. For retail marketing, the spices are packed in polythene bags as such or may be further packed in attractive paper of card cartons and packets. Bulk packaging is carried out in polythene-lined jute bags or multiple bags of paper. Direct exposure to light should be avoided especially for peppers. The storage area should be cool, dry and as dark as possible to prevent fading of colours of the chillies/spices.

iii. A grinding machine (incorporating a mill and a grinder) is required for the company to remain in the spcie/chili business. The equipment is expected to mill to a fine consistent powder. This equipment is being sourced.

D.2 EXPANDING AND DIVERSIFYING EXISTING FOOD PROCESSING BUSINESSES

A business is expanded and diversified when some measure of success has been recorded in its on-going operations. A business can also expand when there is unutilised capacity and other products can be produced profitably using existing equipment. A and A Brothers and Solomon Choice Coffee/Spices have demonstrated some degree of capability in managing their businesses and are making some profit while contributing to employment generation. Expanding into new food processing businesses through utilising current equipment would enable the companies to maximise capacity utilisation and get more value for money paid to workers who would otherwise be idle if there were downtimes on existing equipment, due to some factors such as inadequate supply of raw materials or lack of other inputs for production. This gives a certain degree of versatility, as a switch in production can be made from one product to another. In the Solomons, this idea has considerable degree of merit as the supply of food raw materials is not always consistent.

D.2.A A & A Brothers Limited

The company has already diversified into the production of 'fish and chips' as a direct consequence of its 'deep frying' facility. The contribution of the new business to the existing one remains to be seen.

Other options which have been discussed with the Manager include:

- fried, salted peanuts and
- coconut chips.

The marketing strategy is that the fried salted peanuts are sold on daily basis as health foods/snacks to school children while long storage and having to preserve it with an anti-oxidant is avoided. The process is outlined in section III.E page 58 of this report.

Coconut chips process flow is given below:

Ingredients

FLAVOURS	CONCENTRATION	SOAKING TIME
Salt	2%	2 hours
Barbeque	4%	2 hours
Sugar	50%	4 minutes

i. Open 12 month old coconut into two, put coconut inside oven and bake at 176°C for 15 - 30 minutes.

ii. Scoop out meat.

iii. Remove pairing using a sharp knife.

iv. Slice meat thinly using potato peeler 2½" long.

v. Season in any of the above flavours. Solution to coconut is 2 : 1

vi. Drain for 20 minutes

vii. Spread on a baking sheet and put in pre-heated oven (300°C). Toast while drying.

viii. Bake for 30 minutes or until desired brown colour is obtained.

ix. Cool for 10 minutes

x. Pack in cellophane/foil/polythene bags and label.

The only equipment required for this product is an oven that reaches up to 350°C. A & A Brothers is still trying to source this equipment.

Following the training workshop in Food Processing, A & A Brothers have started experimenting in the production of coconut jam. (See Annex IV.7). The first attempt was quite encouraging and further assistance is required in quality control, recipe formulation, packaging and shelf life studies.

D.2.B Solomon Choice Coffee/Kolomola Spice

The Manager, Gilbert Leamana, travelled on Study Tour of Coffee and Spices to Fiji and Vanuatu with the following objectives:

- to gain some insight into processing and marketing
- to have a better understanding of processing and marketing for planning of coffee and spice development
- to make recommendations to appropriate authorities for the purpose of immediate actions in coffee and spice development and in food processing.

Before he departed, he sought advise from the consultant on the nature and types of topics relevant to his spice production business. The following outline was given to Gilbert as a guide.

D.2.B.1 TOPICS FOR DISCUSSION

GROUND AND PROCESSED SPICES

i. FARMING PRACTICES

- use of agricultural inputs
- yields
- effect of bad weather or other agro-ecological problems on yield
- harvesting and quality control
- storage requirements.

ii. TYPES OF SPICES - FAMILIARISATION

- major - pepper, cardamon, turmeric, ginger, chillies
- minor - coriander, vumin, fannel, celery, garlic, aniseed, mace, nutmeg.

iii. USES AND SCOPE

- use in homes and hotels
- preparation of various processed foods e.g. pickles, sauces, beverages, confectionery, soup, powders, instant curry powders, canned meat, etc.

iv. PROCESS OF MANUFACTURE

- washing
- peeling and slicing
- curing
- drying
- drying
- cleaning and grading
- grinding and mixing
- packaging.

Some of the steps may not be required for processing of certain spices.

v. CURRY POWDER FORMULATION

- Blending Ratio for various spice combinations.

e.g Chillies
Coriander
Turmeric
Garlic
Cumin
] Blending in a certain ratio to obtain curry powder.

vi. QUALITY CONTROL

- process control during drying being critical to avoid loss of volatile constituents.

vii. EQUIPMENT AND MACHINERY - Note manufacturers of equiment for contact for possible purchase and replication in the Solomons.

viii. Advantages of improved Technology in the Spice Industry

ix. As far as government institutions are concerned visit Ministry of Commerce and Industry in Fiji; and for professional bodies, visit and discuss with:

- Small Scale Industries Association
- Manufacturers Association
- Chamber of Commerce and Industry.

D.2.B.2 Upon return to Solomon Islands, the entrepreneur expressed interest in diversifying into the following areas:

D.2.B.2.1 - Peanut roasting
2 - Chili sauce production
3 - Coconut candy production.

Prior to the entrepreneurs request, efforts were already in top gear at the Business Development Unit of the Ministry of Commerce and Primary Industry to fabricate a peanut roaster. A local fabricator was identified and using some funds from the local Food Processing Programme, a roaster was purchased.

The roaster, 18" diameter and 24" long was fabricated using a 1.5mm rolled flat steel. Trials at the entrepreneur's factory confirmed a batch size of 3-5kg of raw peanuts (in shell) and roasting time of 40 minutes - 1 hour. Roasting time depends on initial moisture of peanuts and the quantity. Roasting was carried out using open fire, generated from wood.

The entrepreneur will eventually pay for the roaster and effort at fine-tuning roasting parameters are on-going, including modification of the fire place for energy-efficient roasting.

In particular, the importance of quality control of raw peanuts to avoid aflatoxin infestation and the logistics of raw material storage was stressed to the entrepreneur at the early stages. Quality control and roasting procedure are given in other sections of the report (see III.E.p 58-59). A 50gm pack retails for about $0.65 much below the price of its competitors in the market place. This should enhance the sales performance of the product eventually. In the meantime, intending entrepreneurs visit the Ranadi factory of Kolom Choice Coffee to view the roaster. The Council of Chiefs from South Malaita (Annex IV.1.I) have paid a visit to examine the roaster.

D.2.B.2.2 Chili Sauce Production

Chili sauce is the sound, clean, cooked product made from chopped, peeled, ripe, whole tomatoes, chopped pepper, salt , sugar, spices, and vinegar, with or without onions and garlic.

The requirements for production were explained to the entrepreneur. Sourcing and pricing were on-going by the time the consultant departed Solomon Islands. Specially the tomatoes used in making chili sauce should be large, firm and well ripened, and have little waste when peeled. The peeled stock should be free from green cores and skin.

Requirements

a. Raw Materials: Tomatoes - large, firm, well ripened.
Onions, garlic, salt, vinegar (100 grain)
Capsicum akabare, Cassia, cloves, essential oils.
(Oil of primento, and oil of clove or in its absence, soybean oil.

b. Equipment: (Atmospheric Cooking)

- Stainless steel cooking pots (10 gal) or Vanuatu pot of same capacity.
- Stainless steel knives
- Cutting board; working table
- Speedy gas burner - single
- Fittings to connect gas
- Gas bottles (25kg)
- Bottles with screw caps (300g)
- Labels and glue
- 1 kg loose weight balance scale
- Holding tank for water, commercial sink, water taps.

c. Formula for Chili Sauce.

Peeled tomatoes or pulp	13 gallons	
Capsicum akabare (ground, fresh)	3.7 lbs	
Peeled chopped onions	1.7 lbs	
Sugar	7.0 lbs	
Salt	1.7 lbs	
Vinegar, 100 grain	0.6 gallons	
Cassia, broken	0.25 lbs	
Cloves, headless	0.15 lbs	
Garlic, peeled and chopped fine	0.1 lb	
Soybean oil or essential oils	0.05 lb	Cook to 6 gallons
Essential Oils: oil of pinento	1 pound	
oil of clove	2 pound.	

d. Procedure (Atmospheric Cooking)

i. Add about half of the tomatoes to the cooking pot and cover with about 3 lbs of sugar.

ii. Add 3 gallons more of tomatoes and start cooking. Scatter the capsicum akabare over the tomatoes and add cassia and cloves. As the tomatoes boils, add salt after 4 minutes cooking time. As the batch cooks down gradually, add the balance of tomatoes. Concentrate to about half the volume and add the vinegar, onion, garlic and allow the batch to cook several minutes to get rid of the raw flavour. When finishing, the blended oil

or soybean oil is scattered over the surface and allowed to mix. Then the bottles are filled at 190°F, capped, cooled, labelled and packed.

Note: There is approximately a 30% loss on peeling.

CAUTION: The Chili sauce production process leads to the evolution of various flavours along with steam.

The entrepreneur should be careful not to mix up dry spice production with coffee production, or the bagging and exports of cocoa (which are the current businesses at the entrepreneur's Randi factory) with chili sauce production.

Care should be taken in the storage of raw materials, the finished products, and the processing lay-out generally. This requires thinking through.

The entrepreneur should ensure that he has a souce of raw material supply and a ready market. There is the need for further technical support to see this venture to fruition.

Various recipes are possible and other ingredients (as available) can be substituted if some of those listed in the recipe are unavailable commercially.

D.2.B.2.3 COCONUT CANDY PRODUCTION

The entrepreneur returned to Solomon Islands with samplesof coconut candy with the following composition:

- dessicated coconut
- corn syrup (liquid glucose)
- colouring (red colour)

The product is basically dessciated coconut at the centre, coated with a layer of red coloured corn syrup.

Ingredients	Equipment
Coconut (dessicated)	Stainless steel knives
	shred mill
Corn syrup	Dryer
Red colour (food grade)	Packaing material.

Further work could not continue on this concept before the consultant departed Solomon Islands because costs are awaited for the dessicator (Almedah Food Equipment, Philippines), glucose syrups and red colour.

It should be pointed out however that the cost of dessicated coconut should be weighed against producing it locally when the feasibility study is conducted by the Business Development Unit.

It is the consultant's view that the procedure for manufacturing dessicated coconut is capital intensive and is beyond the scope of Kolomola Choice Company at this stage. The essentials of the process employed for making dessicated coconut is involved as follows:

Mature nuts are deshelled, broken into two and dewatered. The dewatered nuts are pared and cut into small pieces, washed and then ground in shred mills to produce strands of coconut. Drying is usually carried out in continuous band driers at a temperature of 90 - 150°C. The resultant product, called dessicated coconut, will have about 2% moisture, and is very widely used in the manufacture of sweets/candies.

It should be remarked that producing coconut candy at the same Ranadi factory with the stated composition poses considerable microbiological risks. Therefore adequate care should be taken in the storage of raw materials, in the allocation of process space, given the range of products the entrepreneur is interested in producing, and the varying requirements (physical, chemical, microbiological, hygiene and safety) of each food product.

D.3 FLAVOUR IMPROVEMENT OF ROASTED NGALI NUT KERNELS

Very little development work has been undertaken on the flavouring of Ngali nut kernels. More work would appear to have been done on roasting as it has been discovered that both temperature and duration of roasting is critical for optimum flavour. At Dodo Creek Research Station, about 200gm of kernels are dry roasted in a micro-wave oven for 8 minutes.

As part of on-going efforts to improve the rather subtle taste which is bland and oily, the consultant spent a few weeks at Dodo Creek, working to improve the organoleptic quality of roasted Ngali nuts. It is generally believed that an improvement of the flavour will enhance marketability, especially now that Commodity Export Marketing Authority (CEMA) are promoting the sales and consumption of Ngali nuts. Simply packaged dried and roasted kernels have been retailed with reasonable success in Honiara since 1989. Overall, the domestic market for processed Ngali nuts is estimated to be 1.2 tons of kernels per year although supplies are erratic.*

It is generally agreed that attempting to market Solomon Ngali nuts in high profit sensitive overseas markets before minimum supply levels can be guaranteed and processing techniques are refined would be premature and possibly counter productive. Although a basic product now exists, it is not suitable for Western markets and will need further development and testing before being ready.

Therefore, the main objective of the series of product development experiments carried out was to improve flavour through adding either sugar, salt, honey or barbeque flavours and analysing tasters reaction to these.

a. THE PROCESS

i. Production of Kernels

The nuts in shell are cracked by hand and testas (skins) removed by soaking in boiled water for 5-10 minutes to loosen testa. The kernel in testa is released by squeezing the testa between the thumbs and forefingers.

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* Evans, Barry, 1991. The Production, Processing & Marketing of Ngali Nuts (Canarium spp.) in Solomon Islands.

ii. Roasting

At the Dodo Creek Research Station, about 200gm of the testa is weighed and dry roasted for 8 minutes in a Goldstar - Micro wave oven for 8 minutes before being packed in vacuum sealed plastic bags. (Multivac Packaing Machine).

ii. Application of Sugar

The following concentrations of sugar in solution were prepared - 5%, 10% and 25%. These were made up in 400ml hot water as required. (There was no constant temperatur water bath).

200gm of Ngali kernels were soaked for 10 minutes in each solution, covered to prevent heat escape and flavour penetration of the kernels. At the end of 10 minutes, the kernels were drained and dry roasted in a micro-wave oven for 8 minutes. At the end of 8 minutes, any sample showing any degree of wetness was given a one-minute further roasting. The kernels were cooled, packed in plastic bags, and vacuum sealed.

iv. Application of Salt

Subsequently, the following concentrations of salt were prepared, 2%, 4% and 8%; made up in 400ml hot water.

200gm of Ngali kernels were soaked for 10 minutes, and at the end of each soaking period, drained and dry roasted in a micro-wave oven for 8 minutes. These were cooled and packed in vacuum sealed bags and labelled.

v. Barbecue Flavour

Barbecue flavour could not be obtained in Honiara and experiments were undertaken with barbecue sauce. This experiment was discontinued because the results of preliminary trials were not in line with expectation. The barbacue sauce tasted more of tomato and the nuts were very dark upon roasting.

b. SENSORY EVALUATION

i. Addition of Sugar

Tasters were asked to score the sugar flavoured roasted nuts according to their degree of likeness or preference for sweetness and overall flavour.

The rejection of the 25% sugar flavoured kernels was unanimous, with comments such as too sweet, tasted like loleys, too much sugar, etc.

The 5% sugar flavoured kernels was found to be under-flavoured and was rejected in favour of the 10% sugar flavoured kernels. In a triangular taste test, over 95% of the tasters were able to identify the 10% sugar flavoured kernels over the 5% flavoured ones.

ii. Addition of Salt

The 2% salt concentration was prefered by most tasters, but preference was marginal over other concentrations apparently because of very subtle differences in people's preference for varying salt concentration.

Further experiments were undertaken to find out whether soaking time had any effect on the 2% salt concentration especially salt penetration of the kernels and consequently, salt retention. Thus, using the same salt concentration, the kernels were soaked for 30 minutes, 1 hour and 2 hours respectively.

Tasters were asked to show their preference in terms of saltiness: too salty, salty, normal salt or little salt.

The results showed that tasters were unanimous in disapproving soaking for 2 hours in 2% salt solution. The remarks indicated 'too salty'. Of a total of seventeen tasters, nine prefered the kernels soaked in 2% salt concentration for 1 hour while six prefered soaking for 30 minutes. Two could not make up their minds. In triangular taste test, the prefefence was still in favour of soaking the kernels in 2% salt concentration for 1 hour.

c. Problems Encountered

The Ngali nut laboratory at Dodo Creek Research Station is not equipped with adequate facilities for product development as such. Although micro-wave ovens and a multivac packaging machine are in place, the room is not spacious enough to house other requirements needed for product development. In order to coat Ngali nuts with honey, a special equipment known as an enrobber is required. This is unavailable at the moment. It cannot be located in the present room should Dodo Creek purchase it.

In addition, it is difficult to experiment with recipes using Ngali nuts and other ingredients in the present set up.

A package of basic infrastructure such as: cooking facilities, utensils refrigerators, freezers, other storage systems, working tables, cutting board, hot water or steam line is absent at the moment. The same holds for basic pilot plant testing equipment.

d. The Future

i. As a result of CEMA's awareness campaign, there is bound to be increased demand and increased tonnage of Ngali nuts being purchased from the provinces.

Consequently, the present micro-wave roasters at Dodo Creek Research Station will become inadequate. Therefore plans should be in place to purchase a new roaster. For continuous small capacity roasting, the Proctor Com-Pak Roaster/Cooler is adequate.

ii. It is likely that salted, roasted Ngali nuts will be prefered as snack foods to sugar flavoured Ngali nuts. Further work is required to confirm this. In addition, the application of salt needs fine-tuning, in addition to determining shelf-life. Soaking may not be the best means of applying salt to the kernels.

iii. A product development laboratory should be set up or built at Dodo Creek Research Station. A qualified Food Scientist/ Biochemist/Applied Scientist should be employed to develop products based on Ngali nuts.

A portion of the laboratory should be assigned to SENSORY EVALUATION and the laboratory as a unit should be adequately equipped.

A suggested list of equipment (the list is by no means exhaustive) is given below:

- for roasting Ngali nut kernels: at low cost and meeting virtually all roasting and drying requirements.	Proctor Com-Pak Roaster/ Cooler Proctor & Schwartz, Inc. 251 Gibralih Road, Horsham, Pennsylvania 10044 Fax: (215) 443-5206 Telex: 6851098.
- boiler (steam generator)	
- source of gas	Boral Gas, Honiara
- cooking facilities - gas ring etc.	Boral Gas, Honiara
- utensils	
- refrigerator/freezers	
- cutting boards, laboratory working table	
- stainless steel knives	
- steam jacketed kettles/mixer for heating and cooling.	
- coating (stainless steel revolving coating pan)	
- sensory evaluation laboratory equipment	
- product development laboratory testing equipment.	

D.4 DAIRY PRODUCTS PROCESSING : BETIKAMA DAIRY

a. Background

Betikama Dairy was established in the mid 70s to provide from sales of milk, financial support to the school as well as to provide supplement to the students' diet. The objectives are still valid today.

At the moment, the school has 35 milking cows which provide approximately 150 litres of milk per day.

b. Process of Manufacture

Cows are milked early in the morning and the milk brought to the processing room. The milk is pasteurized at 60-65°C for about 30 minutes and cooled in vats with water, circulating at room temperature. The milk is bagged in ½ litre and 1 litre plastic bags, sealed and refrigerated before sales.

However, the process of manufacture is inefficient and the school has cut back on supplies of milk to customers.

The school is now looking for a better pasteurizing system, capable of coping with the level of operation but at the same time, very efficient. Such a system will enable the school to market good pasteurized milk to the general public.

The school is now taking steps to improve the pasture. This is possible following the arrival in July '92 of a large tractor capable of ripping the soil in the dairy farm. The school can now plant grass and carry out normal maintenance of the pasture. It is hoped that with financial assistance, the quality of the herd could be improved so that milk production will also increase.

c. Justification

Betikama Dairy is the only dairy farm in the country and this point is well appreciated by the authorities. At the moment, there is an increasing demand for milk by primary school children and Betikama could well supply some of the needs as milk is the best source of protein for young growing children. There is also an increased demand by the general

populace which has necessitated increased imports in the form of UHT long life milk. An increase in the consumption of dairy products has been witnessed since 1983, with consumption in May 1990-91 at 870 tons, made up of local milk production of 30 tonnes of fresh milk and the further importation of 840 tons of other dairy products, at a CIF value of $52.5-5.8million. The establishment of a mini dairy plant at Betikama High School, will help to reduce milk imports. This will lead to foreign exchange savings while contributing to the nutritional status of the populace especially school children.

d. Machinery and Equipment

An efficient and practical method of processing milk on a small scale is the Micro Dairy manufactured by Alfa Laval Engineering. The micro dairy production line consists of the folloing :

- Reception tank; volume 250 1
- Centrifugal pump, motor 0.55 KW.
- In-line milk filter
- Pasteurizer for milk, type MICRO THERM; Capacity process maximum 900 1/hour.
- Set of stainless steel pipes and fittings
- Cooling machine
- Packing equipment.

Specifications of the micro dairy and costs have been given to the Principal, Betikama High School. The original copies are at the Business Development Unit.

The microtherm micro dairy is the most efficient dairy plant in use today and Alfa Laval is a household name in dairy engineering.

Supervision of installation, start-up, commissioning and training are all components of the Technical assistance offered by Alfa Laval as part of the total package.

e. Land and Building

The current infrastructure at Betikama Dairy will have to be renovated to accommodate the Microtherm unit and auxilliaries. A total covered area of about 200 sqm or more may be required. The area will be dependent on the final package of machinery and equipment and the rehabilitation of Betikama's cold room.

f. Capital Requirement

The capital required for machinery and equipment is AS$133,000.

Betikama High School will have to approach donors and sponsors for financial assistance.

g. Profitability

There is insufficient raw materials (fresh milk) to justify a capital outlay of such magnitude. However, for commercialisation purposes, the possibility of using the same plant, for reconstituted milk, other dairy products and fruit juice should be evaluated. The Microtherm is versatile and capable of processing liquids such as fruit juice.

III.D.5 SMALL SCALE COCOA PROCESSING

a. Introduction

Cocoa was introduced relatively recently as a cash crop in the Solomon Islands. Currently, the country produces about 4,000 metric tons per annum and it has become one of the major sources of foreign exchange for the country. It contributed $12.861 million or 28.45% to total Agric exports in 1991 ranking second to palm oil products.

Cocoa is grown mainly by smallholder farmers and communal farms on plantations averaging 1.0 hectare and 20-50 hectares respectively.

b. Processing

Currently, the predominant type of processing is small scale primary processing. This refers to fermenting and drying of the cocoa beans, prior to exports.

Secondary processing is limited to home-made chocolate drinks from roasted cocoa, but this remains to be popularized. There is no commercial scale secondary processing to produce non-alcoholic cocoa based beverage imported into the Solomons from April 1990 to June 1991. The tonnage for cocoa, coffee products and tea was about 100 tons at a CIF value of $1.359m.

The equipment for small-scale processing of cocoa beans into cocoa liquor, cocoa powder and butter was sourced. The quotation for the processing plant (capacity 600kg/hour) was received from Maschinenfabric Gmbh. More quotations are expected from other manufacturers e.g. Bauermeister before a comparative feasibility study is undertaken.

The purpose of the feasibility study is to investigate the economic viability of producing cocoa powder, butter and liquor and downstream processing using Solomons cocoa beans, an import substitution evaluation for imported cocoa products, and non-alcoholic beverages.

Commodity Export Marketing Authority is interested in this study. A copy of the full details of the quotaion from Maschinenfabric Gmbh is at the Business Development Unit.

III.E. SUPPORT TO POTENTIAL FOOD PROCESSING BUSINESSES

III.E.1 VISIT TO GIZO (12 - 17/10/92)

At the invitation of the UNV Business Advisor, Gizo, a mission was undertaken to meet with six (6) entrepreneurs who want to start food processing businesses. The consultant also participated in the celebrations of the World Food Day (16/10/92) highlighted opportunities in small-scale food processing to the participants, and handed out basic information on peanut roasting, fruit juice, preserves and small-scale oil extraction, at the booth/stand allocated to the Business Development Unit, Ministry of Commerce and Primary Industries, Gizo.

Discussions were held with each entrepreneur on his/her requirements for starting a small-scale food processing business. Itemised below are the highlights of the discussions including the background to each business/request:

III.E.1.1 Peanut Butter Production

Entrepreneur: Frank and Minnie Lave
Sausama, Kolombamgara
P. O. Box 132, Gizo, Western Province.

(a) Background

Mr. and Mrs. Lave are classical examples of successful farmer entrepreneurs with more than 10 years experience in Kolombangara. They are engaged in vegetable and root crops farming and marketing, selling their products at the Gizo and Munda open markets, Noro, Solomon Taiyo, Gizo Hospital, Hotels and Restaurants in Western Province. They have discovered that vegetable farming is expensive and have gradually shifted to peanut farming, which is pest free, requiring less expensive inputs. They now grow peanuts but have difficulty selling the peanuts in the raw state.

They are interested in being assisted in procuring appropriate equipment and machinery to process the peanuts into peanut butter. Previous attempts by the entrepreneurs at producing peanut as peanut butter with a crunchy texture have shown positive and encouraging results.

It is hoped that with the installation of appropriate processing equipment, about 80% of the entrepreneurs' current 20-acre farm land will be devoted to peanut crop production while more peanuts will be procured from nearby farms.

(b) The Business

i. The entrepreneurs have a ready source of raw material which is essential for setting up a peanut processing business. For example, it is estimated that the Western Province produces about 55 tons of marketable peanuts annually, harvested all year round. (Table III.4).

The entrepreneurs have some idea about peanut butter production, having learned the art from the Principal at St. Dominics Rural Training Centre at Vanga Pt. They have one small rotary grinder (manual) which produces crunchy peanut butter but the process is time consuming and labour intensive. They normally use stone oven for roasting and wooden bowl and stick for grinding the peanut into crunchy peanut butter.

ii. The entrepreneurs plan to build the processing facility on their property where four workers are employed to help with farming and peanut butter production.

iii. Currently, five stores in Gizo sell imported peanut butter which varies in prices from $6.00 for 235gms to $10.15 for 375gms, selling approximately 186 containers monthly. There is also demand in Munda, Ringi, and Noro but the demand has not been quantified. The guest houses, hotels and restaurants also use peanut butter on a small-scale. Supplies in general are not fresh. Most of the local people cannot buy the peanut butter in the stores because it is expensive.

(c) Technical Assistance/Training Required

Technical assistance will be provided in souring appropriate equipment, set-upp, and training in the use of the equipment. The importance of good manufacturing practice will be emphasized and quality control procedures set up for the business, especially the quality of raw peanuts in storage.

PEANUT SURVEY - WESTERN PROVINCE

TABLE ...III.A.....

FARMERS NAME	VILLAGE	ISLAND	AREA (HA)	kg HARVESTED AT ANYONE TIME	AMT TO TO MARKET kg	HOW OFTEN
Terry Hoke	Sunfly	Kolombangara	0.0036 ha	50kg	40 kg	4 times a year
Reuben Alezama	Tuki	Kolombangara	0.01 ha	75	65	3 times a yr
Eiden Peter	Liangai	Vellala Vella	.006 ha	120	100	2
Frank Lave	Sausama	Kolombangara	1 ha	1150	1050	2
Royal Beiti	Liangai	Vella La Vella	.005	85	75	3
Stanley Vatoiki	Mangana	Kolombangara	.01 ha	1 x 25kg	Not yet	Just started
Rubenson Devi	Liangai	Vella La Vella	.005	95 kg	90	2
Gordon Poka	Liangai	Vella La Vella	.0045	135 kg	115	3
Hywin Ruben	Liangai	Vella La Vella	.0025	60 kg	50	3
John Mark	Liangai	Vella La Vella	.004	65kg	60	3
Peter Guana	Liangai	Vella La Vella	.0045	75 kg	70	3
			1.0591 ha	2010	1785	31

Approx. 55 tones marketable product per year.

(d) Personnel Required

The business requires four unskilled workers; each allocated to the following operations:

- roasting
- shelling and winnowing the skins
- grinding into peanut butter and mixing in other ingredients
- weighing/dispensing into jars, capping, labelling and packing.

The entrepreneurs will provide the Supervisory Cover required including book-keeping and management.

(e) Equipment Required:

- Roaster: hand driven rotary roaster capable of roasting at least 3 - 5kg/batch of peanuts fired using wood or coal briquettes from a fire place ensuring energy efficiency.
- Peanut Sheller with screen sizes 10mm, 11, 13, and 16mm
- Winnowing baskets
- Colloid mill or hand grinder.
- Mixing bowl.
- 1kg loose weight balance scales (pan or flat tray) (flat tray 150mm x 150mm; pan 150mm round x 25mm deep).
- Screw cap jars with printed labels, glue.
- Working table
- Building with storage facilities for raw and packaging materials and finished products, adequate ventilation, windows with netting, and stacking on pallets above the floor.

(f) PROCESS FLOW CHART FOR ROASTING PEANUTS

i. Peanuts Roasted in Shell

PROCESS	NOTES
PEANUTS	
Clean & Sort	Sort to remove shrivelled nuts.
Sundry & Store	Sundry and store in jute sacks, in a well ventilated room; keep sacks on racks off the floor. Protect from rodents and pests.

Roasting	Roast over a metal sheet (Chinese wok) over a fire or, in a manual operated hand roaster over a fire or on a large scale using ovens or larger drum roasters as required. Roasting is complete when the nuts have attained a golden brown colour.
Cooling & Storage	Store in airtight containers to retain texture and taste.

ii. Salted Roasted Peanuts

Shelled Peanuts

- Fry in oil at 140°C for 10 minutes.
- Cool
- Sprinkle with salt
- Store in airtight containers or seal into cellophane bags.

The thin skin is sometimes removed before frying.

iii. Peanuts:
- Dry roast (as in roasted in the shell)
- Deshell
- Mix with 1½ - 2½% oil
- Sprinkle with salt
- Pack into cellophane bags. (200gms lots or as required); heat seal

iv. PROCESSING FLOW CHART FOR PEANUT BUTTER

Process	Notes
Nuts in Shell	
Shell	Shell using manual or powered shelling machine
Store	Store in jute sacks, in a well-ventilated room; keep sacks on racks off the floor. Protect from rodents and pests.
Sort	Sort to remove mouldy and shrivelled nuts.
Clean	Clean by using a winnowing basket to remove dust.

Roast	Roast nuts on trays using dry heat to give a characteristic flavour, light golden brown and crisp texture, or in Chinese 'wok'. Mix nuts with washed clean dry sea sand for uniform heat transfer during roasting. Or roast in rotary hand roaster fired from firewood or coal briquettes. Ensuring energy efficiency.
Winnow	Use a winnowing basket. Blow off skins and clean nuts free of dust/sand. Use a fan if required.
Grind	Finely grind the peanuts in two stages with additives like salt (2%), 5½% vegetable oil and 1-2% sugar (optional).
Fill	Fill into clean glass jars and cap.
Pack	Pack into cartons.
Store	Store in a cool dry place.

g. QUALITY CONTROL

Groundnuts should be harvested only when fully mature since harvesting before maturity produces shrivelled nuts. Also nuts that are over mature lose flavour and colour. The nuts should be dried in the shell in the field, while still attached to the stalk, with the stalk turned upside down. Nuts should not be dried on iron sheets to prevent them from being baked and losing their flavour.

The nuts should then be shelled and dried thoroughly before storing to prevent mould growth and incidence of food poisoning by aflatoxin. On the other hand, the nuts can remain in the shell until required, but the peanuts should be spread out in the open air as frequently as possible for air and sundrying.

III.E.1.2 MIRIAM & UZZIAH MAIKE
UM ENTERPRISES, CHINA TOWN
BOX 91, GIZO

Miriam and Uzziah Maike currently make hard ice cream and ice blocks. They would like ideas on possible improvement and explore other items that can be processed with the existing equipment.

a. The raw and packaging materials (i.e. ice cream mix, cups and spoons are supplied under contract by May Ice Cream based in Honiara. Enough mix is stocked to last two months. However, the activities of May Ice Cream can best be described as those of a middleman. UM Enterprises wish to break away from such permanent attachment and monopoly of inputs.

The production equipment is "SNOWMASTER AUSTRALIAN" purchased second-hand from May Ice Cream. The machine gives 60 cups of ice cream from a batch frozen in 30 minutes. There is no maintenance schedule for the production equipment and so far, the minor problem experienced on the machine was fixed by a technician from Fisheries Department in Gizo. For any major breakdown requiring spare parts, a technician from May Ice Cream would have to travel by ship from Honiara to Gizo to repair the machine including supply of spare parts which are never stocked by UM Enterprises. Transportation by ship to Gizo from Honiara takes place once a week and UM Enterprises would have to wait if the repair technician misses the ship in that week from Honiara to Gizo.

After operating costs, the monthly profit from the ice cream operation is only SI$500.00 compared to SI$1000.00 for flavoured and coloured ice blocks. Sales of ice cream are mainly through shops in Gizo, with packaging in 250 ml, 1 litre and 2 litre lots.

Two workers are employed with Mr. and Mrs. Maike providing the management and supervisory cover.

b. The main problems facing the business are as follows:

1. Marketing ice cream is a major problem. No feasibility studies were undertaken before the business commenced.

The project started when soft serve was quite popular in town but not hard ice cream.

2. Production depends mostly on order. In some weeks, less than 500 cups of ice cream are produced, as opposed to the production of soft serve in town which is constant. Current flavours are vanilla, strawberry and chocolate.

3. With packaging materials, if May Ice Cream runs out, then UM Enterprises would have problems - the same holds for any problem arising from the supply of ice cream mix.

c. Recommendations

1. The entrepreneurs should be able to exercise control over raw and packaging materials, independent of a middleman. There is no doubt that the business is suffering from overpayment for raw and packaging materials at the moment.

2. To exercise such control and discretion means that various flavours from other sources can be tried to find out the combination which sells best among ice cream consumers in Gizo, Ringi and Noro, Solomon Taiyo.

3. Demand for soft serve ice cream is greater than hard ice cream, the later being considered by consumers as premium product which does not serve the immediate needs of consumers. On the other hand, the soft serve is served on a chewable cone base and demand is high. This business should purchase a soft serve machine, however small.

4. When the volume of production of ice cream increases or as soon as the business is able to pay off its loans on the building, a second ice cream machine is needed as a matter of urgency.

5. There should be a maintenance schedule, signed with a reputable technician as opposed to a repair option which is expensive, and could have serious implications for the business if the repair is not carried out on time.

Based on the recommendations, the following addresses are given for follow-up by the entrepreneur:

1. Ice Cream Mix - Soft serve and hard ice cream

   Contact: FOOD SPECTRUM Pty Ltd.
   11 Garnet Street
   Carole Park 4300
   P. O. Box 147
   Goodna 4300 Australia
   Telex 4100g Fospec
   Fax: (07) 271 3170.

2. For Slush and Shakes:

   CARPIGIANI Bruto Machine Automatiche S.p.a
   Via Emilia, 45-Anzola Emilia (Bologna)
   Italy
   Tel: (051) 733021
   Telex: 510318 Carpi 1

   OR

   HARBIN Equipment Wholesale Pty Ltd.
   19 Kyabra Street
   Fortitude Valley
   Brisbane, QLD 4006
   Tel: 07 854 1422 - Brisbane
   02 337 1352 - Sydney
   Fax: Sydney 02 337 4424.

3. For Ice Cream Machine or Soft Serve Machine

   CURTIN (Queensland) Pty Ltd.
   P. O. Box 1181
   Sunnybank Hills 4109
   Tel: 07 344 2444
   Fax: 07 345 6403
   OR
   215 Jackson Road
   Sunnybank Hills 4109
   BRINSBANE, Australia.

Curtin Markets the Table Top Mounted Soft Serve Machine (small scale) for about Aus. $5000.00.

III.E.1.3 RON PARKINSON
COCOA BUYER, GIZO

a. Ron wants to make cocoa from the cocoa bean. He currently sells cocoa beans to exporters, and wants to know what small-scale equipment is needed and the process involved. The entrepreneur will also like to know whether the products can be marketed locally.

Ron is the only entrepreneur buying cocoa in Gizo and has been doing so for 2 years. In addition, he trades in Marine products such as trochus, blacklip, gold lip, sharks fin and berche-de-mer and sells his products to Red Beach Enterprises, an exporter in Honiara. The entrepreneur will like to export directly but he is held back due to lack of funds and the little quantity of cocoa that he is able to buy. So far in 1992, his best buying months had been July and August when he purchased 5.7 tons of cocoa beans each month. To encourage farmers to sell to him, he gives bags and deducts the cost of bags during payment. The entrepreneur wishes to process cocoa beans if viable and still export some beans.

b. At the current level of production of cocoa beans, the most logical product which is less expensive to produce is a cocoa drink from whole cocoa beans. The process is outlined below:

Fermented and Dried Cocoa Beans

ROAST - need roaster

↓

SHELL - by hand

↓

(obtain roasted shelled nibs)

↓

Mill to Cocoa Liquor (mass) - use hammer mills
pin mills
OR
stone mills

↓

Run into molds

↓

Refrigerate and pack.

C. Equipment Required

i. Roasting Machine: A simple gas fired unit with gas flow control mechanism. Rated capacity about 7 lb/charge; roast time 15 - 20 minutes
Daily, 168 lb/day
Cost £1864 FOB London.

ii. Liquor Mill (simple hammer mill produces unrefined cocoa liquor), and collection trays.

Type CORMALL MD 12 fitted with 1mm screen available from:

Cormall A/S
Tornholm 3, Ragebol
DK - 6400 Sonderborg
Denmark (454) 486111

Cost (est) SBD 4,500 CIF.

iii. Trays:

Aluminium or stainless steel, depth 7-10mm.

Length by breadth 600mm x 300mm minimum.

iv. Molds:

Available from:

Deron Plastic Limited
P. O. Box 62-116
Sylvia Park
Auckland, New Zealand.

v. Factory space required about 750 sq. ft.

To avoid the grittiness associated with the product from the liquor mill (hammer mill), the use of an alternative liquor mill - the low Duff McIntyre Refiner/Conch. Mark 7, with 45 kg batch capacity is recommended. The unit will grind and refine roasted beans to commercial chocolate standard, overcoming the objections of grittiness, accept and mix sugar with the liquor to produce a sweetened superior final product.

Prices are as follows:

For 45 kg batch capacity	£6500 + 4% FOB costs
250 kg batch capacity	£11500 + 4% FOB costs
500 kg batch capacity	£14250 + 4% FOB costs

At the moment, tests are ongoing in New Zealand using Solomon Island beans and the equipment specified above to produce chocolate blocks for test marketing as chocolate drink.

It is expected that the results of such tests will pave the way for the direction to follow in setting up small-scale cocoa processing. Further developments will be communicated with the Business Development Unit, Gizo and the entrepreneur.

III.E.1.4 ELLEN PAIA
ZIPALE BLUE RESTAURANT
GIZO, WESTERN PROVINCE

Ellen Paia wants to make banana, tapioca and kumara chips. She has applied for a bank loan and is currently trying to relocate her business. She seeks advise on how to start up the business.

The entrepreneur is highly motivated but she is faced with the problem of lack of space. Her rent expires at the current site of operation and will not be renewed, and attempts to get a new location from the provincial government has not materialised. She is now waiting to be allocated land by the Lands Department in Gizo. She does not need to go through the executive because she has a registered business.

a. Raw Materials:

Ensuring an adequate supply of raw materials is a prerequisite for a successful chips operation. This was clearly explained to the entrepreneur, given the fact that Gizo is a central market in the Western Province where competition for goods especially food raw matterials is high. The entrepreneur will need to make firm arrangements on contractual basis (preferably) with farmers who bring the raw materials to the market to supply her factory according to her production plan. This particular arrangement is critical for banana which is in short supply. Tapioca and kumara supplies are adequate but selecting the right type (in terms of maturity and size) is also essential for cost effective production.

Other raw materials required include vegetable oil, packaging materials - plastic films and labels.

b. Equipment Required:

- Deep frying equipment (double chamber) from CQQ, Australia.
- Slicer
- Heat Sealer
- 1 kg loose weight balance scale (pan fitting, 150mm round, 25mm)
- Coriander
- Knives, other kitchen utensils and working table
- Plastic films and labels.

c. Building:

A building ($48m^2$) would be required to house the following:

- raw material reception
- washing and peeling
- deep frying room with adequate exhaust and ventilation proper setting should be installed on the windows to keep insects and rodents off.
- packaging, weighing and sealing section, also finished goods room
- the floor of the processing room should slope and drain naturally so that when it is scrubbed and washed, no pools of water remain.

Ancilliary Services:

Water, electricity, small office for supervisor.

PLANT LAYOUT

	3m	4m	2.5m	2.5m
	Water tap/sink	Water tap/sink		
4m	Raw Materials Reception Washing, peeling slicing room.	Deep frying room, draining of oil, *exhaust	Scales, sealing equipment, packing. Finished products storage	Office

Procedure:

Mature green cooking bananas, kumara (sweet potatoes) young tapioca, (cassava), are peeled and sliced into oval or round thin shapes. The sliced components are washed to remove adhering starch, followed by draining excess water before deep frying. The product is ready when the colour is golden brown, light and crispy. The fried product is removed and the oil drained, cooled and salted before packing into 200gm and 40gm polyethylene plastic bags, labelled and heat sealed.

d. Quality Control:

Critical control points include:

- the quality of the raw material - the attributes of which are described in the procedure. Peeling should ensure minimum loss as overmature and non-uniform shapes give peeling difficulties.
- the oil should be sufficienly hot before deep frying to avoid soaking rather than frying the product.
- excess oil should be drained and recovered through the Coriander.
- the weighing scale should be checked often to avoid product giveaway.
- the product should be monitored at the market place to ensure that quality guaranteed at production is maintained especially the texture of chips.

III.E.1.5 Jack Forest wants to start a peanut roasting business. He needs advice on the equipment needed and the procedure.

Jack's main interest is to roast and sell shelled peanuts. He does not own a peanut farm but wants to go into partnership with a farmer who produces about 1.5 tons per harvest, about 2 harvests a year. He will also buy some peanuts from other farmers to supplement. Jack thinks the demand for roasted and salted peanuts is high in and around Gizo and he hopes to retail the peanuts to the public for a start, and if he produces enough, will sell to the shops. His future plans include exporting to neighbouring countries unable to grow peanuts.

a. Raw Materials Required

The venture calls for nuts of nearly uniform shape and size since shelled salted nuts will be sold as finished product. Thus, raw material quality is a critical factor in the success of the business. Therefore, the business partner (farmer) must strive to produce nuts of uniform quality which will enjoy consumer loyalty and preference over other roasted peanut products in the market place and which, from the consumer's point of view is premium product.

b. Quantity Required

This depends on how much the business can sell. The raw materials should be stored in a way to prevent mould growth and afflatoxin. It is unlikely that large quantities of peanuts will be held at any given time. However, the principles of quality control should be enforced.

c. Quality Control

Groundnuts should be harvested only when fully mature since harvesting before maturity produces shrivelled nuts. Also nuts that are over mature lose flavour and colour. The nuts should be dried in the shell in the field, while still attached to the stalk, with the stalk turned upside down. Nuts should not be dried on iron sheets to prevent them from being baked and losing their flavour.

The nuts should then be shelled and dried thoroughly before storing to prevent mould growth and incidence of food poisoning afflatoxin. Alternatively, the nuts can remain in the shell until required but these should be spread out in the open air as often as possible to dry.

d. Equipment Required

- Hand operated rotary roaster, can roast up to 5kg of peanuts per batch. Fired using wood or coal briquettes.
- Peanut sheller with screen sizes - 10mm, 11, 13 and 16mm.
- 1kg or 5kg loose weight balance scales with pan fittings.
- plastic bags with labels
- Heat sealer.

e. PROCESS FLOW CHART FOR ROASTING PEANUTS

1. Peanuts Roasted in Shell

PROCESS	NOTES
PEANUTS	
Clean and Sort	Sort to remove shrivelled nuts
Sun dry and store	Sun dry and store in jute sacks, in a well-ventilated room; keep sacks on racks off the floor. Protect from rodents and pests.

Roasting	Roast over a metal sheet (Chinese wok) over a fire, in a manual operated hand roaster over fire or on a large scale using ovens or larger drum roasters as required. Roasting is complete when the nuts have attained a golden brown colour.
Cooling and Store	Store in air tight containers to retain texture and taste.

SALTED ROASTED PEANUTS

ii. Shelled Peanuts

* Fry in oil at 140°C for 10 minutes
  Cool
  Sprinkle with salt
  Store in air tight containers or seal into cellophane bags

* The thin skin is sometimes removed before frying.

iii. Peanuts

Dry roast (as in Roasted in the Shell peanuts)

↓

Deshell

↓

Mix with 1½ - 2½% oil, weight for weight.

↓

Sprinkle with salt

↓

Seal/pack into cellophane bags (200 gm lots or as desired).

f. Personnel Required

Two unskilled workers are required. They will be trained on-the-job. The roasting procedure and the point at which roasting should stop would be gained from experience. Jack will provide the supervisory role required.

g. Infrastructure

Longer term, it will be necessary to build a fire place with a chimney. Roasting can be done over a smokeless fire emanating from coal briquettes, with roasting in a large concave-shaped "Chinese wok".

The nuts are roasted in a bed of washed,dry sand to ensure uniform roasting. At the end of roasting, excess sand is sieved and reused for the next round of roasting. Sand particles left over with the roasted shells is blown off by means of a fan.

III.E.1.6 BARBARA UNUSU

Trescols Restaurant

P. O. Box 1, Gizo.

Barbara Unusu wants to start making fruit juices. She is currently operating a restaurant in Gizo town and wants to expand. She needs to know what type of equipment is needed and the procedure.

The restaurant business was started in 1990 when DBSI granted a loan of $15,000. Four people are employed at the restaurant and book keeping is done by the husband. The loan has been paid off and the building where the restaurant is housed has also been paid off. It is now trescol's property.

Patronage at the restaurant by customers (especially local people) is dwindling and therefore, Barbara will like to explore and expand into other businesses like juice making to keep the business going.

During discussions, it became apparent that the entrepreneur needed to have an appreciation for the type of raw materials required, their quantities, seasonalities, prices and quality, and availability around Gizo for a successful juice operation. In addition, the availability of markets was streesed, as well as the current competition for such markets by the shops in Gizo. After the exchange of ideas, it was felt that the entrepreneur is better off going into preserves (jams, jellies and marmalades) production. The reasons are obvious -

- low investment, equipment not very expensive
- simple process, product initially meant for the local market
- the uncertainty of raw material supply
- therefore, the entrepreneur will not need to make high loan repayments monthly.

a. Raw Materials required:

Pawpaw will be the most basic raw material used most of the time since it is available year round. Thus using pawpaw as a base, jams and jellies can be produced. To produce marmalades, other fruits in season will have to be included such as pineapple, soursop, mango, guava, passion fruit, oranges and bush lime. Pineapple, passion fruit, soursop jams are also distinct options.

Ensuring the supply of raw materials at the right price, quality, quantity, and regularity is the most critical factor stressed to the entrepreneur during the discussions.

She would have to link up with farmers (fruit growers) around Gizo and make firm commitment on contracts, work out logistics of supply, and ensure that the suppliers understand the quality attributes/ specifications required of the raw materials. All infrastructure necessary to ensure the storage of quality raw materials shall be taken into account. Having ensured that the feasibility for the project will be undertaken by the Business Development Unit in Gizo.

b. Equipment Required and Sources

Equipment	Source
Fruit pulper	Girbal, Belgium or Brett Engineering, Auckland
Fruit press	As above
Stainless stell knives	Local or Gibpat, Auckland
Stainless Steel spoons/ wooden spoon.	Local or Gibpat, Auckland
Cutting board	Local or Gibpat
Stainless Steel mesh sleves/strainers	Gibpat, Auckland
Measuring cups/jugs/ cylinders	Gibpat, Auckland
pH Meter or pH paper	Simon Smith Biolab, Auckland
Refractometer	Simon Smith Biolab, Auckland
Sugar Thermometer	Simon Smith Biolab, Auckland.

Cooking facilities, i.e.	
gas ring or electric ring	Local
Aluminium or enamelled pan	Gibpat, Auckland
Stainless Steel boiling pan	Gibpat, Auckland
Jam jars with lids (250g)	ACI Auckland for jars, National Cans
Jam jars with lids (550g)	Christchurch, Auckland for lids.
Bottle filler, capper	Auckland
Bottle cooler	R & R Equipment, Honiara
Labels, glue	Quickstik, Auckland
Scales 250kg/100kg	Gibpat, Auckland
50kg	Gibpat, Auckland
5kg	Gibpat, Auckland
1kg (+ or - 10g)	Gibpat, Auckland
Citric acid, pectin	Simon Smith Biolab, Auckland

c. Process

Before the preparation of the preserve, the fruit is washed to remove dirt and dust. Any mouldy fruit, leaves, stalks and other contaminating materials are removed at this stage. The fruit is given a preliminary treatment which depends on the fruit used.

For jams and jellies, the process is outlined below:

PROCESS FLOW DIAGRAMS

FRUIT PULP

For use in drinks (including juice nectars, squashes, cordials, syrups, wine, spirits, vinegar and preserves.

PROCESS	NOTES
Harvest	Mature fruit, harvested carefully. Except for hard fruits (e.g. coconuts) they should not be piled into vehicles. Use containers with loaded weight of 10kg approx. Smaller and they will be thrown, larger and they will be dragged or dropped - both causing damage to food and container.

Sort/grade	Sort by size, colour, shape, maturity, skin defects.
Clean	Wash in clean water. Use filters or chlorinate if necessary (one teaspoon of bleach per gallon of water)
Peel	By hand or by small scale equipment. Wear gloves if manual peeling as acids in pineapple and enzyme) can damage skin. Use stainless knives and easily cleaned plastic or wooden cutting surfaces.
Pulp	Use a fruit press, fruit mill or pulper/sieve. All metal in contact with fruit should be stainless steel. Some fruits are heated to increase juice yield and prevent browning. Citrus juices are extracted by a reamer or press. Juice is strained manually through sieves and clear syrups/cordials produced using a fine cloth bag.

PRESERVES (JAMS, JELLIES)

PROCESS	NOTES
Pulp & Filter for jellies only	Some jams also contain whole fruit pieces. For jellies the pulp is filtered through mesh and fine cloth until it is crystal clear.
Mix - Sugar Acid Pectin	Add sugar (approx. equal weight to fruit pulp depending on recipe) and mix in correct quantities of citric acid (to obtain pH 3.0-3.3) and, for some fruits, pectin (approx. 2% by weight). Precise formulation found by experimentation.
Heat	Heat quickly in stainless steel pan, with constant stirring to prevent burning until soluble solids content reaches 68-72% as measured by refractometer.
Fill/Seal Jars & Lids	Bottles and caps sterilised by boiling in water for minimum of 10 minutes. Hot fill while bottles are hot to prevent breakage. Small lid sealers available.
Cool	Cool in air or more rapidly in a bottle cooler.

Figure III.1 PROCESS FLOW CHART FOR JAM PRODUCTION

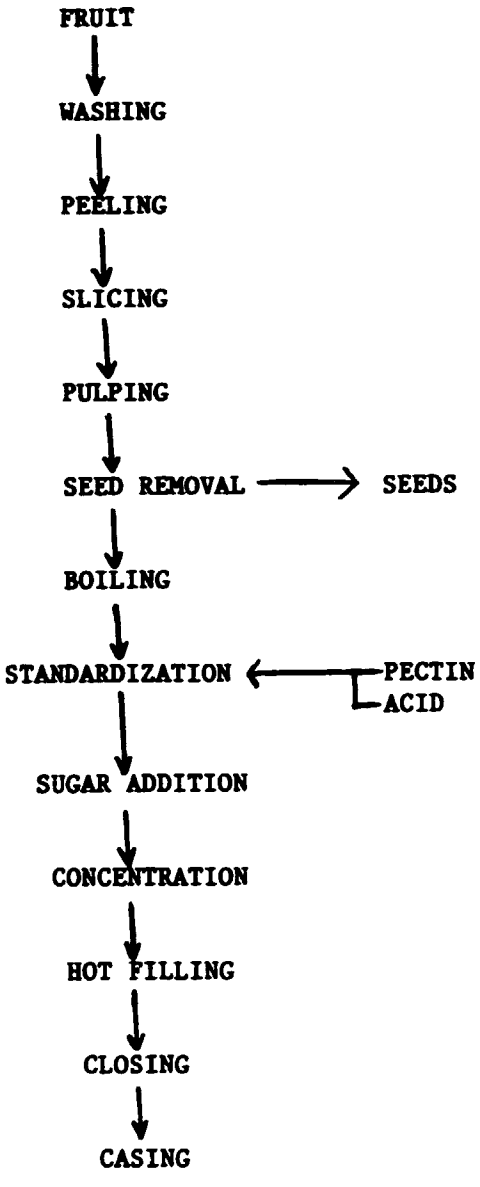
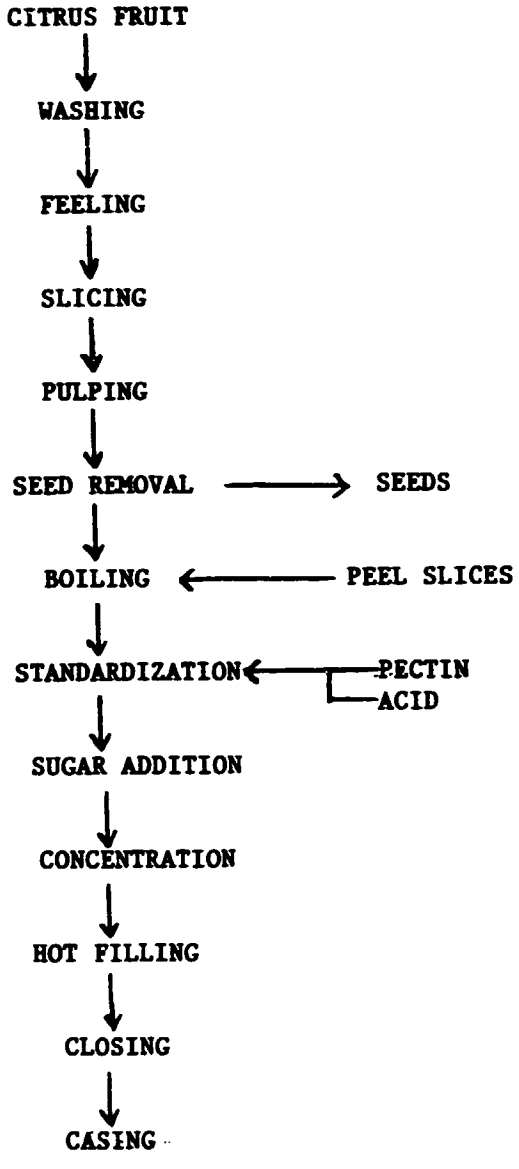


Figure III.2 PROCESS FLOW CHART FOR MARMALADE PRODUCTION



JAM MAKING:

RECIPE (for about 8 jars of 450g)

2.5 kg fruit
2.5 kg sugar
14g citric acid
15g pectin

RECIPE Pineapple Jam

fruit pulp	38%
sugar	49% (starting recipe before boiling)
pectin	1%
water	12%

Citric acid as required to give pH 3.0

RECIPE Passion Fruit Jam

Fruit juice	20%
Skin pulp	20% (starting recipe before boiling)
Water	11%
Sugar	49%

Sodium bicarbonate 0.015%.

d. Personnel Required

It should be emphasized that the successful production of jams on a commercial scale is not easy and failures are by no means unknown. Therefore personnel must be skilled to recognize when things are going wrong and take corrective action.

A minimum of four (4) skilled workers are required, each trained to handle any of the following operations -

- washing fruits, peeling, slicing, pulping/pressing
- boiling, standardization, formulation anc concentration
- hot filling, closing, cooling, labelling and packing
- the fourth will provide supervisory cover while Barbara Unusu will manage the operations.

e. Quality Control

The following faults may be encountered:

- slack jam — caused by prolonged boiling which hydrolyses the pectin, too high acidity, lack of pectin, use of too much sugar in proportion to pectin and excessive cooling prior to filling.

- discolouration — due to insufficient cooling causing scorching

- crystallisation — due to too low acidity resulting in sucrose crystallising out.

f. Infrastructure

In addition to services like electricity and copious supplies of water, the followings are important about jam manufacture.

- processing area should be roomy and well ventilated.

- due to considerable accumulation of steam during the boiling operation, the ceiling of the building should be sufficiently high with the building fitted with steam exhaust. The windows should be screened to prevent the entry of insects.

  A good sewage system is essential to avoid congestion due to accumulation of sugar in the effluent.

III.E.2 REQUEST FROM AUKI, MALAITA PROVINCE

E.2.1 COTTAGE LEVEL OIL EXTRACTION FROM COPRA

The major product obtained from copra is coconut oil. Coconut oil has both edible and industrial uses. It is processed into cooking oil and edible oil.

In industry, coconut oil is used in the manufacture of toilet and laundry soaps; paint and varnish; fatty acids, detergents, etc.

Coconut oil extraction at the cottage level involves grating clean copra to desirable particle size; cooking/steaming to liberate the oil and to facilitate extraction; pressing to separate the oil from the copra; settling and screening to remove undersirable particles from the oil. This is followed by filling into tins, drums or plastic kegs for storage.

The resulting copra cake may be used for animal feed production.

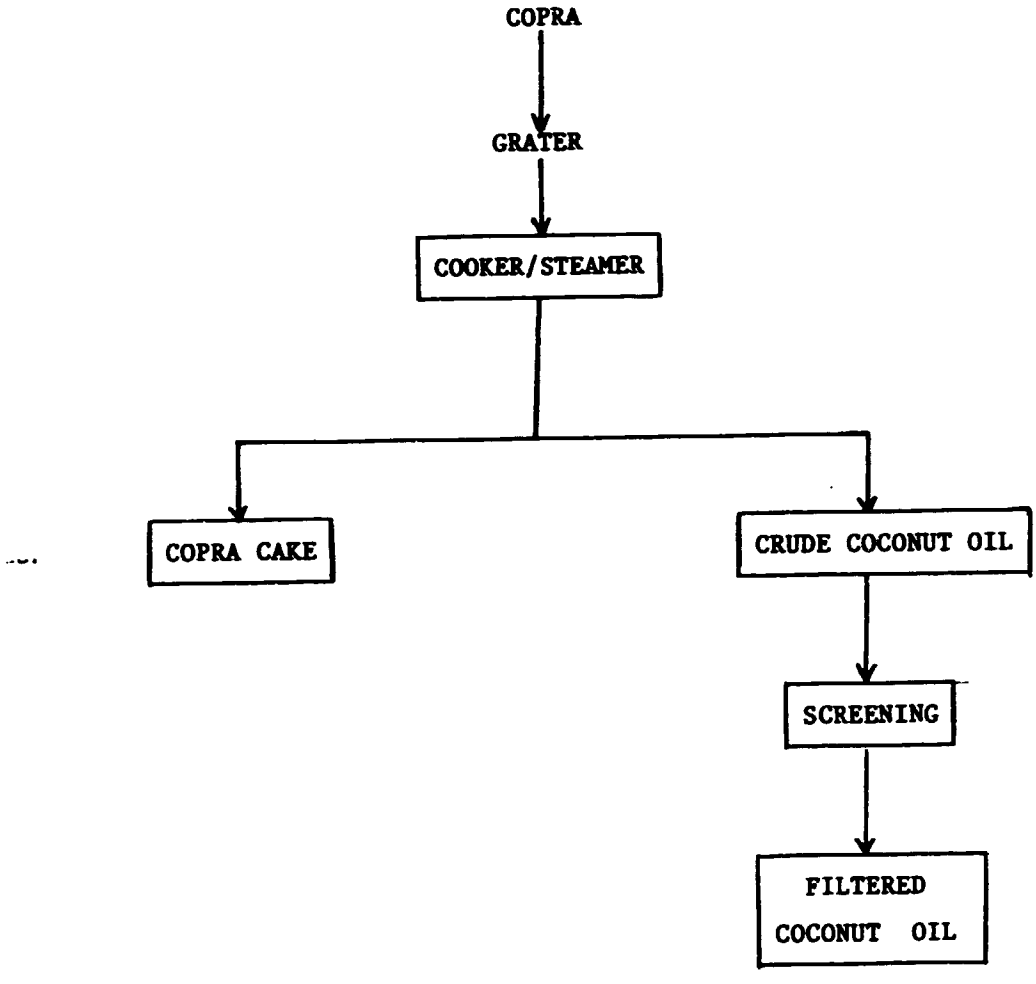
The process is outlined in Figure III.3.

List of Equipment

i.	Manual Grater	R & R Engineering, Honiara or can be fabricated locally.
ii.	Cooker/Steamer	to be fabricated locally.
iii.	Manual Oil Expeller/Copra Screw Press	R & R Engineering, Honiara
iv.	Wire mesh and white cheese cloth for screening.	

Figure III.3

PROCESS FLOW CHART FOR OIL EXTRACTION FROM COPRA



E.2.2 SOAP MAKING

1. INTRODUCTION

Coconut oil is very suitable for soap manufacture, making a soap which characteristically foams well (even in salt water), and has a very strong cleansing action. This is ideal as a laundry soap, and coconut oil also makes an acceptable toilet soap. Up to 30 percent coconut oil can also be used with tallow or lard, to give a milder toilet bar formulation. The Solomon Islands, in common with many other Pacific Islands, import large quantities of soap each year, which in principle, could be substituted by soap manufactured locally, wholly or partly from coconut oil.

2. EQUIPMENT REQUIRED

2.1 One (1) 4-gallon plastic or metal bucket (not aluminium)
One plastic container to measure 2.5 litres
One long wooden spoon for stirring
One 1-litre container
One 750 ml container
One plastic funnel
One 2-gallon bucket
One metal or wooden tray (5 cm x 55 cm x 35 cm)
Thin wire for cutting soap.

2.2 Mechanised

Same as above including the following additional equipment:

a. Soap making machine
   - with manual agitator/stirrer (fig. 1a - Annex III.3)
   - with motor-driven agitator/stirrer (fig. 1b - Annex III.3)

b. Soap cutting machine (fig. 2 a, b, c - Annex III.3).

3. CHEMICALS/INGREDIENTS REQUIRED

3.25 litres oil
400 gms caustic soda
6 teaspoons citronella oil or perfume (optional).

4. PROTECTIVE CLOTHING

Goggles
Hand gloves
Overall

5. PROCEDURE

5.1 Mixing

i. Measure 1 litre of water into the 4 gallon bucket
ii. Add 400 gms of caustic soda and stir until completely dissolved
iii. Fill up the 2.5 litre container and the 750 ml container with the oil.
iv. Transfer the oil into the two-gallon bucket
v. Pour the oil into the hot caustic soda solution as a thin stream while stirring the mixture constantly
vi. This operation should be carried out over five minute period
vii. Continue stirring for a further ten minutes
viii. Add the citronnela oil or perfume and stir.

MOULDING AND CUTTING

i. Pour the mixture into the tray
ii. The mixture should set in about three days
iii. Cut the soap into equal pieces using the wire
iv. Keep soap tablets dry and cool

A much harder soap can be made by replacing 750 ml of the oil by the same quantity of melted beef fat, available from butchers.

WARNING

When adding caustic soda to water, the mixture becomes very hot. This mixture is caustic. Do not allow it to splash onto skin or into eyes. If this happens, it causes severe burns, if not washed off immediately. Wash any splashes off the skin with lots of water.

If it gets into eyes, wash with lots of water and seek medical advise. The use of rubber gloves and goggles to protect the eyes is highly recommended.

5.2 MECHANISED

Same as described above except that more soaps can be produced using the soap making machine and the cutting machine.

5.3 DESCRIPTION OF THE SOAP MAKING MACHINE

The soap making machine is a cylinderical tank. A drum can also be improvised to reduce costs (Recommended for sole proprietorship, small-scale businesses). The tank is heated from underneath by a gas heater. The traditional method uses firewood as fuel. The tank is equipped with a multi-blade stirrer/agitator that could either be manually operated or operated by an electric motor.

In the case of the electrical motor driven agitator, the electric motor is mounted above the tank supported by a metal frame on four stands.

5.4 DESCRIPTION OF THE SOAP-CUTTING MACHINE

The machine is manually operated. It consists of a flat metallic platform (P) divided into two and guided on both sided by horizontal metal frames (G). An impeller/ram (R) runs between each of the two divisions for pushing the semi-hardened soap block against and through the vertical cutting wires mounted vertically from a metal support (HS) and attached to the flat metallic platform. The metallic platform is mounted on a sturdy frame (F) on four stands. (Figs. 2a, b & c - Annex III.3)

5.5 CUTTING OPERATIONS

1. Production of Soap Bars

The semi-hardened soap block is pu[illegible] and through the cutting wires to produce soap slabs [illegible] slabs are then laid flat and pushed in turn against and through the cutting wires to produce soap bars. The sequence is as shown in figure 3 - Annex III.3).

2. Production of Soap Tablets

The soap bars from the first set of operations are pushed transversely, i.e. across their lengths, against and through the cutting wires to produce soap tablets. (Fig. 4 - Annex III.3).

The above sequence are for only one half of the cutting platform.

The second block would be concurrently cut in a similar set of operations on the second half of the table.

Thus, it is important to note that the soap mould must be of such a size that will produce soap blocks that would fit into each of the cutting spaces (C.S).

IV. TRAINING PROGRAMME

AN INTRODUCTION TO FOOD PROCESSING WORKSHOP

During familiarisation of the food processing sector, especially small scale industrial ventures, it was noted that there were very few entrepreneurs in small-scale food processing.

A further investigation revealed that intending and potential entrepreneurs face institutional and attitudinal barriers in their quest for greater participation in the industrial development of the country. Existing educational/training facilities for the development of entrepreneurial and management skills often neglect the specific problems with which small-scale entrepreneurs must cope. In addition, there is a general lack of technological, marketing and statistical information and an inadequate package of infrastructure.

Entrepreneurs need to acquire a basic understanding of the technology of the industry in which they want to establish themselves if their efforts are to result in a successful profit making, value-added business in addition to training in either management or entrepreneurship.

a. Objective/Rationale

1. The objective of the workshop is to make the participants aware of potential small-scale business opportunities in food processing and to become familiar with the skills required to start and operate a small scale food processing business successfully.

2. The workshop will enable the participants to acquire a basic understanding of appropriate technology for the food processing industry.

3. The potential constraints of small-scale food processing in the Solomon Islands will be explored and discussed.

4. To identify entrepreneurs

b. Date and Place

The workshop took place at the Food Laboratory, Home Economics Department, School of Education and Cultural Studies, Solomon Islands College of Higher Education (SICHE) on November 24 - 26, 1992, with factory visits, presentations of business ideas and closing ceremonies on the 27 November, 1992. A copy of the announcement in the Solomon Star Newspaper is attached in Annex IV.1.

c. Target Trainees, Recruitment and Selection

The workshop was targeted at those entrepreneurs who had already ventured into some kind of entrepreneurial activity in food processing and those intending to go into small scale businesses in food processing. At this stage, it was impossible to have a homogeneous group of people to attend the workshop, since we were seizing a first opportunity to attract and identify entrepreneurs. Therefore, people came from various social and educational backgrounds, selected from a group of applicants based on certain criteria (Annex IV.2),such as background, experience, whether public or private and the type of food processing business the entrepreneur is interested in starting. The list of participants is attached (Annex IV.3).

d. The Workshop

In view of the business environment, the national food consumption pattern the status of raw materials availability and processing equipment in the country, it became necessary to involve trainers with a management background and trainers with a food-processing technology background in the workshop. National resource persons included lecturers at the Home Economics Department of the College of Higher Education, the School of Marine and Fisheries Studies and the Ministry of Agriculture and Lands. Guest lecturers from the Honiara Municipal Authority on Food Regulations were invited. Successful Solomon Islander entrepreneurs in the area of food processing were also invited to share their experiences with the participants. The participants presented business ideas at the end of the workshop and were taken on field trips to sites where on-going food processing activities were observed.

The detailed programme of the workshop is attached. (Annex IV.4).

The course was officially declared open by the Permanent Secretary of the Ministry of Commerce and Primary Industries. This was followed by a statement on Government Development Objectives with respect to Food Processing by the Director of the Industrial Development Unit of the Ministry. The objectives include:-

- the achievement and maintenance of self-sufficiency in food supply, increased agricultural productivity;
- increased cash income;
- improved foreign exchange earnings;
- increased small businesses for Solomon Islanders;
- the participation of Solomon Islanders in economic activities.

The foregoing set the stage for the workshop:

The introduction of personal entrepreneurial characteristics by using the "Enterprise Experience" approach was followed to enable the participants understand and begin to develop entrepreneurial behaviour. This was achieved by means of an exercise in which participants filled out a questionnaire on "Personal qualities to be a successful small business owner". (Annex IV.5).

The rest of the workshop was devoted to the theme of food processing beginning with a discussion on National Food Consumption pattern and types of foods commonly eaten. Other details covered during the workshop are given in the programme and copies of relevant hand-outs are attached to the report. (Annex IV.6).

The methodological approach used during the workshop was mainly through group discussion; to emphasize active participation by participants, while the trainer stimulates and acts as a facilitator. The method elicited the existing knowledge of the participants while the group discussion broadened their knowledge.

Because of the apparent lack of process equipment, learning by doing could not take place. Rather, it was learning through practical demonstrations of the processing options in peanut processing, fruit juicing, preserves such as marmalades, jams and jellies, based essentially on recipes which showed basic steps required in making these at home. These recipes and procedures are attached in Annex IV.7. The same holds for fish smoking and drying of fruits.

e. Business Plan Presentation

The need for a presentation was stressed to the participants at the beginning of the workshop. The objective of the presentation was to evaluate how much information the participants acquired as far as requirements for the food processing business is concerned; to counsel them during the presentations and find out more about their weaknesses and give further assistance in such areas as:

- technology of production;
- self assessment, location, product;
- marketing aspects, production plan;
- finance.

Participants formed the following food manufacturing companies so as to facilitate the presentation:

Company A	Company B
Peanut Roast Enterprises Limited	Sunshine Chillie Company
Paul Fafale	Oliver Bikimoro
Hellen Tafisia	Hugo Ragoso
Jane Tapalaboe	Daniel Gaobata
Adriana Filian	Duddley Longamei
Joseph Ziku	

Company C	Company D
Tropical Jam Limited	Tropical Fruit Products
Barbara Unusu	Josephine Baera
Minnie Lave	Richard Marahura
Peter Rimou	Saxon Talo
Mark Biloko	Moffat Misikui
Stanley Siapu	Delmay Lovi
Francis Tabaia	Geenter Kera
	Joini Tutua

Most presentations covered the basic requirements necessary for food processing operations but demonstrated cash flow problems. Income and expenditure were out of tune. They had no problems with sourcing raw materials, determining market potential and market share but the organisational structure presented in some cases showed that overheads would ruin the business.

These points were elaborated and discussed with the groups at the end of the presentation.

f. Reactions of the Trainees on the Training Programme

A course evaluation, designed in two different formats (see below), was administered at the end of the workshop.

Format A

Participants were asked to score the the workshop/training in such aspects as:

A Relevance of training content
B Suitability of training approach
C Performance of the trainer
D Administration
E Comments.

Score

1 = Very good
2 = Good
3 = So-so
4 = Bad
5 = Very bad.

Format B

The following questions were posted:

1. Is the training course of any use for you ?

2. Which part of the training was most important for you ?

3. Indicate the training sessions which did not meet your needs

4. Please list other subjects which were not in the course but which you feel should have been included.

5. Did you improve your entrepreneurial behaviour by attending the course ?

6. Please give us your opinion about the course as a whole.

In summary, the overall reaction of the participants was positive (Annex IV.8). It was felt however that the course should have lasted longer than four days. Some participants (outside Guadalcanal) felt that such courses should in future, take place in the provinces and not in Honiara. Some participants also felt that more of such courses should be organised with Health and Hygiene personnel present to talk about food regulations in the Solomons. Another suggestion was that the course should teach participants how to formulate proposals on small-scale businesses. On the average, the following scores were recorded:

-	relevance of training content	- very good	1.00
-	suitability of training approach	- good plus	1.47
-	perfomance of trainer	- good plus	1.38
-	administration	- good	1.857

Copies of these are also annexed for reference. (Annex IV.9).

The products were evaluated organoleptically, strictly on the degree of likeness for them. Of the juices, mango juice scored higher at 4.57 out of 5 maximum than pawpaw juice (unsweetened) which scored 4.14. Of the preserves, pineapple/pawpaw jam scored highest at 4.76, coconut jam at 4.2 and pawpaw jelly at 4.14. Preserved tamarine and candied tamarin scored 2.90 and 2.76 respectively. Roasted and salted peanuts scored 4.47 while dried pineapple scored 3.6. In summary, the scores reflect in some cases, a dislike for sugar. (Annex IV.10).

The workshop was officially declared closed by the Under Secretary Ministry of Commerce and Primary Industries and the Consultant gave the following closing remarks.

g. Closing Remarks

Under Secretary, Ministry of Commerce and Primary Industries (MCPI), Director, Industrial Development Unit (IDU), MCPI, Project Manager/Chief Technical Adviser (CTA), Resource Persons from the College of Higher Education and Ministry of Agriculture and Lands, Fellow Participants, Ladies and Gentlemen,

By and large, the objectives of the workshop have been achieved :

i. we have sensitized our participants about opportunities in food processing;

ii. we have exposed them to basic knowledge in food processing;

iii. in their business plan presentations this morning, the participants demonstrated that they now have ideas of what is required to set up small-scale businesses in food processing.

We expect that very soon, each intending entrepreneur will approach the MCPI for support and guidance. At that point, support will be specific and assistance tailored towards each individual business.

Your comments in the course evaluation are noted. These will guide training plans in the future.

I should seize this opportunity to thank the Permanent Secretary, Ministry of Commerce and Primary Industries for his support, the Director of Industrial Development Unit, the Chief Technical Adviser and my colleagues in the Ministry.

The co-operation of the Solomon Islands College of Higher Education and the Resource Person who participated in the Workshop is appreciated.

To our participants, many thanks for your enthusiasm. The group discussions were quite participatory and lively. We hope you will truly establish your business very soon. We wish you safe journey back to your provinces.

Thank you.

Olu Omosaiye

h. Demonstration of the Potentials of Palm in Home Cooking

Earlier in the Mission, (3rd Sept. 1992), the Consultant demonstrated the potential uses of natural fresh palm oil to fifteen (15) selected women at the Women's Interest Resource Centre in Honiara. The Consultant had observed that palm oil is not consumed as part of the normal diet and all palm oil produced by Solomon Islands Plantations Limited(SIPL) is exported to generate foreign exchange.

While the generation of foreign exchange through palm oil exports is good for the country, the refined palm oil products imported into the country costs four times as much as the cost of natural palm oil. Yet fresh palm oil is good nutritionally, rich in carotenes (vitamin A precursor), and is the main cooking oil in use in many African ccuntries. Unfortunately, it has not been introduced to the Solomons.

The demonstration became necessary in order to show the women the 'natural goodness' of palm oil and to encourge them to use it in their cooking. SIPL's palm oil is good quality, with 4% free fatty acid in the finished product.

i. FAO/MAL Workshop on Root Crops, Honiara 26th - 29th October, 1992

In co-operation with FAO, the consultant served as a resource person in a workshop organised on root crops processing. The main objectives of the FAO sponsored workshop were:

- to increase the ability of home kitchen in processing root crops for the benefit of a household unit and
- to enhance the capacity to produce more root crops for marketing in urban centres and so create conditions to become self-sufficient and self-reliant in food production.

The workshop was held at the Women's Interest Resource Centre in Honiara, Solomon Islands from 26th to 29th October, 1992. The target trainers were mainly women who are directly involved in kitchen preparation of foods.

The root crops of interest are tapioca, sweet potato, yam, taro, kumara and pana and how these are made into convenient products, e.g. flour and chips, the methods and equipment involved in the preparation.

The ultimate aim is to extend and diffuse amongst the women community, knowledge, and practical information on food storage, preparation and processing so as to improve their living standards.

The consultant's main contribution was in the area of material processing and utilization of food products from cassava, especially starch based dippa from Liberia, fufu and gari from Nigeria and other West African countries, dumboy from Liberia and Ghana and the use of cassava leaf known as 'sakasaka' in the Congo. The preparation of these foods was demonstrated and subjected to sensory evaluation. The foods were highly rated, especially sakasaka which was presented as a stew (palm oil based) to be used as condiment for eating foods. Moreover, it was the women's first exposure to such experience and they were quite excited.

Root crops represent the major staple foods of Solomon Islands and indeed the Pacific Region where people consume root crops freshly boiled or baked, with hardly any form of mechanized processing.

However, the Ministry of Commerce and Primary Industries has already established a banana and rootcrops chips business in Honiara and Buala, Ysabel with a third business in the process of establishment in Gizo.

Other commercially viable products from root crops that can be developed into small scale business include gari production, and dried chips for cassava starch or fufu production. The point should be made however that raw materials are needed in commercial quantities to support such a venture.

V. PROBLEMS ENCOUNTERED

Food processing of locally produced crops is a new area with only three businesses set-up under the project. Some of those who appeared to show interest were not entrepreneurs with a mission. Thus, one of the most difficult problems was finding capable people to become entrepreneurs.

Another problem encountered was sourcing appropriate equipment for food processing. The sourcing of equipment was bedeviled by the inherent nature of the project, and the lack of raw materials to support a financially viable project even when equipment was sourced.

In addition, process equipment (in any scale) is not available locally. Therefore, the project had to start everything from the beginning. The issue was exacerbated by the lack of facilities or infrastructure such as laboratories to conduct experiments. In fact, it was most difficult or near impossible to conduct experiments as laid down in the job description without a food processing development laboratory.

Local engineering capacity for equipment fabrication is also limited. This area requires specialization in order to appreciate food processing equipment specifications but the relevant manpower and know-how are limited at the moment. It took such a long time for R.& R. Engineering to give a quotation for the equipment the project required.

In contacting companies overseas to procure equipment, response was exceedingly slow. Many overseas companies found our specification rather unattractive and the equipment unprofitable for their type of business activity.

Those companies who showed interest gave quotations which were rather high for the scale of operations being proposed.

For processing crops like peanuts into peanut butter commercially, small-scale processing equipment are rather difficult to obtain. The smallest equipment from the U.K, Japan or France is rather expensive for the businesses proposed. Even if the businesses could support such high cost equipment, the lack of raw materials in commercial quantities to make the project financially viable complicated matters.

These difficulties necessitate the need for the development of the local engineering capacity in Solomon Islands. The upgrading of the infrastructure at the School of Industrial Development at the College of Higher Education (SICHE) could serve as a positive step in the development of the engineering and machine tool industry, needed to support industrial development in the Solomons.

VI. PROJECT STATUS

As a result of the problems of inconsistent supply of raw materials, small size of markets, poor transport and distribution network, and problems related to equipment sourcing, the low-cost approach to food processing businesses was chosen. In this case, the entrepreneur starts his/her business at home on a small scale, and begins sales in the neighbourhood. For fruit juicing as an example, some of the hotels in Honiara had already shown interest in purchasing fresh juice daily. For fruit drying, school children in the neighbourhood are the immediate consumers, while for home made jam/jellies/marmalades, the degree of success with consumers in the neighbourhood is an indication of what might happen in the market place.

Other advantages of this approach include:

i. low investment, equipment not very expensive

ii. simple process, product initially meant for local market

iii. cost effective, the entrepreneur initially operates from home and saves money on rent. Two entrepreneurs have been cleared by the Health Department to proceed

iv. the entrepreneur will not need to make high loan repayments monthly.

The situation with small-scale food processing businesses in the Solomon Islands as at December 1992 is given below.

A. Feasibility Studies Completed

i. GREV Peanut Roasting - pending loan approval

ii. Frozen Tapioca for Export - waiting for funding

iii. Zipale Blue Chips - awaiting loan approval.

iv. Kolomola Peanut Roasting - started operations.

v. Makira Bakery - awaiting loan approval.

B. Feasibility Studies in Process

i.	Macy Maeramo	Fruit Juicing. Fresh fruit juicing at home cleared by the Health Department.
ii.	Delmay Lovi	Preserves (jams, jellies, marmalades), fruit drying (entrepreneur currently experimenting with fruit dryer).
iii.	Jack Forest	Peanut Roasting
iv.	Frank & Minni Lave	Peanut Roasting; Peanut butter.
v.	Trescols (Barbara Unuzu)	Preserves - jams, jellies, marmalades.
vi.	Grev Bakery	Hot Bread
vii.	Bartholomew Wanefalea (North Malaita)	Oil extraction from copra Soap making
viii.	Kirakira Chips	Chips production
ix.	South Malaita	Peanut Roasting.

C. Expansion and Diversification Programme

i. A & A Brothers Enterprises Limited

- Coconut chips production (equipment being sourced)
- Coconut jam production (experiments on-going).

ii. Solomon Choice Coffee & Kolomola Spices

- Chili Sauce production] ingredients and equipment being
- Coconut Candy] sourced.

These businesses need continued technical assistance from UNIDO Project Personnel and the Business Development Unit of the Ministry of Commerce and Primary Industries to see them to fruition. Indications are that in the new year, more entrepreneurs interested in small-scale food processing will approach the business development division for support.

VII. OTHER POTENTIAL FOOD PROCESSING BUSINESSES

1. PROCESSING FRUITS AND VEGETABLES

a. Introduction

There is no doubt that a sound agricultural base will have to be developed before the establishment of small-medium (or large) scale food processing industries utilizing local raw materials can seriously take place. Increased internal market demand is also critical.

The volume and value of current imports of some processed foods (Table VII.1), indicate the scope and scale of agro-industrial possibilities. As far as fruits and vegetables are concerned, it is hoped that within the next two years, a number of technically and financially viable small and medium scale multipurpose fruits and vegetable processing facilities would be established in Honiara and other places on Guadalcanal. These facilities would produce fruit juice, preserves, dried fruit and market freshly packed vegetables. This will be a departure from current practice.

This is because it will take about two years for on-going efforts at Dodo Creek Research Station, in co-operation with out-growers on Guadalcanal to succeed in commercial fruits and vegetable production e.g. pineapples, mangoes, soursop etc. in quantities adequate for domestic and industrial demand.

The success aspect is that processors can enter into successful contracts with outgrowers giving them the required supplies, not only during seasonal gluts but guaranteed regular supplies as required.

TABLE VII.1 **FOOD IMPORTS: 1987 TO 1990**

Item.		1987		1988		1989		1990	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Fruits Dried	(kg)	7687	24055	9056	34891	3779	32813	5851	30733
Jams, Marmalades, Fruit Jellies	(kg)	45158	79486	39285	115002	21023	111665	162855	316885
Fruits and Vegetable Juices	-	-	503517	-	666070	-	514047	-	298297
Fruits, Canned or bottled	(kg)	29918	54772	25455	61651	26529	68379	15130	63010
Fruits, Frozen	(kg)	13631	14215	12911	28634	14309	41261	12604	52455
Vegetable, Preserved	(kg)	76695	172937	71104	203655	50555	241997	22538	109143
Edible Nuts, Fresh and Dried	(kg)	-	40753	-	45088	-	61402		31494
Vegetable Oils, Coconut & Palm	(1)	448897	796173	411981	1020662	222068	901632	279754	1178917
Beverages non alcoholic	(1)	973737	864786	952889	1311894	583121	1147300	344958	610842
Beer, ale, Stout	(1)	1985129	1519121	2086733	2903185	1633138	4144558	1969382	4246884

SOURCE: STATISTICS OFFICE
HONIARA.

MARCH 1992

b. Raw Materials

The raw materials and their seasons are given below:

Throughout the Year	October to December
Oranges	Mango
Guava	
Pawpaw	November to December
Watermelon	Pineapple
Soursop	
Banana	January to February
Bushlime	Avocado
Passion fruit	
Five Corners	

c. Machinery and Equipment

i. For low cost investment in fresh fruit juicing; entrepreneur prepares juice based on fruit availability and own recipe:

	Equipment	Source	Product	Packaging
-	Nutrifaster Juicer	Australia	3 lit/min.	Returnable 2 or 4 litre screw cap plastic bottles as available and plastic cups with lid.
-	Santos Centrifugal Juicer	PKK, Australia	1 lit/min. 150kg fruit/ hour.	

ii. For small-medium scale investment requiring inputs of about 250kg - 1 ton/hour of fruits, equipment and packaging options were sourced from:

- Alvan Blanch Development Company Limited, England,
- Alfa Laval Engineering Pty Limited, Australia; and
- National Small Industries Corporation, India.

The package requires a steady source of raw materials for financial viability and profitability and it is therefore a project for the future. The price of the package ranges from $250,000 to over $600,000.

2. MEAT PROCESSING

The volume and value of current imports of processed meat products (mostly canned meat), are increasing at 28% annually. There is considerable scope for import substitution possibilities in setting up canneries to extend the shelf life of animal products to allow a wider consumption base. For example, the imports of bacon and ham, amount to about 29 tons valued at $156,000 CIF, and 33 tons of sausages (pork, beef), valued at $214,000 CIF. Of the total imports of canned foods, 2000 tons are meat products of which 80 percent is canned meat; while 65 percent of all canned meat imports are beef based.

Against this background, the Livestock Development Authority (LDA) is losing out on wastes which it has no facility to process into downstream products like sausages, bacon and ham, in its butchery. The problem is complicated by the lack of well established small goods processing facility which could assist the LDA with value added processing.

Therefore, a strong case exists at the LDA for integrated meat processing facility comprising:

- the butchery
- a small goods processing facility for sausages, ham and bacon from wastes generated at the butchery
- a cannery for canned meats; and
- an animal feeds production facility.

The setting up of the cannery is a means of extending shelf life of animal products and improving distribution, given the lack of cold chain distribution of animal products, the limitation in the number and distribution of butchery shops, and the very small proportion of the populace with access to electricity and functional refrigeration.

3. COCONUT PRODUCTS PROCESSING

a. Paramount importance is attached to the coconut tree in the Solomons. The contributions and characteristics of the coconut industry in the Solomons are given below:*

i. % as total export earnings by the primary export industries in 1950s/60s - 85%

ii. Above (i) but in 1987 - 8%

iii. Above (i) but in 1990 - 7%.

Investments to Date

Area

: Country 2,845,000 ha

: Under coconuts 58,938 ha (%) 1985 Coconut Development Project Survey.

. (Production (by weight) in equivalent terms)

: Nuts 191 million nuts

: Copra 42 metric tons

: Fresh meat 75,000 tons

: Shell 30,160 metric tons

: Husk 42,000 metric tons

: Water (not available).

. Population

: Direct involvement - over 45% of total population

: Reliance - approximately 90% of total population.

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* Based on: Coconut Products Development Programme 1990 - 2000 Part 1; An Overview. Compiled by S, Ilala, CEMA. Solomon Islands (1992).

b. As a result of the widening trade deficit in the last 4 years which is quite disturbing, the most logical area to turn the economy around is to map out an economic recovery programme involving the realisation of a return on substantial investments within the production sector. Clearly, an integrated approach is needed. "Closer inter-linkages and consistency between institutions involved in the production, processing and marketing of coconuts and coconut-based products on common strategies and programmes must clearly be a development priority during this decade, 1990 - 2000", CEMA concluded.

c. Subsequently, CEMA, as an instrument of government policy, conversant with government objectives and strategies on diversifying the produce base and capacity of the economy, has drawn up a list of development objectives, sectoral policies, sectoral strategies and programmes to encourage and facilitate the establishment of small-scale coconut industries to process and manufacture coconut-based products, both for the home and export markets.

d. The programme period is 10 years, with 1990 as the commencement of the programme, because of CEMA's close collaboration with Lever's Solomons Limited and the investment of $1.5 million in the copra crushing mill at Yandina. One advantage of such co-operation is that CEMA would gain access to technical information in adapting the product technologies in its efforts under the ten year programme and to facilitate the ease of setting up small-scale coconut-based industries at selected locations nationwide.

e. To this end, CEMA is in the process of setting up two small-scale oil extraction plants in the country - one at Kirakira and the other at Noro.

f. Orders have been placed with Handers of Japan to supply machinery and equipment

g. Ultimately, the oil will be used for laundry soap manufacture.

However, CEMA is faced with marketing problems since the internal market is small. A market study is being undertaken in two phases. The first phase is for prospects in Solomon Islands. The second phase will cover markets in PNG, Vanuatu, Fiji, Tonga and New Caledonia.

There are distinct opportunities, in setting up less expensive, labour-intensive and functional oil expelling units in the rural areas for both edible and industrial uses, especially soap making. The technical aspects are described in Section III.E.2 pp 79 - 84 of this report. Toilet and laundry soaps are basic requirements of an average household whether rural or urban, and there exists a potentially good market base to have rural soap making factories in the Solomons. It has been estimated that a small share of existing market in Malaita will prove to be a viable business.

h. Other coconut products include:

- chips
- milk
- jam
- cream.

An entrepreneur in this project is curently experimenting with coconut chips and jam as a means of expansion and diversification. The technologies for producing any of the products are quite popular, but feasibility/marketing studies are a strong proposition in the Solomons before any of the products can be profitably produced.

4. FISH SMOKING FOR EXPORT

a. Introduction

The business is being proposed by VELAVIRU Producers Development Co-operative Association Limited (VPDCAL), which, for the past six years, has been in the Fishing Development Project. The association was formed by people in and around South Choiseul who have customary rights and ownership of the land and sea resources in the areas stretching from Poro to Vaghina and from Vaghina to Oloko bay to the North.

b. Business Location

The location of the business is as follows:

1. The fishing development project is based in Velaviru Island. This is where the fishermen fish and the Association buys fish from the fishermen. The Association then stores and markets them in Honiara public market.

2. The Association's Head Office and Marketing Outlet centre is located in Honiara where it has access to the market.

3. The proposed smoked fish venture will be located in Honiara. This is mainly because of the accessibility to other important services such as electricity, water and markets of the proposed product.

c. Product

The final product to be produced is SMOKED REEF FISH.

d. Raw Materials

The raw materials for the proposed product is REEF FISH which will be supplied by the fishermen (Members) of the Association. There are currently about 200 fishermen who fish for the Association in which the Association pays each individual fisherman SI$1.90 per kilogramme for each one's catch. The average monthly catch is approximately 10 tons. This can be easily increased to 15 tons per month or even 20 tons, if the Association has more storage facilities in the fishing ground. In fact, it is the intention of the Association to venture into such business activities.

e. Consistency of Raw Material Supply

The only difficulty which may affect the continuous supply of raw materials is the breakdown of the fishing vessel which is sometimes experienced. However, the source of the raw materials and availability of labour is highly dependable. In fact, the supply of raw materials can further increase if the Association only have another similar size fishing vessel.

f. Means of Financing the Proposed New Business

The Association is currently in arrears with its DBSI loan at SI$50,000. The total loan received from DBSI in 1989 was SI$173,000 which was used for purchase of a fishing vessel, MV Tana. With this loan arrears, it would be unwise for the Association to apply for another loan in financing the proposed business. The VPDCAL's management have considered this matter and decided to seek financial and technical assistance from Provincial Development Unit (PDU) under its normal funding arrangement.

The main reason of seeking financial assistance from Provincial Development Unit is to allow the Association to repay its current loan at the interest rates of 14% annually.

g. Machinery and Equipment

The options available for smoking fish include:

i. Afos Maxi Smoker ex Afos Limited, Hul England. Details are given in Annex VII.1 - Cost approximately SOI$55,000.

ii. R & R Engineering Low Cost Fish Dryer, approximately $9,000(SOI).

The Afos equipment is tested and proven, while the R & R Engineering equipment remains to be tested.

h. Fish Smoking Process

The process involves cleaning the fish as soon as they are landed, descaling, heading, gutting and filleting, washing and weighing.

The cleaned fish is then immersed in brine made up by dissolving 1kg of salt in 1 gallon of water. Large fish are left for 1-3 hours while small fish for 30-40 minutes.

This is followed by washing, sun drying (1-4hours), smoking with skin side upwards, sun drying (1-3 days) and weighing before packing and storage.

Good dried smoked fish will keep for up to 2 months.

i. Quality Control

The finished product (e.g. smoked reef fish) is meant for exports. Therefore finished product quality must conform to international standards and the requirements of the importing country.

j. Markets

VPCAL already ships smoked 'berch de mer' to customers in Asia but the customers have complained of substandard quality. It is hoped that the new arrangement will help in resolving the quality problem while personnel will be trained in maintenance, repair and good manufacturing practice to ensure sustained quality.

k. Capital Requirement

The present costs of the Afos Maxi Fish Smoker and the R & R Engineering Fish Smoker/Dryer are SOI$55,000 and SOI$9,000 respectively. The cost of raw materials, labour, manufacturing overheads will depend on the market value of the currency at the time of project implementation.

VIII. RECOMMENDATIONS

1. The Present Status

Small-scale food processing businesses in the Solomons are developing albeit slowly. Following the training workshop in food processing, many entrepreneurs were sensitized and some have approached the Business Development Unit of the Ministry of Commerce and Primary Industries for technical assistance and guidance in setting up small scale food processing businesses. Existing entrepreneurs in small-scale food processing are motivated and are planning to expand and diversify. Government should give adequate support to the Business Development Division working with Business Advisors (UNV's) and local counterparts to promote businesses. The assistance provided such as feasibility studies on a potential business project, business support and assistance with the establishment and management of the business, arranging technical assistance and training and providing business training and especially, the training of local counterparts by the project should be strengthened and sustained.

The current momentum in the development of small-scale industries should also be sustained. Continued technical assistance by UNIDO Project personnel is needed in the areas of equipment selection, installation, training and production, quality control and assurance, good manufacturing practice in the transformation of raw material into market-ready products.

2. The Raw Material Base

The growth of food industry is primarily dependent upon the availability of raw materials in commercial quantities. Therefore in the short term, the development and availability of even supplies of local raw materials in commercial quantities is a challenge for agriculture in order to consolidate food self-sufficiency and ensure food security.

Local supplies of raw materials for processing are usually initially derived from those which saturate the fresh foods market. In the Solomons, saturation is not always possible because there is no commercial agricultural production. However, there are seasonal saturations which require appropriate technologies for storage and preservation. A clear example is the market saturation of pineapples and mangoes in season.

The regular supply of raw materials to industry throughout the year, requires a master plan interlinking agricultural and industrial developments and this should be mapped out by government.

3. The Need for Statistical Information on Agricultural Production

Commercial agricultural production should be accomplished in a systematic and logical manner reflecting all statistics of production. A foreign investor with interests in food processing will be interested in production data. The current dearth of data is problematic in any form of development planning and this area requires very urgent attention.

4. Science Technology and Industrialization Policy

An obvious requirement is a government policy on Science, Technology and Industrialization with appropriate strategies to achieve it. The policy if implemented, lays the foundation of a national technology system, the presence of which is vital for the selection, transfer, adaptation and application of technologies which are appropriate to the tasks in food processing and preservation. There should be a clear political will to provide the country with a more autonomous industrial base. The country should, in various ways, explicitly demonstrate faith in technology progress by making it mandatory and evolve different strategies to accelerate it in her development plans.

5. Human Resource Development

There are on-going initiatives to develop human resources in the Solomons. There is currently no place in the Solomons where courses in food science and technology are being taught. It must be noted however, that some degree of dissemination of knowledge in these areas takes place informally

in other applied sciences at the SICHE. However, in recognition that human resources development is a precondition for optimal planning, implementation and utilization of the resources of the Solomons, the curriculum at NATI should be modified and strengthened to emphasize training in production, harvesting, handling and storage of raw materials (post harvest technology). The curriculum at SICHE should be modified and strengthened to include basic courses in food science and technology up to the Diploma level. It is the consultant's view that at this stage of development of Solomon Islands, the country needs to give pride of place to training in these fields. These courses must suit the manpower needs of Solomon's food industry - obviously reflecting local and national industrial needs.

Students in training should be exposed to the workings of food industries in the Solomons as part of their curriculum and operators in the food industry can acquire capabilities in skills which are essential in the management of food industries by attending part-time lectures at the college. It is gratifying to note that SICHE already offers courses in managerial and commercial courses and these are directly related to the food industry. In all cases, the role of women should not be forgotten and their training should be an integral part of the overall development.

6. Development of the Engineering and Machine Tool Industry

The engineering industry is traditionally an important source for the growth and development of technical manpower and a focus for the process of technological innovation. It is important to assign a high priority to its development in the Solomons so as to sustain a broad-based, growth-oriented engineering sector, committed to a maintenance culture needed in all industries.

The Engineering and Machine Tool Industry should be able to fabricate, in addition to simple tools, appropriate technology equipment which is simple, low-cost, low-risk, labour intensive and reliable to run.

Therefore, a well-equipped engineering workshop, funded from aid donors, should be set up in Honiara with the foregoing objectives, while UNIDO provides the technical expertise required for the set-up.

7. Formation of Centre for Appropriate Technology

Government should as a matter of urgency, set up the above named centre as a nucleus for technological advancement. In so doing, government may seek technical assistance from donors or bilateral organisations.

The objectives of the centre are:

- to develop both new low-cost and when necessary, advanced appropriate technologies and their diffusion system;
- to search for existing successful traditional and indigenous technologies which can be improved upon;
- to publish, collect and provide the public at the grass-roots level with appropriate technology materials and a variety of relevant technical information of practical economic use. Local dialects could be used as appropriate;
- to reach out and work with local innovators, investors, crafts people and food processors, offering consultancy and training in appropriate technologies, thus promoting community self-reliance and local employment.

The centre should operate in the fields of agriculture, food processing, and small-scale manufacturing. As far as food processing is concerned, the centre should be equipped with basic processing equipment for a pilot plant for development work and technology information demonstration. The range of equipment includes:

- peanut roasters, peanut butter grinders, peanut decorticators or shellers;
- coffee hullers, pulpers, roaster and grinder;
- hammer mill, stone mill for chillies and peppers;
- chips production equipment - deep fryers peelers, heat sealers;
- fruit press/pulper, strainer, pasteurizer, holding tank, bottling assembly, labelling, etc;
- fruit dehydrator/dryer, equipment for preserves (jams, jellies, marmalades).

- fish smoking assembly;
- manual oil press.

There should be a strong linkage between the Business Development Unit, Ministry of Commerce and Primary Industries and the Centre for Appropriate Technology, Food Processing to enhance industrial and business development in the Solomons.

Regional co-operation and support from donor agencies could play an important role here.

8. Institution Building

Solomon Islands College of Higher Education (SICHE) is recommended as the nucleus for the creation of the centre for appropriate technology. The advantage is that the institution has some infrastructure and buildings which can be utilized for this purpose. The next logical step is that SICHE should include in its curriculum a programme for a diploma in Food Science and Technology. SICHE is in Honiara and the National Agricultural Teachers Institute (NATI) in Malaita Province can also serve as a second centre for appropriate technology - food processing. With the setting up of the technology centre at SICHE and consequently, a pilot food processing plant, SICHE's position to teach food science and technology is enhanced, so also is the use of the pilot plant for technology information demonstration.

It will also be in the best interest of the nation if SICHE is linked to other appropriate technology centres around the Pacific and indeed most recognized bodies around the world for information gathering, storage and retrieval.

There is no doubt that the future of this project is firmly institutionalised and sustained if this approach or a modified form of it is adopted.

9. The Need for Integrated Approach to Development

There is the need to promote the harmonious balanced development of the agro-food industrial system in the Solomon Islands. This implies that efforts at agricultural production should be co-ordinated in line with industrial needs, bearing in mind the domestic needs and demands of the populace as well. After all, food processing succeeds after domestic demand/consumption is met.

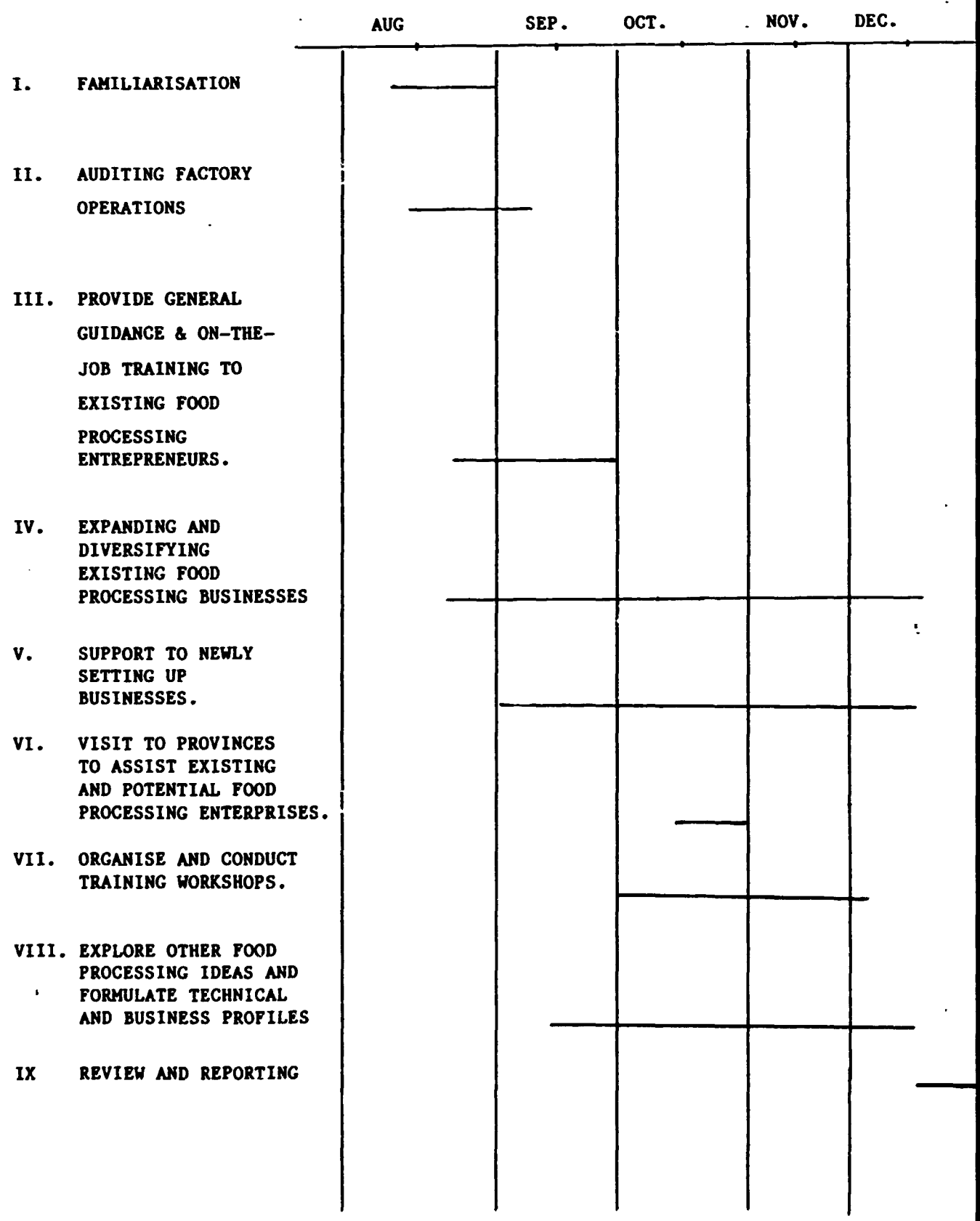
The relevant government institutions such as Ministries of Agriculture and Lands (MAL), the Livestock Development Authority (LDA), Dodo Creek Research Station, the Ministry of Commerce and Primary Industries, Investment Promotion Division, Commodity Export Marketing (CEMA) and Foreign Trade should work in a co-ordinated manner to strengthen linkages between them for the development of industry in general and food processing in particular. By the same token, all service industries - management, education and training, engineering, transport, electricity, water supplies, customs, and the health department have key roles to play if industrial growth of any consequence is to take place in the Solomons. These roles are of critical importance and should be played in an integrated manner.

Annex I

WORK PLAN

FOOD PROCESSING EXPERT (DP/SOI/90/007/11-53/J12105)

AUGUST - DECEMBER, 1992



DETAILS OF WORK PLAN

I. FAMILIARISATION

a. Discuss Government Development objectives with respect to SSI in food processing.

b. Evaluate problems and constraints hindering the achievement of governments development objectives.

c. Visit institutions and infrastructural facilities in support of industry.

- Dodo Creek Research Station
- Commodity Export Marketing Authority (CEMA)
- Ministry of Agriculture and Lands, (MAL) Livestock Development Authority, and Small Holders Development Project.
- Women Interest Division - Ministry of Health.
- Solomon Islands College of Higher Education.
- Natural Resources College.
- Ministry of Natural Resources - Fisheries Division.
- Development Bank of Solomon Islands (DBSI).
- Central Bank of Solomon Islands (CBSI).
- National Bank of Solomon Islands (NBSI)

d. Market Survey

e. Visit existing agro-based food industries and support industries.

- Solomon Islands Plantations Limited (SIPL), palm oil production.
- A & A Brothers - banana chips production.
- Varivao Holdings - Coffee and spices processing, cocoa export.
- Ngali nut roasting and packing.
- Honey producers co-operative
- R & R Engineering.
- Boral Gas.
- Betikama High School - Agricultural Development programme for fruits and vegetables, dairy milk processing.

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f. Discuss on-going or pipeline projects with other donor agencies.

- International Labour Organisation (ILO)
- Australian International Development Assistance Bureau (AIDAB)
- New Zealand High Commission.
- British High Commission - Overseas Development Agency (ODA).
- Embassy of Republic of China
- EEC
- Embassy of Japan

II. AUDITING FACTORY OPERATIONS

The objective of the audit is to improve productivity and increase profitability of existing food processing enterprises:-

- Banana chips, Solomon Choice Coffee, Ngali nut production.

The audit includes review of:-

- raw material availability, quantity, quality, price and seasonality.
- processing, process control, product quality control and assurance, good manufacturing practice (GMP), maintenance and repair schedules.
- packaging and product presentation.
- marketing strategy, market channels and promotional activities.
- exports, export quality requirements.

III. PROVIDE GENERAL GUIDANCE AND ON-THE-JOB TRAINING TO EXISTING FOOD PROCESSING ENTERPRENEURS.

Based on the outcome of the audit, specific assistance and training will be targeted at each food processing enterprise.

IV. EXPANDING AND DIVERSIFYING EXISTING FOOD PROCESSING BUSINESSES

This involves process and product development and packaging modification as required.

- development of flavoured Ngali nuts for private Sector Business. (Flavours include honey, barbeque, salt and sugar).

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- explore process and product diversification/expansion at A & A Brothers given the existing equipment. (e.g. the production of coconut chips).
- package modification of existing Solomon Choice Coffee packs followed by market promotion.
- upgrading standards of dairy products processing at Betikama High School.

V. SUPPORT TO NEWLY SETTING UP BUSINESSES

- assist in identifying and sensitising entrepreneurs.
- provide technical expertise and assist with feasibility studies.
- identify suppliers of appropriate equipment.
- order equipment
- installation, test runs and Commissioning.
- identify training needs.
- organise and conduct on-the-job training in technical and business management. Provide marketing support.

VI. VISIT TO PROVINCES TO ASSIST EXISTING AND POTENTIAL FOOD PROCESSING ENTERPRISES.

VII. ORGANISE AND CONDUCT TRAINING WORKSHOPS

- identify training needs.
- select entrepreneurs and workers in the technical and management aspects of food processing and on the basis of selected most potential crops.
- conduct training courses covering needs identified. These may likely border on entrepreneurship, technology and management skills.

VIII. EXPLORE OTHER FOOD PROCESSING IDEAS AND FORMULATE TECHNICAL AND BUSINESS PROFILES.

These ideas relate to potential opportunities for set-up by Small-Scale entrepreneurs OR Medium Scale as the case may be. The profile will include potential markets, size of plant, number and type of personnel and equipment required.

IX REVIEW AND REPORTING

Local Food Processing Entrepreneur Development Programme

What is the Local Food Processing Entrepreneurs Development Project?

The Local Food Processing Entrepreneur Development Project is a programme that has been established to help Solomon Islanders establish small scale businesses that process locally grown foods for sale throughout the country and possibly overseas.

How is the Programme Managed?

The programme is managed by a committee made up of representatives from Commodities Export Marketing Authority, School of Natural Resources-SICHE, Ministry of Agriculture and Lands, and Ministry of Commerce and Primary Industries.

Who Will the Programme Assist?

The programme is designed to assist three individuals or groups who have viable food processing business proposals and who have the ability to carry them out. The programme will give priority to women and businesses established in or have a close connections to the Provinces.

How Does the Programme Assist Entrepreneurs?

The programme will assists people by conducting a feasibility study on a potential business project, providing business support and assistance with the establishment and managment of the business, arranging technical

assistance and training, providing business training, providing grant funds to help get the business established, and providing a guarantee for a equipment loan through DBSI.

Feasibility studies will be conducted by the Special Projects Units, and UNIDO Project personnel, Ministry of Commerce and Primary Industries with the full participation of the proposer(s). The Special Projects Unit/UNIDO Project personnel will also provide business training, and daily business support and advice during the early stages of business's development.

CEMA, and the School of Natural Resources will provide technical assistance and training. The programme may also arrange technical training and assistance through the UNIDO Project, or through one of the regional development programmes available through the Ministry of Commerce and Primary Industries.

The programme may provide grant funds as limited working capital in the early stages of the business's development, e.g. wage and rent subsidies for a limited number of months. The amount of grant funds will depend on the nature of the business to be established and the needs of the proposer(s). The grant subsidy, if any, will be determined by the management committee.

All funds for the equipment will be provide on a loan basis. The programme will deposit funds on fixed deposit, with a commercial bank, as a guarantee for a loan through DBSI. The interest earned from the fixed deposit will be credited against the DBSI loan to subsidize the interest rate of the loan.

How Do People Apply?

Individuals or groups can apply by submitting their business idea in writing to the Special Projects Unit, Ministry of Commerce and Primary Industries, P.O. Box G26, Honiara. The application must include information on:

- the type of food processing business you would like to start;
- where will you get the supply of local food from;
- where will you start the business;
- the background, experiences and position of all the people involved in the proposed business;
- what you will need to start the business e.g. money, equipment etc.;
- what resources you have available e.g. money, equipment, building;
- and why do you want to start this type of business.

How do People Get Selected for Assistance Under the Programme?

Applications are screened by the management committee and the best ideas are selected for feasibility studies. The completed feasibility study is presented to the management committee for final screening. If the management committee endorses a feasibility study then the business project will be assisted under the programme.

Funded by the New Zealand High Commission.

Proforma Invoice for Pasteurized Milk

MESSAGE NO ...8.7.2.6..

Telefax : +61 (02) 746 2171
Phone : +61 (02) 746 2744
Telex : AA 121192

T E L E F A X

TO	:	Ministry of Commerce & Primary Industry (Fax : 0015 677 23 110)
ATTN	:	Dr Olu Omosaiye
FROM	:	Brian Fitzpatrick
EF	:	BF-697
ATE	:	22 October 1992
SUBJECT	:	PASTEURISED, PACKAGED MILK FOR LOCAL CONSUMPTION

I apologise for the delay as I have been travelling in the Pacific.

As stated in my fax 9/9/92 we supply mini dairies for the purpose outlined in your enquiry. A copy of our new leaflet No PB62977 has been mailed to you today.

The cost of a Micro dairy with capacity 300-900 l/day is Swedish Crowns 247,570 (about A$63,000).

A packing machine capable of filling the milk into plastic (heat sealed bags) at a capacity of 400 bags/hour is SEK 90,000 (A$23,600).

You will require a cooling plant for making ice water for cooling the raw milk and also chilling the pasteurised milk before packing. The price of a cooling machine type AG1300 with storage capacity of 57,350 KCals is SEK 139,545 (A$35,000).

A specification of the Micro Dairy is attached.

You will require a 500 l balance tank and pump between the pasteurise and the filling machine and the price of these items is SEK 45,520 (A$11,400).

I am awaiting arrival of further details of the Micro Dairy and will send to you as soon as received.

I am informed by our Principals that more than 800 Micro and Mini Dairies have been supplied worldwide and the system we propose is a practical and efficient method of processing milk on a small scale.

Regards

Brian Fitzpatrick

Quotation No:

Item	Qty	Description	Price Net FOB Swedish Port, SEK
1		MICRO DAIRY, PRODUCTION LINE, FOR PASTEURIZATION OF MILK	
		Cold or warm milk reception.	
		Pre-erected and test run before delivery.	
		Specification of Equipment:	
	1	RECEPTION TANK	
		of stainless steel, uninsulated.	
		Volume: 250 l.	
		Including:	
		- Adjustable feet - Outlet valve.	
	1	CENTRIFUGAL PUMP	
		Motor: 0,55 kw	
	1	IN-LINE MILK FILTER	
	1	PASTEURIZER FOR MILK, TYPE MICROTHERM	
		Including:	
		PHE with plates of stainless steel in the sections for regeneration, heating and cooling.	
		- 90 percent heat regeneration - Holding in s.s. tube - Electric water heater, 3 x 3 kW - Hot water circulation pump - Temperature guard and signal lamps - Acoustic Alarm - Thermometer	
		Capacity Process, max.: 900 l/h	

Quotation No.:

Item	Qty	Description	
	1	SET OF STAINLESS STEEL PIPES AND FITTINGS For the interconnection of the equipment included and piping of the milk to the tanks according to the general layout in our pamphlet. NOTE: The process tanks or cooling machines are not included. Pre-erection and test running of the line is made before delivery. Approximate temperature programmes and capacities: For pasteurized market milk: With warm milk in: 35-71-76-39-5°C, 900 l/h With cold milk in: 5-69-76-13-5°C, 900 l/h For pasteurized cheese milk: 35-71-75-39-32°C, 900 l/h or 5-48-75-32°C, 300-400 l/h For pasteurized yoghurt milk: 35-82-90-43°C, 900 l/h or 5-58-90-43°C, 200-250 l/h	

Quotation No.:

Item	Qty	Description	
1.4	1	COOLING MACHINE, TYPE ALFA-GLACE AG 1300 For the production of ice-water. Power input: 1 x 2.2 kW Storage capacity: ~~31,000~~ 57350 kcal Ice-building capacity: 4,650 kcal/h Designed with a patented soft ice production system; a stainless steel tank with an evaporator in the bottom and an agitator that sweeps the ice crystals off the bottom. Thus the ice crystals float and the soft ice is formed. The water is mixed with glycol (or alcohol). One load included in the delivery. One condensing unit and an ice water pump for circulation of the ice water between the tank and the plate cooler complete the unit.	
		<u>PACKING EQUIPMENT</u>	
1.5	1	PACKING MACHINE FOR PACKING INTO PLASTIC BAGS, HAND-OPERATED, SEMI-AUTOMATIC Application: Packing milk/yoghurt/white cheese into 1/2 and 1/1 litre bags. Motor: 0.75 kW. Capacity: approximately 400 bags/h. 500 test bags 1/1 l included.	

Quotation No.:

Item	Qty	Description	Price Net FOB Swedish Port, SEK
1.6		TECHNICAL ASSISTANCE ----------	
		SUPERVISION OF INSTALLATION, START-UP, COMMISSIONING AND TRAINING Alfa-Laval provide the above supervision by a Specialist during 4 weeks. The Buyer has to provide for: - Lodging in good standard hotel - Return air ticket as well as all local travelling expenses. The Buyer has to provide for local erection personnel: 1 - Local skilled electrician 1 - Local skilled plumber 1 - Local erection personnel. In our commitment there are no gas, tools, welding machines, cranes, trucks, or lifting devices included. If the Purchaser so requires, the Contractor's specialist will stay longer than the above-mentioned time against an extra fee as follows: The weekly basic fee is based on 8 hours per working day and does not include daily allowance nor cost for travel and accommodation.	

Quotation No.:

Item	Qty	Description	
		ERECTION AND COMMISSIONING Pre-mounting of stainless steel product piping and fittings in our workshop before delivery. NOTE! The service piping for water and cooling media is not included. Erection at site is not included in our price. Commissioning is not included in our price. TECHNICAL DOCUMENTATION Comprising: - Flow diagram - Layout - Layout with pipes - plan - Layout with pipes, isometric - Layout with proposed electrical installation points; voltage 3x380/220V, 50 cycles - Instruction manuals for the machines - Instruction manual for the Mini Dairy - Instruction manual for installation NOTE! When order, please confirm type of electric current. GUARANTEE The guarantee is one year after Take-Over or up to 18 months after the FOB delivery of the plant, whichever occurs first. Alfa-Laval will substitute, free of charge, any defective part that may appear in the equipment, provided that the defect is caused by defective material, workmanship or design. Given capacities are valid provided that the fresh milk is of acceptable quality.	

Quotation No.:

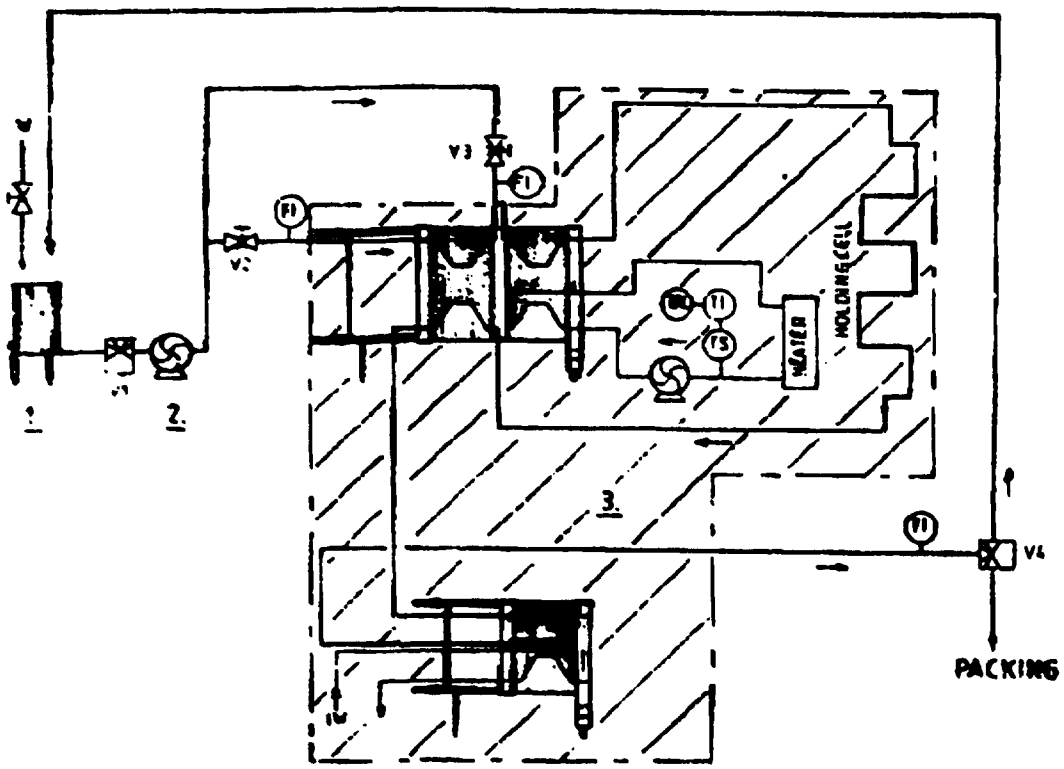
Item	Qty	Description	
		SPARE PARTS In the Mini Dairy are included spare parts required to maintain the plant 5,000 hours normal wear and tear. TOOLS In the containers in which the Mini Dairy is delivered all tools required for the erection of the unit and its maintenance are included. TECHNICAL ASSISTANCE Alfa-Laval can provide technical assistance for the installation and start-up of the plant and for the training of operators. The conditions for the technical assistance will have to be agreed upon in each individual case. TIME OF DELIVERY The time of delivery amounts to 4 working months as defined in Clause 6 of the General Conditions for Plant Sales and after the confirmed Letter of Credit has been received by Alfa-Laval in Lund. PRICE VALIDITY These prices are valid 3 months. TERMS OF PAYMENT The Mini Dairy is delivered against an irrevocable Letter of Credit to be opened in the name of Alfa-Laval AB and to be confirmed by a Swedish bank; it shall be payable in Sweden. All bank charges are to be paid by the customer.	

Quotation No.:

Item	Qty	Description	
		The Letter of Credit is to be payable against the following documents: - Bill of Lading - Commercial Invoice - Certificate of Origin - Insurance Certificate It should be issued for the total cost of the Mini Dairy and CIF cost. GENERAL TERMS The enclosed General Conditions for Plant Sales shall apply. Lund, B FOOD & DAIRY INTERNATIONAL AB Marketing & Sales B	

Quotation No.:

Item	Qty	Description	
		SPARE PARTS In the Mini Dairy are included spare parts required to maintain the plant 5,000 hours normal wear and tear. TOOLS In the containers in which the Mini Dairy is delivered all tools required for the erection of the unit and its maintenance are included. TECHNICAL ASSISTANCE Alfa-Laval can provide technical assistance for the installation and start-up of the plant and for the training of operators. The conditions for the technical assistance will have to be agreed upon in each individual case. TIME OF DELIVERY The time of delivery amounts to 4 working months as defined in Clause 6 of the General Conditions for Plant Sales and after the confirmed Letter of Credit has been received by Alfa-Laval in Lund. PRICE VALIDITY These prices are valid 3 months. TERMS OF PAYMENT The Mini Dairy is delivered against an irrevocable Letter of Credit to be opened in the name of Alfa-Laval AB and to be confirmed by a Swedish bank; it shall be payable in Sweden. All bank charges are to be paid by the customer.	



POS. LIST

1. RECEPTION TANK, 250 L
2. CENTRIFUGAL PUMP
3. THERMAL MILK STABILIZATION UNIT, TYPE MICROTHERM

VALVE - LIST

V1, V4 = 3 WAY PLUG COCK
V2, V3 = REG. VALVE

(FI) = FLOW INDICATOR
(TI) = TEMP. INDICATOR
(TS) = TEMP. SWITCH
(TAL) = TEMP. ALARM. LOW VALUE

Rev.	Qty	Description	Date	Sign

MICRO-DAIRY

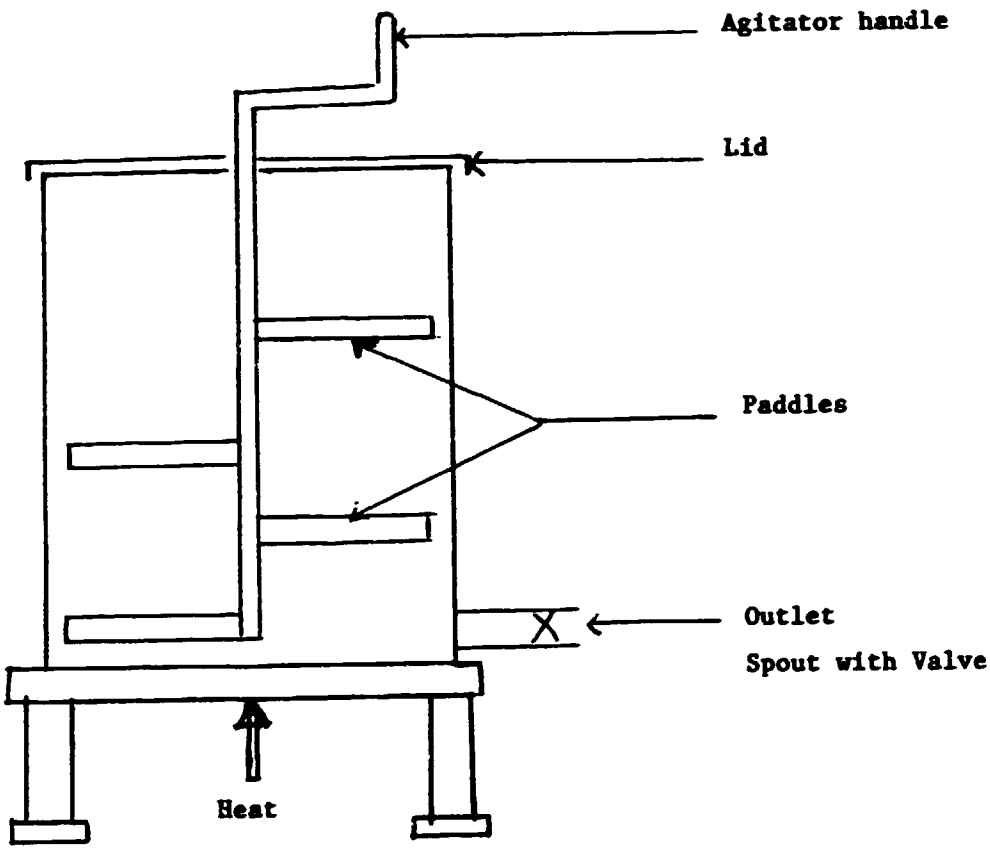
LUND SWEDEN

Page

Scale	Dept.	Drawn	Checked	Appr.	Date	Drawing No	Rev.
	FT-T	HL			840607	32 002 - 0376	

Figure 1 SOAP MAKING MACHINE

(a) With Manual Agitator



(b) With Electric Motor Driven Agitator

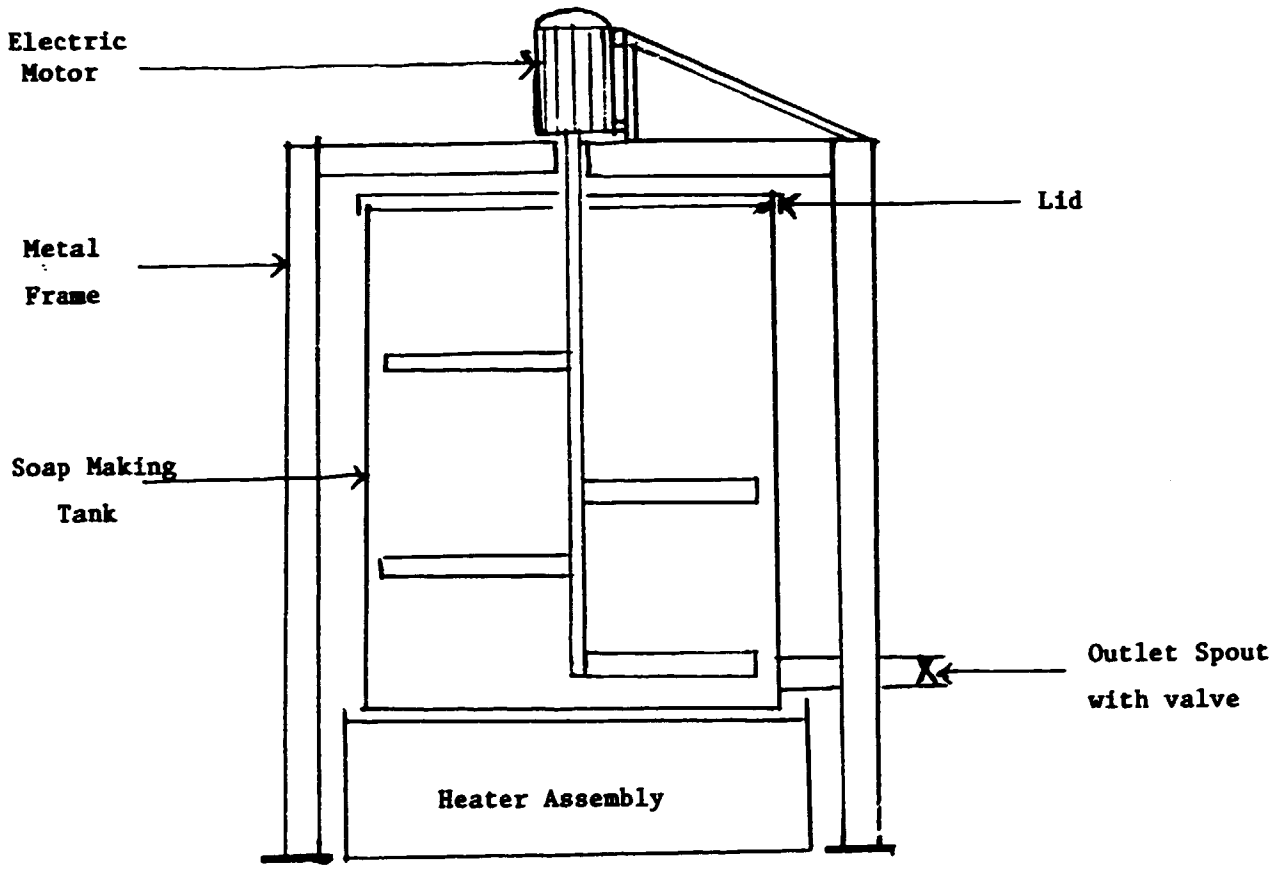
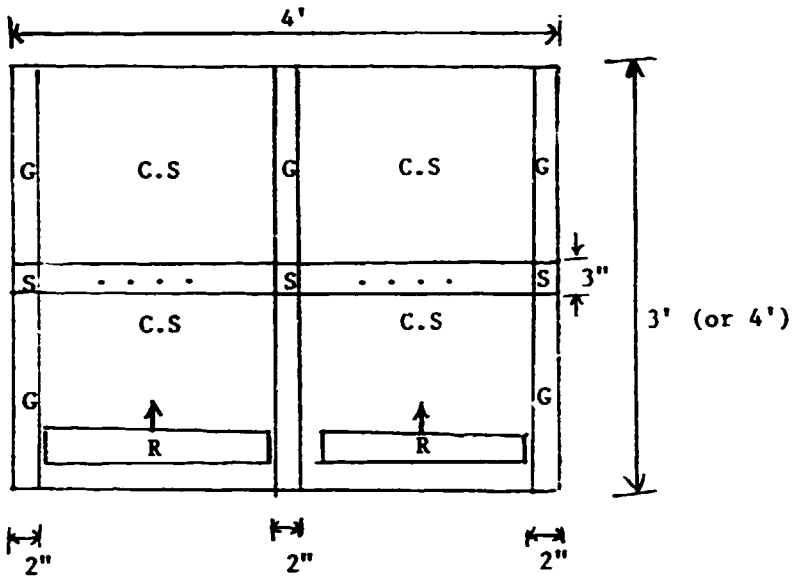


Figure 2 SOAP CUTTING MACHINE

(a) Plan

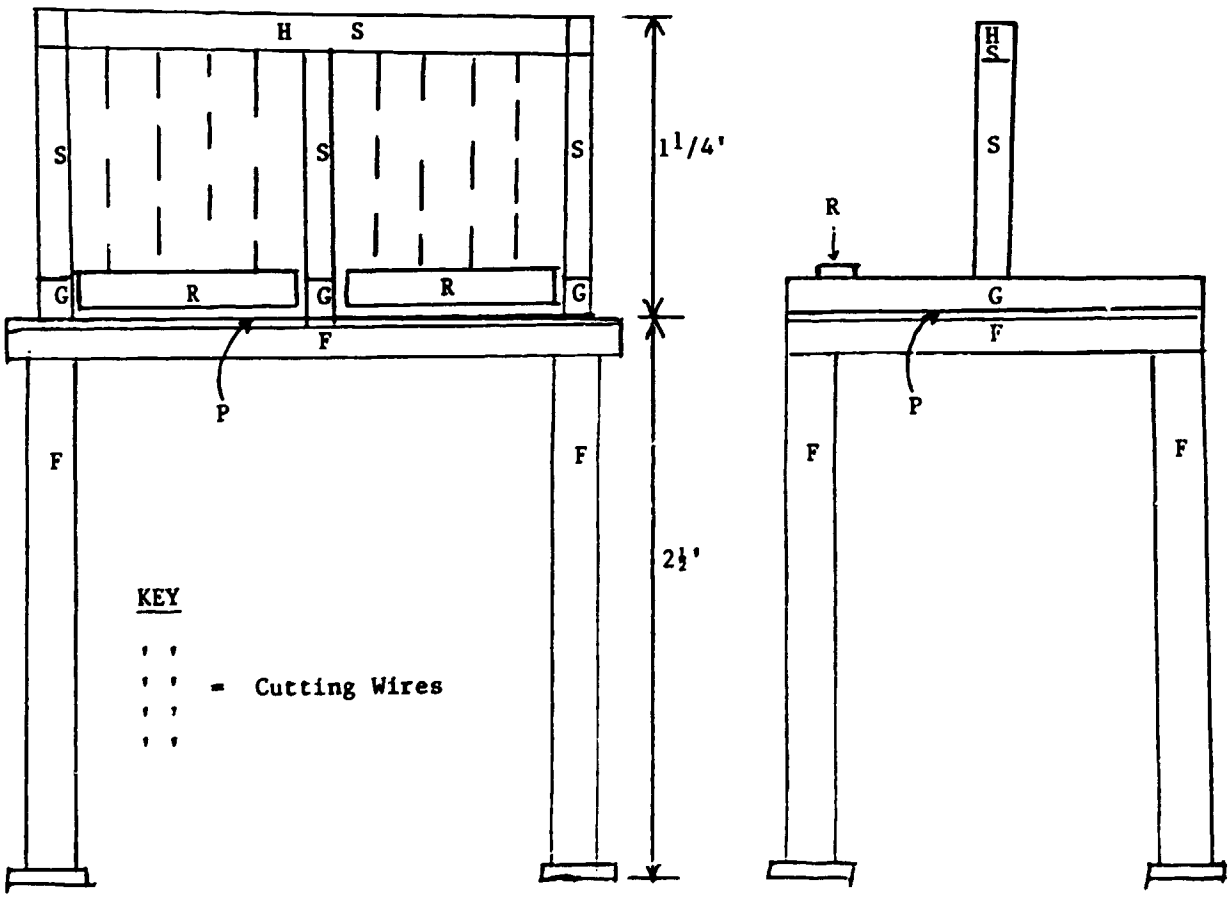


KEY

.... = Cutting Wires

(b) Front View

(c) Side Elevation



KEY

= Cutting Wires

Figure 3 Production of Soap Bars

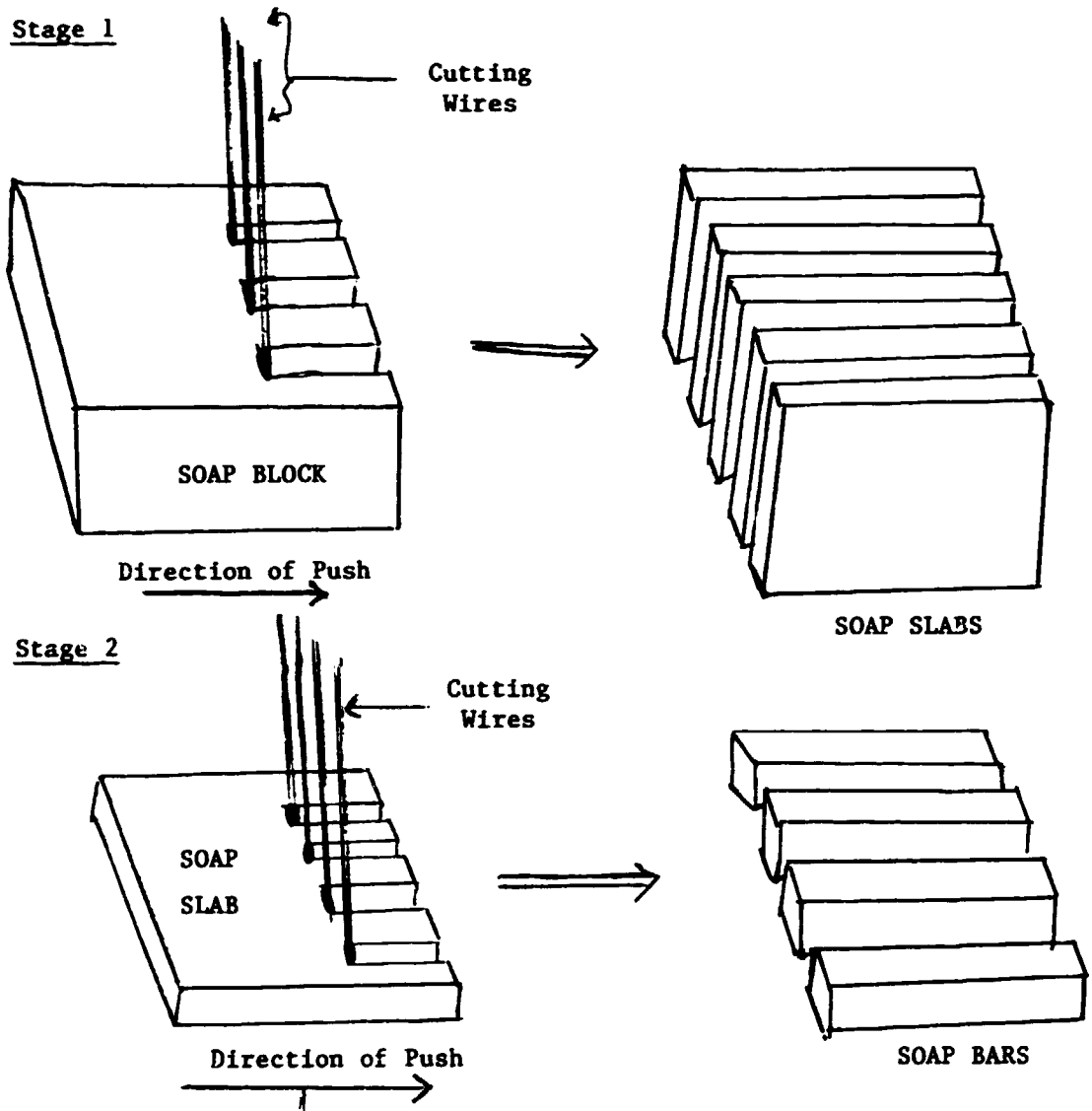
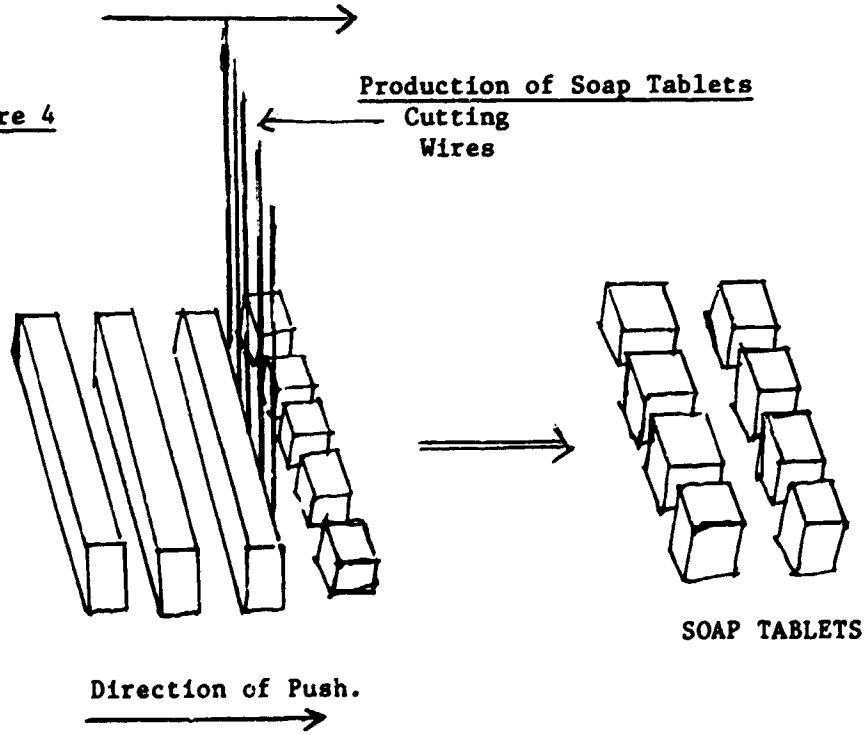


Figure 4 Production of Soap Tablets



MC&PI UNDP/UNIDO INTRODUCTION TO FOOD PROCESSING COURSE

The Ministry of Commerce and Primary Industries and the UNDP/UNIDO Project will conduct an "Introduction to Food Processing Course" at the Solomon Islands College of Higher Education from 24 to 26 November.

The main course instructor will be Dr. Olu Omosaiye the UNIDO Food Technologist.

This course will teach participants the basics for establishing a small scale food processing business. Follow-up assistance will be provided to those entrepreneurs demonstrating the best potential for starting small scale food processing businesses.

If you are interested in starting a small scale food processing business and would like to attend this course please contact the Head of Industrial Development Mr. Jeffery Wickham or John Tabepuda on phone 21049.

Space is limited on this course and space will be filled on a first come basis.

SOLOMON STAR, 6 NOVEMBER, 1992.

Food Processing Course Participants - Honiara 24 - 26 November, 1992

			Interested In
1.	Josephine Gigita	Auki Food Bar, Malaita	Processing chips
2.	Barbara Unusu	Gizo, Western Province	Jam, Jellies, Marmalades
3.	Mini Lave	Gizo, Western Province	Peanut Butter
4.	Mark Biloko	SICHE, Honiara	Fruit Drying
5.	Peter Rimou	Auki, Malaita Province	Pineapple Juicing
6.	Francis Tebaia	DBSI, Honiara	Salted Fish Drying
7.	Stanley S. Siapu	DBSI	fruits, Chips, Peanuts
8.	Duddley Lonamel	Kolomola Marketing Division	Coffee, Peanut, Spices
9.	Daniel Gaobata	CDC C/P.P Manengelle (Farmer)	Peanut, Kumara, Kosa.
10.	Hugo Ragoso	Buala, Ysabel Province	Fruits, Chips
11.	Oliver B. Jino	MCPI, Honiara	Eel Fish Drying
12.	Andriana Filiau	A & A Brothers Enterprises	Banana, Cassava
13.	Hellen Tafisia		Kumara chips
14.	Janny Tapalaboe	Tapalaboe family	Chips processing, Topiko
15.	Paul R. Fafale	Ysabel province	Peanuts processing
16.	Joseph Ziku	Honiara	Fruit processing
17.	Richard Marahora	Kira Kira, Makira province	Chips (banana, Cassava)
18.	Joini Tutua	Velaviru Dev. Assoc.	Fishing development
19.	Saxon Talo	Honiara	Sugar cane juice
20.	Moffat Misikui	Paradise Trading Company	Sugar cane juice
21.	Greenta Kera	Guadalcanal	Peanuts (roasted)
22.	Delmae Lovi	Honiara	Jams, jellies, fruit juice.

FOOD PROCESSING WORKSHOP.

AN INTRODUCTION TO FOOD PROCESSING 24th to 26th NOVEMBER. 1992. AT THE FOOD LABORATORY. DEPARTMENT OF HOME ECONOMICS. SCHOOL OF EDUCATION & CULTURAL STUDIES. SICHE (PANATINA CAMPUS).

TUESDAY 24th NOVEMBER, 1992.

8.30 - 9.00 am - Official opening - *Permanent Secretary. MCPI.*
9.00 - 9.30 am - Refreshment.
9.30 - 10.00 am - Government development objectives with respect to Food Processing. - *I. Wickham. Director. IDC*
10.00 - 11.00am -Characteristics of an entrepreneur. - *I. Tabepuda. MCPI.*
11.00 - 12.00 pm - National Food Consumption pattern and types of foods commonly eaten. - *L. Gina. Whewell- SICHE.*
12.00- 1.00 pm - LUNCH.
1.30 - 2.45 pm - What is Food Processing.- *Dr. Olu Omosaiye*
2.45- 3.00 pm -BREAK
3.00 - 4.30 pm - Drying of fruits. - *Giles West*
Production of Home-made cocoa - *Giles West. SDP.*

WEDNESDAY 25th November, 1992.

8.30 - 9.30 am - Packaging- *G.Crooke, F/Packaging; Dr. Olu Omosaiye*
9.30 - 10.30 am - Food Regulations. - *HMA Health Inspector.*
10.30- 10.45 am - BREAK.
10.45- 12.00 pm - Hygiene, Health and Safety.- *HMA Health Inspect.*
-SICHE Instructor.
- Quality Assurance. *Dr. Olu Omosaiye.*
12.00 - 1.30 pm - LUNCH.
1.30 - 4.30 pm - Peanut Roasting/Salted Nuts.
- Preserves -Jams, Jellies, Marmalades
- Fruit Juice - *Eleanor Ansaldo, STC,UNICEF.*
- *Dr. Olu Omosaiye.*

THURSDAY 26th NOVEMBER, 1992.

8.30 - 10.30 am - Sales and Marketing. - *Richard Pezzulo*
10.30 - 10.45 am - COFFEE BREAK.
10.45 - 11.15 am - Breadfruit (Nambo) chips - *Levi Laka.*
11.15 - 11.45 am - B. Kool Ice-cream - *Simon Cameron.*
11.45 - 12.15 pm - Hot Bread Kitchen - *Alex Bartlet.*
12.15 - 1.30 pm - LUNCH.
1.30 - 2.30 pm - Marine Resources.- *School of Marine and Fisheries -SICHE.*
2.30 - 4.00 pm - Honey-Based Food Products - *R. Ramaeo*
Dr. Olu Omosaiye
4.00 - - ANNOUNCEMENTS.

FRIDAY 27th NOVEMBER, 1992.

8.30 - 10.30 am - Presentation of Business Ideas -
- All Entrepreneurs.
10.30 - 12.30 pm - Factory Visit
2.30 - 4.30 pm - CLOSING - *Under Secretary. MCPI.*

PERSONAL QUALITIES TO BE A SUCCESSFUL SMALL BUSINESS OWNER

Read through the following checklist and fill it out, honestly. Donot tick yes just because you would like to be Suitable. Assess yourself realistically. If you find it difficult to judge yourself fairly, ask someone else whose judgement you trust to help assess yourself.

ARE YOU SUITABLE ?

	YES	NO
◇ Are you a Self-Starter?	☐	☐
◇ Can you start and follow through long term Projects?	☐	☐
◇ Can you accept responsibility?	☐	☐
◇ Can you worklong, hard hours?	☐	☐
◇ Is your health Sound?	☐	☐
◇ Would you allow someone to take over from you, if you were Sick?	☐	☐
◇ Do you have leadership qualities?	☐	☐
◇ Are you a good organiser?	☐	☐
◇ Can you make decisions guided by logic rather than emotion?	☐	☐
◇ Can you work well with other people?	☐	☐
◇ Can you compromise solutions in case of disagreement?	☐	☐
◇ Are you are to listen and Learn?	☐	☐
◇ Are you clear when communicating with other people?	☐	☐
◇ Do you have some experience in the area in which you are intending to operate?	☐	☐
◇ Have you had any training in this area?	☐	☐
◇ Do you have adequate knowledge of the area?	☐	☐
◇ Are you sensitive to the needs of others (Your future Customers)?	☐	☐
◇ Do you think the customers is always right? Can you cope with crisis situations?	☐	☐

If you have answered "Yes" to most questions, then you probably have the personal qualities to be a successful small business owner.

On the other hand,If you

◇ Find it hard to motivate yourself.
◇ Donot like working with other people.
◇ Avoid decisions and responsibility
◇ Are dubious about your health and/or
◇ Like clock- Watching.

Stick to your present Job as long as they will have you.

To be a successful small business owner,you should be single minded, determinded and self Interested.

TRAINING NOTES ON FOOD PROCESSING: OUTLINE

1. What is Food Processing

2. The main Objectives of Food Processing

3. Methods used in the Preparation and Processing of Foods

4. Small-scale Businesses in Food Processing or Income Generating Activities in Food Processing

5. Requirements in Food Processing:

   (a) Product Selection

   (b) Raw Materials - types, quality, quantity, availability, price, seasonality.

   (c) Storage Requirements

   (d) Processing - effects on food quality

   (e) Equipment Selection

   (f) Work Organisation - production plan

   (g) Quality Control and Assurance, Good Manufacturing Practice, Food Regulations, Hygiene, Health and Safety

   (h) Packaging - role in food processing, types of packaging

   (i) Marketing - product, price, place, promotion

   (j) Human Resources

   - Skill required
   - Training on-the-job

   (k) Infrastructural requirements.

6. Food Processing as a Business vs processing for home use.

FOOD PROCESSING

1. WHAT IS FOOD PROCESSING ?

Processing is any one of a number of activities that are involved in the preparation of raw food into convenient and acceptable forms for the consumer.

Food processing refers to any changes made in plant, animal or any other materials used for food, whether these are brought about in the home or in a commercial establishment. In the broad sense, food processing includes food preparation which makes food ready for immediate consumption while food preservation preserves the food for future consumption.

2. WHAT ARE THE MAIN OBJECTIVES OF FOOD PROCESSING

Food is processed for a diversity of purposes:

(a) to improve its nutritive value and availabilty to the body, e.g. detoxification of cassava

(b) improve digestibility, making it easier for the body to break it down in the stomach.

(c) improve hygiene or sanitary quality making it safer to eat by killing harmful micro-organism

(d) create desirable flavours which are pleasant to the taste (sensory attributes)

(e) To preserve it so allowing it to be kept over a period saving time and energy - reducing food wastage and losses

(f) value addition; in economic terms, income generation

(g) convenience

(h) improved food quality and variety

(i) other social/economic benefits (e.g. stimulation of agricultural productivity).

3. METHODS USED IN THE PREPARATION AND PROCESSING OF FOOD

(a) Separation and sub-division involving

Cutting : small pieces by knife, cutlass, matchet

Grinding : reduction into small pieces (particle reduction)using grinding machines, stones

Pounding	:	using mortar and pestle, subdivision into particles.
Graters	:	rubbing of food pieces on a rough surface e.g. coconut grater, cassava grater, manual/mechanical
Peeling	:	stripping or pulling off of the outer layer of a fruit or vegetable, e.g. banana, cassava.
Paring	:	removing surface layers of food by cutting with a knife e.g. cutting off the skin of coconut, cracking of kernels.
Milling	:	reduction of cereals into flour by crushing and sifting (step by step)
Filtering	:	separation of solids from liquids
Floatation	:	separation on the basis of differences in density
Pressing	:	separate liquid from solid using pressure (mechanical)
Refining	:	removal of impurities or foreign matter from food materials (e.g. dirt from salt)

Others are

Skimming	:	removal of floating layer of fat
Steeping		
Evaporation		
Centrifugation		

(b) Combination or Mixing

Combining/mixing food materials or ingredients to increase the palatability of the end product, e.g. improving and controlling texture, flavour through:

Beating/ Whipping	:	air into food: egg) ice cream)	to become light and fluffy
Blending			
Stirring			
Kneading	:	alternating pressure in folding and stretching as in kneading bread dough.	

(c) Heating in the Preparation of Food

In practice, the methods of cooking may be classified according to the method through which the heat is transferred to the food.

These are:

a.	air as a cooking medium	:	baking
		:	grilling
		:	roasting
b.	water as a cooking medium	:	boiling
		:	simmering
c.	steam as a cooking medium	:	waterless cooking or
		:	pressure cooking
d.	sand as a cooking medium	:	e.g. roasting of peanuts i.e. for for foods that can be cooked in their skins or shells.
e.	fat as a cooking medium	:	frying egg, chips
f.	a combination of two or more of these.		

(d) General Effects of Cooking

- When heat is applied to foods, digestibility is increased, and helps to release nutrients
- Has a softening effect on hard or tough foods making them easy to digest
- Destroys any organisms carrying diseases
- May lose valuable nutrients such as sugar, salt and vitamins into cooking water if thrown away.

(e) Cooling - the removal of heat in the preparation of food.

- Refrigeration

The temperature of crushed ice and water gives a temperature of 0°C which is the temperature at which water freezes. Can further reduce this temperature by the addition of salt (good for home food processing);

e.g. 5gm of salt + 95g of crushed ice gives a temperature of -3.5°C

deep freezers are designed to freeze and at the same time store food in a frozen state for a long period of time.

(f) Use of Chemicals in the Preparation of Food

For modern food processing and preservation

e.g. (i) baking powder added to cereal flour during bread preparation causes the mixture to rise

(ii) tomatoes or lemon juice added to meat to help soften it

(iii) the addition of salt to foods during preparation to give a desirable taste.

Question of chemicals as food additives causing health problems - Discuss

(g) Use of Micro-organisms in the preparation of food

e.g. in yogurt preparation

When using these, proper conditions for their growth and development should be provided - right temperature and ingredients, e.g. salt and sugar to promote their development.

4. SMALL-SCALE BUSINESSES OR INCOME GENERATING ACTIVITIES IN FOOD PROCESSING

(i) Peanuts
- (a) Roasted peanuts in shell
- (b) Roasted, salted, peanuts
- (c) Peanut Butter
- (d) Peanut oil.

(ii) Chips
- (a) Banana
- (b) Tapioca
- (c) Kumara
- (d) Coconut

(iii) Fruits
- (a) Fresh juice
- (b) Preserved juice
- (c) Fruit salad (fresh)
- (d) Preserved fruit - jams, jellies, marmalades, candied fruit
- (e) Dried fruits, mixed dried fruits.

(iv) Fish
- (a) Dried, smoked fish
- (b) Dried, salted fish
- (c) Fresh fish, iced

(v) Spices
- (a) Dried, milled spices
- (b) Spice extract in oil

(vi) Vegetable Oil Extraction From:
- (a) Coconut fresh
- (b) Copra
- (c) Peanut
- (d) Palm Kernel nuts
- (e) Oil palm
- (f) Ngali nuts.

(vii) Bee keeping, honey production.

5. Requirements in Food Processing

(a) Product Selection

Factors which are important include:

- perceived demand, competition, availability of raw materials
- added value to foods
- volume of production required for profitability
- technical competence required
- likely shelf-life and its effect on marketing and distribution methods
- capital investment required, types of equipment
- operating costs
- fuel and energy requirements.

(b) i. Raw Materials

- What are the types of raw materials required ?
  - . amounts of major raw materials
  - . minor ingredients
- Which is the major raw material ?
  - . suppose you half this amount ?

ii. Quality Required

- What are the main quality characteristics required of the raw material
- draw up sample specification for fruit

e.g size - large] dramatic effect on yield of
small] peeled and cored fruit

shape - regular] Symmetrical shape generally peels and
irregular] cores more readily and effectively.

Texture, colour, flavour, aroma, solids content is largely related to pectin content of cell walls. Others are MOLD COUNT and Insect fragments.

Question: What would be the precise effect on the final product if there was a major variation in the quality of the main ingredients ?

Therefore, raw material is a major control point in the processes.

iii. Quantity Required

The question may be asked -

(a) Is there sufficient raw material to support a small scale processing facility ?

(b) Will daily purchases be reliable ? e.g. fluctuations in prices, in quality and quantity.

(c) What are the requirements of my production ?
Can I keep unprocessed raw materials overnight ?

(d) Do I have storage facilities ?

(e) How much stock can I hold in storage ? At what risk to avoid economic loss ?

(f) Calculate % yield during preparation

(g) How much product do I want to make for profitability ?

iv. Quantity Required: Simple calculations.

1. Weigh the raw material bought/provided

2. Peel the food and remove any strings, seeds, cores, etc

3. Weigh the waste peels, etc

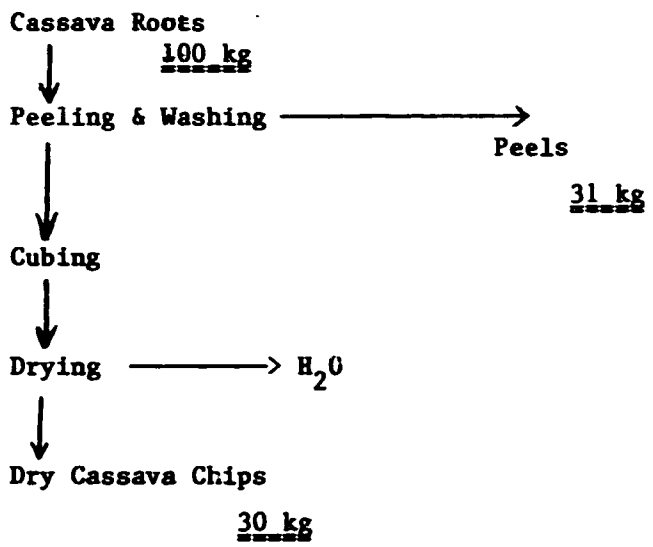
4. Calculate % yield as follows:

$$\% \text{ yield} = \frac{\text{Initial weight of food - weight of waste}}{\text{Initial weight of food}} \times 100\%$$

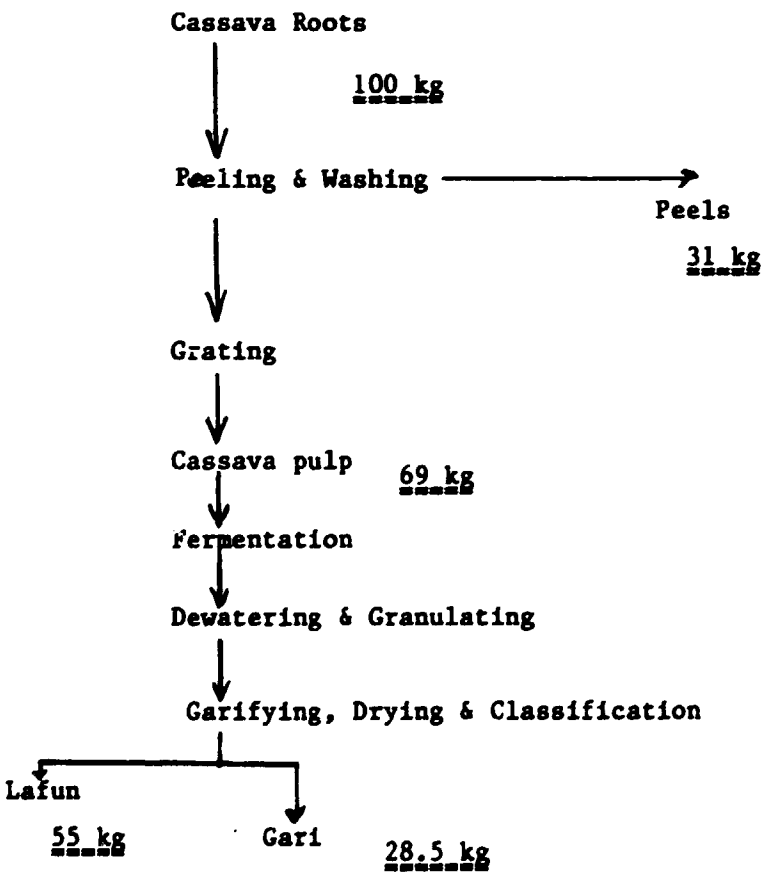
(v) Quantity Required : Examples of Raw Material Yields

Processing of Cassava Roots

1. Production of Cassava Chips

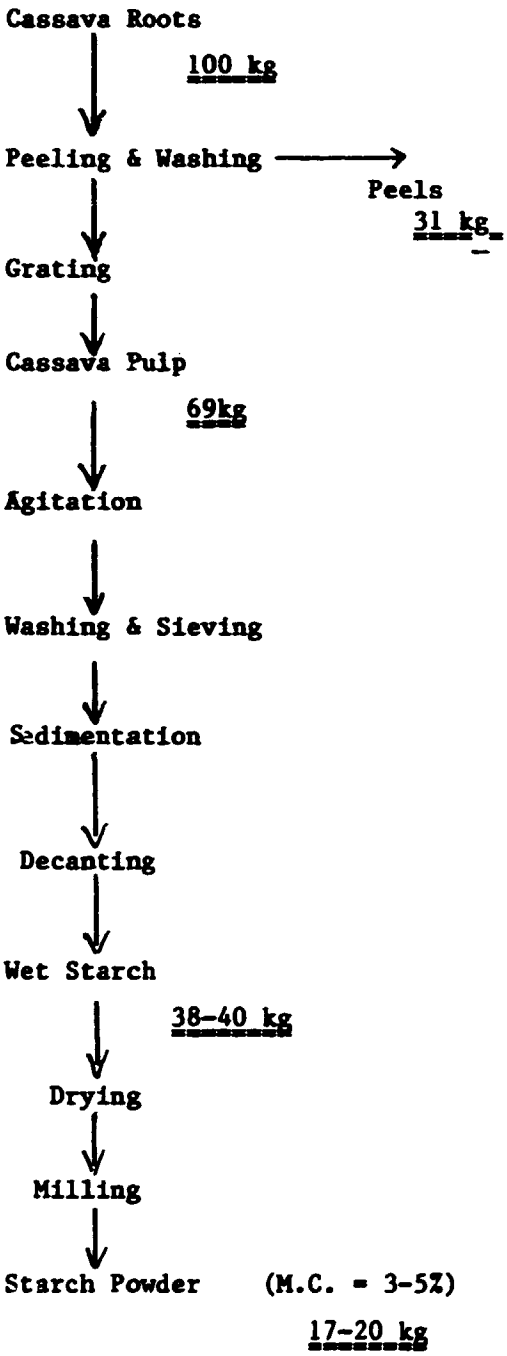


2. Production of Gari or Lafun :



N.B : 100 kg of cassava roots ----> 28.5 kg of gari or 55 kg of lafun.

3. Production of Starch Powder:



5. True cost of raw material

$$= \frac{\text{purchase price}}{\text{Yield}} \times 100\%$$

v. Quality Required: examples of raw material yields.

c. Storage Requirements

- What type of raw materials ?
- Types of storage required for root crops
  fruits and vegetables
  fish products
- quality during storage, monitoring and evaluation
- stocks, records
- stock rotation - first in, first out.

d. Processing

(i) Factors which influence the choice of production scale

- available technology
- amount of capital available to invest
- size of the market and distribution channels available
- availability of electricity, fuel and portable water.

(ii) Effects of processing on food quality

- preservation, prolonged shelf life/improved storage
- enhance nutritional qualities
- added value, convenience, etc.

e. Equipment Selection

It is important to consider the following:

i. Capacity - avoid under capacity, as well as over capacity, and ensure that adequate provision is made for future expansion if required.

ii. Ensure adequate stock cover of spare parts especially if these must come from overseas. They should be obtainable cheaply at the fastest possible time.

iii. Set up a preventive maintenance schedule which, on the long run, is cheaper than repair maintenance which at times can be too costly for the business, in terms of downtimes, replacement parts and delay.

iv. Capacity utilization becomes a critical component especially when machinery is bought from a loan.

v. Availability of local suppliers of equipment and spare parts

vi. Requirements for and availability of power and fuel

vii. Materials of construction to be used for particular types of food and the costs of different materials.

viii. Government regulations - import duty
- taxation

f. Work Organization

i. Each worker must have clearly defined roles

ii. Equipment, offices, packaging and storage facilities must be laid out logically.

iii. Schedule materials, equipment and labour in correct quantities and at the correct time to avoid bottlenecks in the process.

iv. Make optimum use of staff, equipment, time and materials to maximise productivity.

g. Quality Control

Each product has quality factors and control points to be used during their production process.

(a) * Raw Material Control

(b) * Process Control Points

The purposes of Quality Control are:

(i) to protect the customers from dangers (e.g. contaminated foods) and ensure that they get the weight and quality of food that they pay for;

(ii) to protect the business from cheating by suppliers, damage to equipment e.g. (stones in raw materials) and false accusations by middlemen, customers or suppliers.

(iii) to be sure that food laws operating in a country are complied with.

Use of Quality Control

To predict and control the quality of processed foods. This means that quality specifications must be written and agreed with suppliers or sellers and control points must be identified in the process.

Quality Specifications

Describe these through quality attributes Then write specifications and agree with supplier or seller listing those attributes required in a food.

For example -

Quality Attributes for Tomatoes

Attribute	Accept	Reject
Colour	orange/red	more than 10% green
Size	any	-
Shape	any	-

Damage			
-	splitting	less than 5%	more than 5%
-	insect	less than 5%	more than 5%
-	mould	none	any evidence of mould
Hardness		soft to oversoft	more than 10% hard.

Each specification takes account of the intended use of the products and the likely important faults that could be expected.

Quality Attribute		Example
+	Quantitative	amount of meat in a pie or amount of fruit in jam.
++	Hidden	
	- harmful substances	aflatoxin in groundnuts
	- microbiological	number of bacteria in a food
	- nutritive value	vitamin content of a food
	- additives	artificial flavours, thickeners, etc.
+++	Sensory	
	- colour	ripeness of fruit
	- size, shape (appearance)	size of chopped food, particle size of flour
	- thickness or texture	juice consistency, toughness of meat
	- taste	saltiness, sweetness, sourness, bitterness
	- flavour	characteristic flavour of tomato.

Control Points

In every food process, there are particular stages which affect the quality of the final product e.g.

- the amount of heating given pasteurized juices affects the colour, flavour and storage life;
- the amount and type of grinding affects the texture of meat.

These important stages are identified as control points and quality control checks are made at these points to control the process.

Therefore, manufacturers need to identify control points in their process and set up a specification for operators to use.

For example, in jam making:

The amount of pectin, fruit and sugar needs to be carefully controlled, therefore weighing of ingredients is a control point.

acidity of jam (pH), sugar content after boiling (refractometer) and temperature of filling (thermometer) are all control points.

Checks at control points can be used to control process and ensure that each batch of product has a similar quality.

Quality Assurance

Quality Assurance is "Total Quality Control". The term refers to quality in any organisation as everyone's business - from the Chief Executive of the Company, to the least paid worker; implying that everyone must be quality conscious.

Since the business of any organisation is to remain in business, grow and be profitable, it is imperative to produce goods of consistent quality in a cost effective way. This ensures value for money at all times in order to enjoy consumer loyalty.

Therefore, everyone in the organisation must contribute to quality matters especially those concerned with:

- raw material buying
- storage
- processing
- packaging
- engineering and maintenance
- marketing & sales
- exports, imports
- and ALL those concerned with day to day running of the company's activities.

HYGIENE AND SAFETY IN FOOD PROCESSING

BASIC RULES FOR SAFE FOOD HANDLING

* No smoking (bacteria from mouth transfered to food via hands).
* No eating, drinking in processing room (same reason).
* Easy to clean floors, walls, ceiling and equipment (to prevent buildup of soils which harbour bacteria, moulds and attract insects and rodents.
* Suitable working clothes for operators, cleaned regularly. Operators should not have contagious diseases.
* Toilet facilities available and washing facilities for use afterwards.
* Disposal of rubbish away from the processing room,
* Use of clean water, purified if necessary to wash raw materials and equipment.
* Netting to stop insects, birds, pets etc. from entering the room.
* No mixing of raw foods and processed foods (cross contamination).
* Correct food storage and stock rotation.

Basic Hygiene Practices in Preparation, Cooking and Serving of Food

Personal Hygiene

DOs

* Cleanliness of bodies
* Hands washed with soap, fingernails clean.
* Clean clothes.
* Long hair tied back.
* Cover any sores.

DON'Ts

* Comb hair while preparing, cooking and serving of food.
* Scratch head or other parts of the body.
* Pick nose and ear
* Taste food with finger
* Sneeze or cough over food
* Sit on tables or lean on process equipment.

Environmental Hygiene

* Clean surfaces (table tops, floors, walls, ceilings, fans and sinks).
* Well screened windows.
* Clean storage cupboards (free from pests and insects).
* Clean toilet facilities available.
* Proper rubbish disposal area (kept clean all times).

Facilities

* Clean utensils (cleaned with hot soapy water after every use).
* Hygiene storage (store in clean cupboards or shelves).
* Clean fridges (wipe with warm soapy water once a week).
* Freezer (defrost and clean once a month at least).
* Use different cloths for different purposes (tea towels for drying dishes, hand towel for wiping hands, dish cloth for wiping surfaces).

Food Hygiene

* All foods washed before use.
* Food handled with clean hands, or handgloves as required.
* Use different chopping boards for meat/fish, vegetables and bread. Wash chopping board with hot soapy water before using it again.

h. **PACKAGING**

The Importance of Packaging

1. Adequate packaging aids distribution.

2. Rapid and reliable distribution helps reduce malnutrition, removes local surpluses of food, and allows the consumer more choice in the foods available.

3. Packaging and distribution reduce post harvest losses and this together with a larger market allows producers to increase their income.

*Therefore inadequate packaging in developing countries has profound effects on the whole pattern and the total amount of food consumed.

Functions of Packaging

Packaging is a means of providing the correct environmental conditions for food during the length of time it is stored and/or distributed to the consumer. A good package has to perform the following functions:

(1) It must KEEP THE PRODUCT CLEAN and provide a barrier against dirt and other contaminants.

(2) It should PREVENT LOSSES. Its design should provide protection and convenience in handling transport during distribution and marketing. In particular, the size, shape and weight of the packages must be considered.

(3) It must provide PROTECTION to the food against PHYSICAL AND CHEMICAL DAMAGE. (e.g. water and water vapour, oxidation, light,) and INSECTS AND RODENTS.

(4) It must provide IDENTIFICATION AND INSTRUCTION SO THAT THE FOOD IS USED correctly and have SALES APPEAL.

PACKAGING MATERIALS

Metal cans have a number of advantages over other types of container, including the following:

1. They provide total protection of the contents.
2. They are convenient for ambient storage and presentation.
3. They are tamperproof.

However, the high cost of metal and high manufacturing costs make cans expensive. They are heavier than other materials, except glass, and therefore have higher transport costs.

Glass

Glass containers have the following advantages:

1. They are impervious to moisture, gases, odours and micro-organisms.
2. They are inert and do not react with or migrate into food products.
3. They are suitable for heat processing when hermetically sealed.
4. They are re-useable and recyclable.
5. They are resealable.
6. They are transparent to display the contents.
7. They are rigid, to allow stacking without container damage.

The disadvantages of glass include:

1. Higher weight which incurs higher transport costs than other types of packaging.
2. Lower resistance than other materials to fractures, scratches and thermal shock.
3. More variable dimensions than metal or plastic containers.
4. Potentially serious hazards from glass splinters or fragments in foods.

Flexible Films

In general, flexible films have the following properties:

1. Their cost is relatively low.
2. They have good barrier properties against moisture and gases.
3. They are heat sealable to prevent leakage of contents.
4. They have wet and dry strength.
5. They are easy to handle and convenient for the manufacturer, retailer and consumer.
6. They add little weight to the product.
7. They fit closely to the shape of the food, thereby wasting little space during storage and distribution.

MARKETING

1. Marketing is getting people to want your goods, selling them, delivering them to the buyers and getting paid for them.

Marketing consist of four major areas: Product, Price, Place, Promotion.

PRODUCT

Do people want your product?

- Taste good?
- Look good?
- Quality and hygiene.
- Test market- ask your customers.

How many people want your product?

- Market size? Market research -Population, statistics, survey people/stores..
- Competition/market share?
- Who are your main customers? Children/families/adults/intstitution/govern
- Where are your main customers? Village/Provincial capital/Honiara

Can you supply the required product?

- Raw materials available at reasonalbe price?
- Equipment appropriate? not too big -not too small.
- Do you have the technical skill? Need training? From where?

PRICE

Can you proudce the product at a competitive price?
People afford your price? Pricing strategy.
Does your price include a reasonable profit?
How is your price compared to competion?

PLACE

Where you sell your goods depends on

- who the customers are
- where the customers are

Sell from own shop?
Through stores?
School canteen?
Wholesaler in capital?

PROMOTION

Promotion includes every way you influence people so thqt they will buy your goods.

Advertising is telling people what you have to sell so that they want to buy your goods more than they do those of your competitors.

Newspaper
Radio
posters
samples
display

Who your customers are will determine type of promotion.

FEASIBILITY STUDY FOR

_____

PREPARED BY _____

DATE _____

1. **BRIEF DESCRIPTION OF PROPOSED VENTURE.** Page 1

2. **FORM OF BUSINESS (i.e sole proprietor, partnership, limited company).**

3. **WHERE IS THE VENTURE TO BE ESTABLISHED?**

4. **GOODS TO BE PRODUCED? Indicate where your raw materials will come from and how dependable the supply will be.**

5. **HOW WILL THE VENTURE BE FINANCED? Give details of the expected means of finance for this business, i.e. commercial bank, DBSI, PDU, owners contribution, or other).**

6. MANAGEMENT

Who is proposing this new business?

Onwer(s) Title

Who are the key personnel of this new business?

Key Personnel Title

Provide educational background and work experience of each of the owners and key personnel.

What business/technical training/assistance is required?

If possible suggest where this training/assistance should come from.

7. MARKETING

Determine Total Market Potential or potential customers.
This requires doing some research. If selling to the general public, you need to look at some census date on population, number of households, imports etc. to determine total market potential.

Determine Market Share.
You need to consider your competition, both in quantity and quality.
What percentage of the total market potential do you think will buy from you?
Explain why you think you will capture this portion of the market.

7. MARKETING

Describe your customers.
Include such factors as , income level, sex, age group, and race, marital status, etc.

Pricing
How will the price for the product(s) be established.

Advertising/Promotion
Define promotional strategy. (advertising, promotion, etc.)

Distribution
Define how your product will be distributed (sold by whom).

SECTION A
MARKET FEASIBILITY

1. Total Market Potential

Year	1	2	3	4	5

Total Market Potential is based on -

2. Market Share in Units

Year	1	2	3	4	5
Total Market Potential from above					
	X	X	X	X	X
Market Share %					
Market Share Units					

3 Value of Sales

Year	1	2	3	4	5
Market Share in Units					
	X	X	X	X	X
Price per Unit					
Sales					

SECTION B
OPERATING FEASIBILITY Page 6

1. Plant and Equipment Requirements

List down the plant and equipment needed for this new business.

2. Material and Labour Requirements

Material

List the total materials required with cost for year one.
Include raw materials and packaging.

ITEM	COST
_____	
_____	
_____	
_____	
_____	
_____	
_____	
_____	
_____	
Total cost of materials	

Divide by the Market Share in Units in A2 to get Material cost per unit below.

Material Cost Per Unit	

Labour Page 7

Year	1	2	3	4	5
Number of workers					
Supervisor					
Semi skilled					
Unskilled					
	X	X	X	X	X
Wage per annum					
Supervisor					
Semi skilled					
Unskilled					
	-	-	-	-	-
Gross Wage					
Supervisor					
Semi skilled					
Unskilled					
Total Gross wage					
	X	X	X	X	X
NPF .075%					
	-	-	-	-	-
Total NPF					

Year	1	2	3	4	5
Total Wage(Gross wage plus NPF)					
Divide the Total Wage Bill by Market Share (A2)					
Direct Wage For One Unit					
Work out Total Direct Cost Per Unit					
Direct Material Cost per Unit					
Direct Wage per Unit					
Total Direct Cost Per Unit					

SECTION C
FINANCIAL FEASIBILITY

1. CASH OPERATING EXPENSE SCHEDULE

EXPENSES FOR YEAR ONE	AMOUNT
Rent	
Electricity	
Admin wage	
Water	
Insurance	
Licence	
Transportation	
Miscellaneous	
_____	
_____	
_____	
_____	
Total	

2. CAPITAL COSTS OF FIXED ASSETS SCHEDULE

FIXED ASSETS	AMOUNT
_____	
_____	
_____	
_____	
_____	
_____	
_____	
Total	

3. INITIAL WORKING CAPITAL REQUIREMENTS SCHEDULE

CATEGORY	AMOUNT
Inventory Item	
_____	
_____	
_____	
_____	
_____	
_____	
Total Requirements	

4. PRINCIPAL AND INTEREST SCHEDULE

Page 9

Based on loan of

Capital Cost (plant & equipment)	$
Initial Working Capital	$
Total Funds Required	$
Less Grant	$
Less Borrowers Contribution	$
Total Loan Required	$
Interest rate	

YEAR	PAYMENT	INTEREST PORTION	PRINCIPAL REPAYMENT	BALANCE OF PRINCIPAL
1				
2				
3				
4				
5				
6				
7				

Use table on back page to calculate interest and principle payments.

5. DEPRECIATION SCHEDULE TOTAL ASSETS - $

YEAR	DEPRECIATION EXPENSE	BALANCE TO BE DEPRECIATED
1		
2		
3		
4		
5		

PROPORMA Page 10

PROFIT AND LOSS/CASH FLOW SCHEDULE

YEAR	1	2	3	4	5
ITEM					
Sales (A3)					
Less					
Cost of Sales (B2)					
Equals					
Gross Profit					
Cash Operating Expenses (C1)					
Plus					
Interest (C4)					
Plus					
Depreciation (C5)					
Equals					
Total Expenses					
Gross Profit less Total Expenses Equals					
Net Profit					
Before Tax					
Less					
Income Tax					
• 35%					
Equals					
Net Profit					
After Tax					
Add Back					
Depreciation					
Equals					
Cash Flow From					
Operation					
Less Repayment					
of Principal					
Equals					
Actual Cash					
Flow					

VENTURE FEASIBILITY

Break Even Market Share

(1) Contribution Margin Per Unit:

Selling Price (wholesale Price) per unit

Less Direct Cost per unit -

Equals Margin Contribution per unit =

(2) Minimum Amount of Sales to Cover Total Expenses:

Total Expenses

Divide by

Contribution Margin

= Minimun sales in units

(3) Break Even Sales Dollars:

Minimum sales in units X Selling price = Break even sales in dollars

(4) Break-Even Market Share:

Break Even Sales Dollars X 100 =

Total Market Potential X Selling Price

Break Even Market Share

The projected market share for year one is which is greater than the break-even market share of Based on the above the project is viable/ is not viable.

Return on Investment Page 12

Year	1	2	3	4	5
Owner's Investment	*	**			
Net Profit After Taxes					
***Return on Owners Investment					

* Initial Owner's Investment (How much money will the owner(s) put into the business)

** Subsequent Owner's Investment (initial Onwer's investment plus net profit after taxes)

*** Return on Investment = $\frac{\text{Net Profit After Taxes}}{\text{Owner's Investment}} \times 100$

Note: Profit includes owner's remuneration.

Is the Return on Owner's Investment at least 10% greater than the rate you would get on a fixed/term deposit.

Explain why the business is or is not viable.

LEVEL FACTOR TABLES

INTEREST RATE

REPAYMENT PERIOD IN YEARS

	6%	8%	10%	12%	14%	16%	18%
5	4.212	3.993	3.791	3.605	3.433	3.274	3.127
6	4.917	4.623	4.355	4.111	3.889	3.685	3.498
7	5.582	5.206	4.868	4.564	4.288	4.039	3.812
8	6.210	5.747	5.335	4.968	4.639	4.344	4.078
9	6.802	6.247	5.759	5.328	4.946	4.607	4.303
10	7.360	6.710	6.145	5.650	5.216	4.833	4.494
15	9.712	8.559	7.606	6.811	6.142	5.575	5.092
20	11.470	9.818	8.514	7.469	6.623	5.929	5.353
25	12.783	10.675	9.077	7.843	6.873	6.097	5.407
30	13.765	11.258	9.427	8.035	7.003	6.177	5.517

e.g. 5 years at 12% = 3.605

$$\text{Annual Payment} = \frac{\$60{,}000}{3.605} = \$16{,}644$$

HUMAN RESOURCES REQUIREMENTS

j. Skill Requirements

- to be acquired in a relatively short time eg. on-the-job training, or
- mechanical skills - maintenance and repair
  minimal knowledge of electricity, or
- labour trained in technical schools or training centres or training at various on-the-job spots.

* If the owner handles Managerial and Supervisory tasks, then may need skilled repair and maintenance operative

Essential Skills in the Management of Food Industries

- Production processes
- Quality Control
- Storage technology - post harvest technology
- Food industry sanitation, hygiene and safety
- Food process engineering
- Food transport and marketing
- Enforcement of food laws and regulations.

k. Infrastructural Requirements

- type and capacity of machinery
- the need to store raw materials and/or output
- electricity supply or a petrol/diesel engine to avoid costly shutdowns
- buildings and ventilation, adequate roofing material
- good lighting system
- floor cemented to facilitate eacy cleaning of the floor
- drains as required.

l. Space Requirements

Basic layout for operations, e.g. raw material reception area, storage machinery layout in processing area, finished goods storage, offices, other services, e.g. toilets, cloakrooms, etc.

Ensure maximum space utilization.

6. Food Processing as a Business vs Processing for Home Use

The requirements for processing for home preservation/income generation are different.

In home processing,

The variation in quality is acceptable to the consumers (the family)

The packaging requirements are low

The quantities involved are smaller

Investment in equipment is less.

In processing for sale,

The producer does not know who will eat the food, where/when/how it will be prepared and what the customers think of it.

The food will usually have to be packaged to ensure an adequate shelf life.

The package must attract potential customers to buy the food and instruct them on what is being bought and how to prepare it.

The weight of food in the pack should be the same as declared on the label and the quality and weight of food should be the same in every pack.

More skills required in quality control procedures, packaging and marketing techniques for products that are sold whereas they are not needed so much for home consumption.

Hired labour is needed and greater amounts of food are usually produced compared to home processing.

Usually the business should be registered.

These factors increase the production costs for food and it is therefore not possible to say that because a food is produced successfully in the home it can be easily produced for sale.

OVERVIEW OF FOOD PROCESSING

Main objectives of Food Processing

- income generation
- reduced food wastage/losses
- improved food quality and variety
- other social/economic benefits (e.g. stimulation of agricultural productivity).

Main constraints

- availability of raw materials (seasonality) and packaging materials
- confidence/expertise to market products
- availability and cost of finance, foreign exchange restrictions
- technical knowledge and training needs
- availability of equipment, spare parts and services (electricity, etc)
- higher investment in equipment and the use of equipment that is dedicated to one or more products (home equipment usually has multiple uses)
- safety of products.

Main Advantages

- food is familiar
- raw materials are available
- products are often in demand and affordable
- production costs are relatively low
- there is good opportunity to add value to foods and hence generate income
- household savings in time and money are possible
- the technology is usually simple and people quickly become familiar with it
- the work is suitable for both men and women
- the technology is usually suitable for use in rural areas (electricity and fuel consumption are often low).

Smallholder Development Programme.

Drying Fruit.

Why dry fruit.

The basic reason is to preserve it for future use either because there will not be any in a few weeks or months time or because there is a glut of fruit around that should not be wasted.

Drying fruit also has a number of other useful effects:

It reduces the weight as the water is removed making it less bulky to store and lighter to carry.
It changes the texture so that it can be used in different ways for food. Baking for example.
It concentrates the sugar and other flavours.

Using the sun.

This is an ancient method of preserving fruit and was developed in countries where there are only short periods of supply or brief gluts of fruit.

The best and simplest method of drying fruit is to expose it directly to the sun. This has the following effects.

Drives the moisture off the fruit without cooking it.
Assists in surface sterilizing the fruit.

This is achieved by laying the fruit out on a flat, clean, dust free surface exposed to the direct sun. The fruit should be spread out in a thin layer and moved around to ensure even drying. This method can be used to dry many types of fruit and the following are examples:

Grapes
Figs
Apricots
Banana
Paw paw
Mango
Pineapple
Apple
Pear
Plums

For most effective drying the seed and any tough skin should be removed and if the fruit is thick it should be cut into thin slices to speed up drying.

Improved sun drying.

In places where rainfall is high, insects are a problem, sunshine levels are low or variable methods have been developed to sun the sun indirectly. These can be very simple using plastic sheeting through to solar collectors heating air.

Some important points about fruit drying.

To produce good, clean edible dried fruit the following points are essential:

Use only good quality fruit. Dry rubbish and you get rubbish.

Make sure that the drying process is completed as soon as possible. The fruit may rot before it is dry otherwise.

Do not allow the fruit to become wet during the process. It will rot quickly.

Protect it from insects and rats using screens. Keep ants away by isolating the trays from the ground.

Make sure that your hands are clean at all times.

Carefully select the dried fruit before storage making sure it is well dry, clean and free from mold.

Storage.

Dried fruit can be stored for many months in the right conditions. Badly stored fruit will rot rapidly and be a health hazard.

Use clean dry containers that can be sealed.

Keep the containers in a cool, dry place.

DO NOT allow the fruit to be contaminated by insects, rats or dirty fingers.

Potential uses of dried fruit.

Useful and nutritious snack food.

A substitute for sweets and bongoes.

A source of income.

A useful addition to daily cooking for the family.

Smallholder Development Programme.

Small Scale Processing of chocolate.

What is chocolate.

It is the product of processing dried, fermented beans by the following steps.

Good, clean sweet smelling, crisp dry processed beans are selected.

The outer skin is removed.

The bean is placed in an oven or sauce pan without any water and roasted gently for about 20 minutes.

The hot roasted bean is then placed in a big morter and pounded for about 25 minutes until it looks like butter.

The cocoa mass as it is now called can then be used directly or stored in a sealed jar in a cool dry place for many months.

Cocoa drink.

This drink can be made by boiling some of the cocoa mass in water with sugar for about half an hour.

Milk can be added if required.

In WESTERN SAMOA you will find a big pot of cocoa on the boil all day in many villages. People just help themselves to a cup.

Chocolate.

This can be made by mixing fine caster or icing sugar with the cocoa mass while it is still liquid and warm.

DO NOT ADD WATER.

HOT SMOKING FISH IN A DRUM SMOKER

HOW TO MAKE A GOOD SMOKED FISH

Clean the fish properly, they will then look nice and taste nice after they are smoked.

Clean the fish as soon as they are landed.

Do not leave fish lying about or they will soon go rotten.

You cannot have a good smoked fish if the fish is rotten to start.

Take all the scales off fish.

Head fish.

Split fish down belly side being careful not to cut back skin or fillet fish if really large sometimes this way is preffered for selling.

Fish should be thoroughly washed in running water if possible.

It is useful to now weigh the fish. The weight of the fish that have been cleaned is called the 'dressed weight'.

THE USE OF SALT

The cleaned fish is now put into strong salt water. (Strong salt water is called 'brine'). Fish are put into strong salt water (brine) to make the fish look nice and to help keep away beetles after the fish has been smoked. Fish are not put into brine to make them taste salty.

Brine is made by putting 1 kg of salt into 1 gallon of water and mixing thoroughly.

Large fish are left in the brine from 1 to 3 hours and small fish for 30 to 40 minutes. Fish can be left in brine for a longer time and will then keep longer but the fish will taste salty, so it is best, until we see what the people want here in the Solomon Islands, to leave the fish for the recommended times.

After the fish have been left in the brine for the correct time, take them out off the brine and wash them again so that there are no white spots of salt on the fish after they are smoked and dried.

Put the fish on the drying rack in the sun skin side down to dry off water. Small fish may be dry enough in 1 hour, larger fish in up to 4 hours.

SMOKING FISH IN THE DRUM SMOKER

The best way to smoke fish here is by hot smoking. Put the fish on the racks skin side upwards.

Have the fire with not too much flame and the smoke drum able to be touched by the hand quite easily (40^{o} C). Put the fish in the drum and keep this temperature for ½ hour. This allows fish to start heating up slowly and does not seal outside of fish.

After ½ hour build heat up so as hardly able to touch drum smoker (60^{o} C upwards).

Leave the fish in smoker for 2½ to 4 hours. Do not leave for longer than 4 hours or fish will taste of smoke.

Fish that are smoked properly will be brownish yellow on the inside.

Mamula (Trevally) are a dry fleshed fish and small fish are smoked in about 2½ hours, larger fish 3 hours.

Scapper type fish depending on size 3 to 3½ hours. Tuna (Oily fish) need nearly always 4 hours.

It is a good habit to look at the fish after about two hours, sometimes the trays need moving in position. If putting mixed sizes in it is always better to put small fish in top racks.

FINAL SUN DRYING TO PRESERVE WITHOUT REFRIGERATION

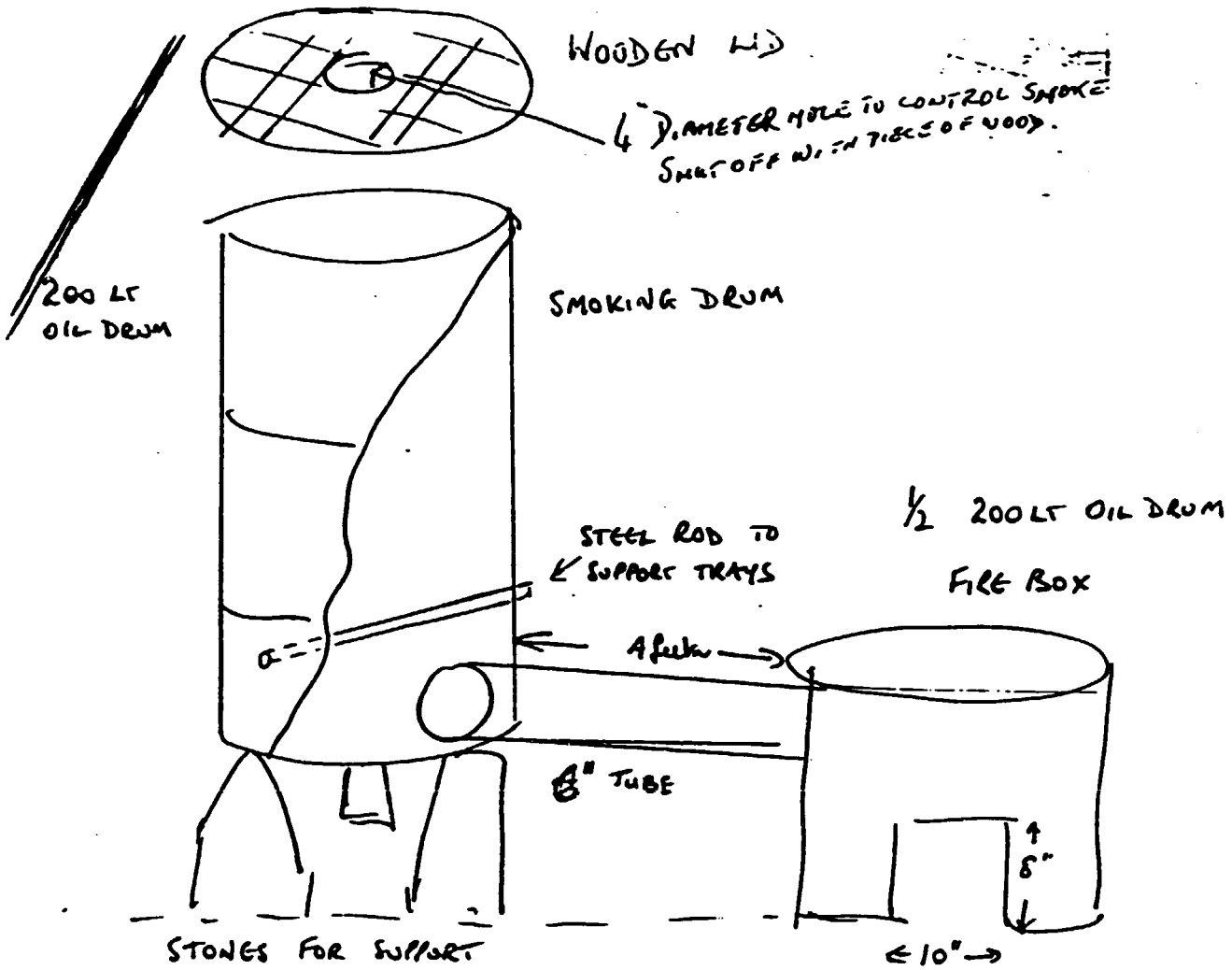
After the fish have been smoked they must be dried again in the sun. This must be done or the fish will go mouldy because the fish are still a little wet.

Dry the fish in the sun for up to 1 day for small fish and up to 3 days for large fish.

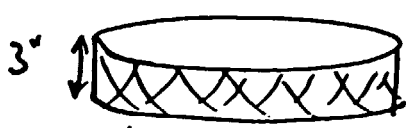
Remember to take the fish in at night.

After the fish has been dried it should weigh 35% to 40% of the 'dressed weight'. 15kg dressed weight gives 5½ – 6kg smoked fish.

Good dried smoked fish will keep for up to 2 months.



DOOR FOR FIRE BOX — MAKE LARGER THAN HOLE FROM OTHER HALF OF DRUM
NO HINGES NEEDED



5 TRAYS TO FIT IN DRUM
USE CHICKEN WIRE OR ANYTHING SIMILAR.

TO MAKE GOOD SMOKED FISH YOU MUST REMEMBER TO

USE FRESH FISH

CLEAN AND WASH THE FISH VERY WELL

PUT THE FISH IN STRONG SALT WATER FOR A SHORT TIME

DRY THE FISH A LITTLE BIT IN THE SUN

SMOKE THE FISH IN THE DRUM SMOKER FOR A SHORT TIME

DRY THE FISH IN THE SUN AGAIN

FOOD PROCESSING WORKSHOP

SASHIMI (Raw Fish Dish)

Sashimi (a Japanese term for raw seafood) refers to an eating experience which includes appearance, freshness, presentation, texture and flavour especially of fish.

People eat raw seafood but sashimi refers to a specially prepared and presented raw fish flesh.

The methods of preparing sashimi may vary and the fish to be used can be different in species, size, texture and colour of flesh.

Sashimi is a usually served thinly sliced fish flesh with fish paste, soy sauce, onions or with other ingredients.

The basic method of preparation is selecting your fish, fillet it, slice the fillets and serve it.

FOOD PROCESSING WORKSHOP - PANATINA CAMPUS -

SOLOMON ISLANDS COLLEGE OF HIGHER EDUCATION - 24-26 NOVEMBER 1992

TOPIC: NAMBO (Breadfruit Chips) FROM THE BREADFRUITS OF REEF ISLANDS TEMOTU PROVINCE (Paper by Levi Laka - Nambo Market Promoter)

1.0 BACKGROUND

The people of Reef Islands and its neighbouring Santa Cruz Islands Group are blessed with this unique plant - the Breadfruit tree. The Reef Islands and Santa Cruz people are traditionally Horticulturalists. We cultivate a great variety of edible fruit trees, one of which is the breadfruit tree - nyia mbalo.

Over the past thousands of years, a careful selection of breadfruit species/varieties has taken place. This has resulted in having a great variety of breadfruit types, especially in Reef Islands, which today are carefully cultivated in family plantations. A family plantation may have 50-100 trees of different varieties. Each tree, depending on size, when in season may bears up to 1,000 fruits. Therefore during a single season, families cannot keep up with eating, because breadfruits, when matured, ripen very fast and fall off the trees. This situation has led to the development of Nambo making - breadfruit chips - as one of the preservative measures.

2.0 NAMBO MAKING

Nambo (or breadfruit chips) making is a specialized traditional skill passed down from generation. This skill was either developed in Reef Islands, or introduced by the original settlers of Reef Islands, whoever they were, some thousands of years ago.

Nambo making is so specialized that its production involves careful preparation and planning, well before the breadfruits mature for harvesting. Prior preparations involves a number of time consuming activities, such as a careful gathering of firewood mainly mangrove and a'akwa wood which is the main source of fuel for drying.

Specially selected stones which when heated, radiates strong heat, have to be collected.

A large tray - (nugulu) made from the roots of wild pandanus plant is carefully made well in advance. The nugulu would measure 6ft x 5 ft x 9 inches deep. It is made by weaving and tying of the materials using local materials.

A number of large baskets are also woven for packing the nambo, well in advance.

A special tree bark fibre is also prepared for knit-tying of the filled nambo baskets. After all the back-up preparations are done, then harvesting of breadfruits can begin.

3.0 THE PROCESS

The Nambo making process begins by harvesting several breadfruit trees, and transported to a central drying area. The breadfruits are then roasted out-doors in an open fire. Roasting is usually done in the late afternoon, and left to cool off at night.

The following day, at dawn, 4 am - 5 am, peeling of the already cooked breadfruits begins. A careful peeling is required to ensure that no black charcoal marks mar the peeled breadfruits. Slicing begins. Depending on the quantity of breadfruits to be sliced, this activity may take a whole morning.

In the late afternoon an indoor earth oven is lit to heat up the special stones which radiate a high quantity of heat. By early evening, the now smokeless heat is ready to do the first drying cycle.

The tray (nugulu) is carefully positioned over the heat source. The newly sliced breadfruit chips - nambo - is carefully poured onto the nugulu (tray) and spread out to fill the entire tray. The nambo is then left to dry. To ensure that all the nambo in the tray receive the same amount of heat, it is hand-raked at regular intervals. This is carried on throughout the night. By dawn, the heat would have subsided, and the nambo would have at least 60% - 80% of moisture extracted. The tray and nambo are removed and the oven re-lit to complete the final moisture extraction.

After the second firing the nambo would now be dry and brittle with its total moisture completely extracted. The nambo is then temporarily stored in the large baskets, and the sequence of preparation for the next lot of breadfruits is repeated until all the breadfruits are harvested.

4.0 FINAL DRYING AND PACKAGING (Pekil wa meke'e)

To complete the nambo process, final drying is necessary to ensure a 100% moisture free packaging, the relevant baskets are prepared by placing a layer of sun dried large circular nugolobu leaves in the interior base and on all sides of the basket. Nambo is then poured inside the baskets, neatly cushioned by the layers of nugolobu It is hand-rammed firmly. The basket is filled well above the basket rim, held firmly down on all sides and over the top by nugolobu. Finally, the special bark fibres are strung firmly over the basket to complete the process.

The filled baskets are carefully stored indoor over a fire place to keep moisture and insects out. The special nugolobu leaves is a moisture proof material and under warm conditions baskets of nambo can last for at least two years.

5.0 NAMBO REPACKAGING AS A COTTAGE INDUSTRY

In 1985 the Ngaube Ma'asingwau Development Community (NMDC), an Association composed of Otambwe people of Reef Islands in Honiara, first began the idea of re-packaging of nambo into 1kg plastic bags to sell through Honiara's Super Markets.

The NMDC developed this idea to raise money for the building of its village church.

The actual packaging is done very simply, by hand filling 1kg plastic bags. It is then sealed by a candle flame. In each packet is slipped in, an information leaflet to explain to the consumer what Nambo is.

6.0 NAMBO MARKET OUT-LETS IN HONIARA

Since 1985 we have been very successful in selling packed nambo, by arrangements through:

a) Joy Super Market
b) Solomon Islands Consumers Society.
c) Food Town
d) Chan Wings Super Market
e) A & D Kitchen
f) Airport Snack Bar
g) YWCA Canteen
h) Mae Visa Store
i) Arania Enterprises, Auki, Malaita Province.
j) Oba Shop
k) ACE Trading.

Demand has always been very high, except the breadfruit from which Nambo is made, is seasonal.

7.0 NAMBO SUPPLY

The purpose of this simple industry was originally to sell the producers nambo so that the producer receives 100% of his/her own nambo. The NMDC only collects 10% commission per package. 90% goes directly to the Producer/Nambo owner. Since 1985 we have been assisting women's groups, individuals etc to sell their nambo to pay children's school fees, and to meet other financial demands.

When Nambo is in season, the supply is very high except, transport problems that we at times encounter. We have so far established a very good relationship with the Super Markets in Honiara. Now they ring us up for more Nambo.

8.0 SURPLUS NAMBO

Another important point we have also established with Nambo producers is 'not' to sell all the Nambo that they have to eat. Nambo is the main staple diet in Reef Islands and it will be wrong to sell what they suppose to eat, for their livelihood. We have since, made it clear to our Nambo suppliers to sell only the surplus Nambo. This the principle we work on. We do not think it is right to sell what people should be eating and to deprive them of their natural food, thus, changing their pattern of eating by selling all the nambo they must eat.

9.0 IMPROVED PACKAGING SYSTEM

Since 1988 NMDC has sought assistance from the Australian High Commission to assist in printing and manufacturing of durable air-light

plastics, specially designed for nambo packaging. The request for better plastics has been endorsed by the Provincial Development Unit (PDU) and NMDC will get Australian Assistance from the South Pacific Trades Commissioner in Sydney in the very near future.

NMDC will also receive two (2) plastic sealers to improve its packaging system.

NOTE: Better plastic packaging and one plastic sealer have been received, and are in full use today.

10.0 POSSIBLE EXPORTS

While I was with the Ministry of Foreign Affairs and Trade Relations, I investigated the possibility of exporting Nambo. In 1986 in Suva, Fiji I was assured that there is potential to export it there.

In Sydney in 1987 I took Nambo samples, both chips and pounded (breadfruit flour). The South Pacific Trades Commissioner, Mr Bill Macambe in Sydney then assured me of an existing demand for naturally grown food in most Australian Super Markets.

It is our current plans to send nambo flour samples for display in the South Pacific Trades Office in Sydney as soon as the improved packaging plastics are in place.

A consignment of two cartons of Nambo have been sent to Vanuatu in March 1990 upon the request of Prime Minister, Fr. Walter Lini as export samples.

Arrangements are being made to export Nambo to Vanuatu to begin with.

11.0 PACKAGING CENTRE

At the present moment packaging is done at NMDC's members homes. Packaging is done by house-wives and unemployed girls and boys of Otambwe village.

For the future the NMDC is looking at a packaging centre where the industry is to be centralized.

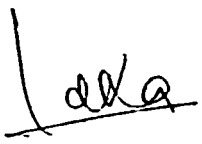
The problem at present is storage and packaging centre which NMDC is working on to establish during the 1990s.

12.0 DIVERSIFICATION

Apart from Nambo, (as from this month, March - May 1990) NMDC will also be packing dried Ngali nuts and Tatalise for sale in super markets. This has been our plans for a long time so that people can begin to buy locally grown foods from super markets, instead of Twisties, Bongos and other varieties of Junk Foods.

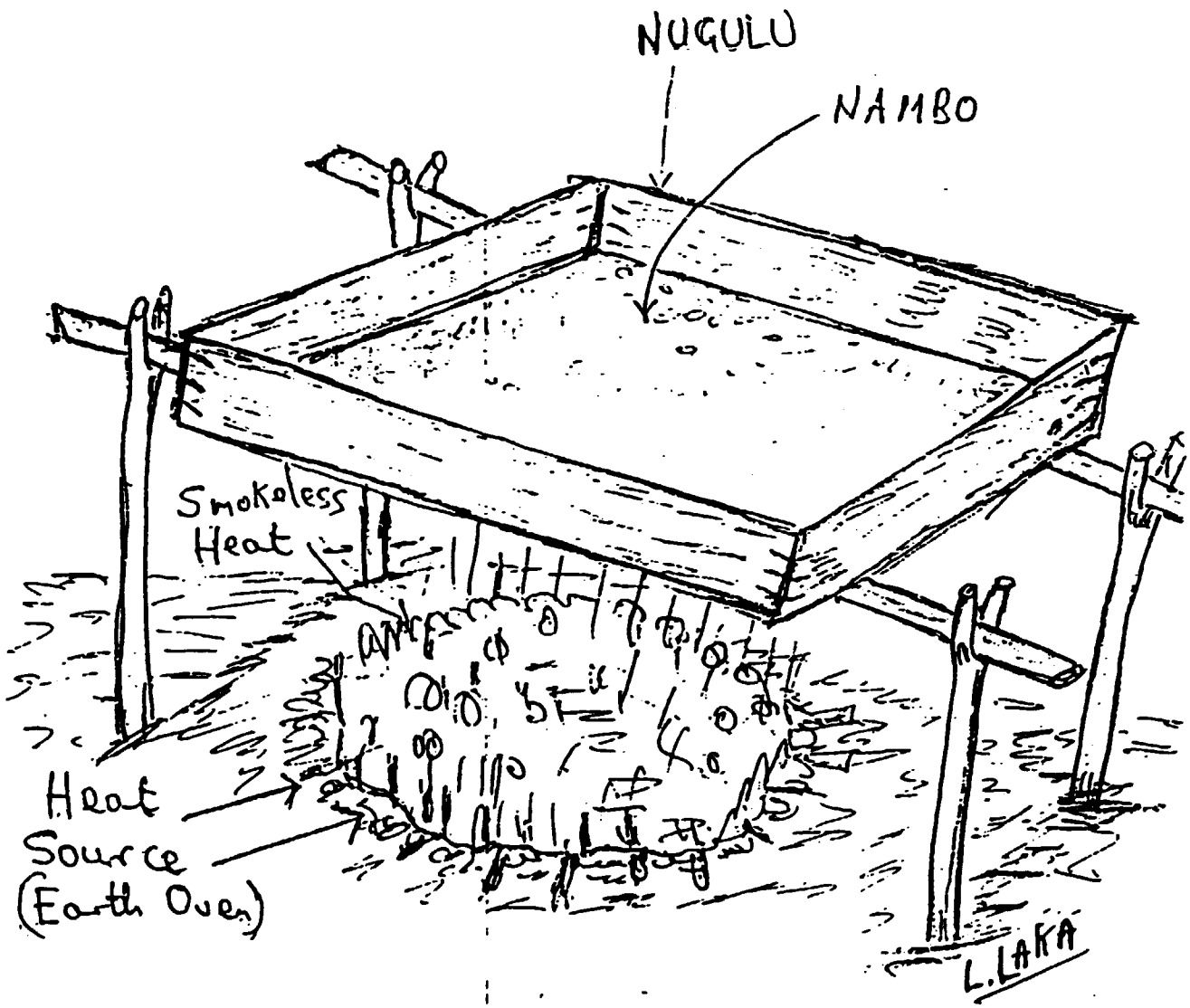
We sold ngali nuts in 1989, at the Solomon Islands Consumers, and they went like hot-cakes.

It is NMDC's drive to educate our people to eat more of locally grown and produced snack foods which are nutritionally rich, than the junk foods on the shelves of most Honiara Super Markets.



Levi Laka
NMDC Marketing Chairman
Honiara

NAMBO HOT AIR DRYING



NAMBO [Breadfruit Chips] DRYING METHOD.

JELLY

Papaya Jelly

Ingredients:

4 C. papaya pulp, grated or cut 1/8 inch thick and 1 inch square.

3 tbsps. lime juice.

2 tbsps. citric acid.

2 C. sugar

Water

Procedure:

A. Extracting Juice

1. Combine papaya and 2 cups water, 2 tbsp. lime juice and 1 tbsp. citric acid.

2. Boil for 15 minutes, Strain juice.

B. Test for Pectin and Acidity

Test for pectin by adding 1 tbsp of fruit juice to 2 tbsp of denatared alcohol.
A fruit which is poor in pectin will form a stringy precipitate or make alcohol cloudy.

Test for acidity (use std. acid solution 1 tbsp lime with 1/2 C. water) fruit juice with less acid can be combined with little fruit acid (citric acid or tartaric acid).

C. Method of Cooking

1. Add 2/3 C. to 3/4 C. sugar per cup of fruit juice (fruit juice rich in pectin can be cooked with higher ratio of sugar).

2. Combine fruit juice and sugar in a saucepan. Boil until sugar dissolves completely. Strain juice through a moistered jelly bag.

3. Return juice into the saucepan and boil vigorously as possible until jellying print is reached.

Jelling point test:

using the sheeting test, the solution falls by sheets, that is two drops combine at the edge of the spoon to form a sheet before falling.

4. Stop the boiling when the jelly sets on the spoon.

5. Add colour and essence if desired. Stik to mit.

6. Allow the bubbles to subside completely or when pouring jelly into the warm jelly glass.

7. Set aside to cool undisturbed.

8. Pour melted paraffin before jelly crabs cools completely.

9. Store jelly away from light.

FRUIT JAMS

1. SOURSOP JAM

Ingredients:

2 cups soursop pulp, seeds removed

1 1/2 - 1 3/4 sugar

PROCEDURE:

1. Pass pulp through sieve to obtain uniform texture.

2. Cook in the fruit pulp gently for few minutes before adding the sugar.

3. Boil rapidly after the sugar has been added until the setting point is reached, you can also use the sheeting test.

4. Remove the jam from heat, after it has reached setting point or thick enough to be spooned out.

5. Remove scum, if any, with spoon dipped in boiling water and wiped just before use.

6. Pour the jam at once into perfectly clean, dry jars.

7. Seal at once.

2. **PAPAYA JAM**

Ingredients:

4 cups ripe papaya pulp, passed through sieve.

3 1/3 C. Sugar

1/3 C. Lime juice

Procedure:

1. Boil papaya pulp in heavy aluminium pan until thick enough for jam.

2. Add acid and sugar and continue boiling until thick and clear. Stir constantly to prevent scorching.

3. When desired consistency is reached. pour into sterile jars and seal at once.

4. Store in cool dark place.

Other Solomon fruits fit for jam making:

- mango
- papaya - tamarind
- purple yam

COCONUT HONEY (JAM)

Ingredients:

1. pc. matured (dry) coconut, grated.

3/4 C. red sugar

Procedure:

1. Milk coconut using one cup water.

2. Combine coconut milk and sugar. Stik to mit.

3. Cook until the mixture is thick enough to spread.

4. Let it cool before use. If you want to keep it for an indefinite period, pour the hot jam into a sterile jar. Seal with melted wax.

5. Best served with rootcrops.

MARMALADE

Marmalades differ slightly from jams. Jams are made from crushed fruit while marmalades contain pieces of fruits suspended in a clear jelly.

PAPAYA - PINEAPPLE MARMALADE

Ingredients:

1 ripe papaya, put through a coarse food chopper.

1 ripe pineapple, put through a coarse food chopper.

1 teaspoon green ginger (sieved fine) to each cup of ground papaya and pineapple.

1 C. sugar for each cup pulp.

Procedure:

1. Combine fruits and ginger.
2. Boil for 10 minutes, Add sugar.
3. Cook mixture by boiling briskly and stirring constantly to avoid burning.
4. Cook until mixture is clear and as thick as desired.
5. Pour hot into clean jars.

   Seal at once.

F R U I T D R I N K S

1. PAWPAW-LIME JUICE

What you Need:

one fully ripe pawpaw, washed, cut into half and seeded
juice from six lime fruits
water
sugar

What to Do

1. Scrape pawpaw meat out of the skin into a clean bowl. Mashed until fine. Strain into a wire mesh until all the juice has been extracted.
2. Add enough water into the pawpaw juice, approximately two times the amount of the juice..
3. Add lime juice and enough sugar to taste. Stir to dissolve the sugar.

Chill, if cooler is available.

2. SOURSOP JUICE

What you Need

One medium size ripe soursop
Juice from 4-6 lime fruit
water
sugar to taste

What to Do

1. Wash fruit. Cut soursop into half. Remove pith.
2. Scoop out meat and remove seeds if possible. Nash the pulp and measure.
3. For every cup of pulp add two cups water. Boil for at least ten minutes. Strain the juice using a wire mesh. Let it cool.
4. Into the juice add lime juice and sugar to taste. Chill.

3. MANGO JUICE

WHAT YOU NEED

10 ripe mangoes

Water
sugar to taste

WHAT TO DO

1 Peel the mangoes. Scrape the meat and mash. Strain.
2. Into the juice add enough water, approximately 2 cups to a cup of juice. Add sugar according to your taste, stir to dissolve the sugar.
3. Serve cold, if refrigerator is available.

4. FIVE CORNERS JUICE

WHAT YOU NEED

ANY number of five corner fruits
sugar
water

What to Do

1. Wash the fruit, remove the corners.
2. using a scraper (piece of tin with nail holes) scrape the fruits, until most of the meat is out, into a deep bowl.
   Strain the juice, using a wire mesh.
3. Into the juice add enough water and sugar to taste. If the fruit is too sour, put on more water. Stir to dissolve the sugar.
4. Chill or add ice cubes if available.

5. COCONUT DRINK

WHAT YOU NEED

3-4 pieces young coconut
sugar to taste

What To Do

1. Break the coconuts, Save the water into a clean jug.
2. Using a fruit scraper (made out of strips of bamboo skin or tin from luncheon meat or corned beef, cut into three pieces, folded at the center around a big nail or pencil, so that a round hole is formed at the tip.) scrape out all the meat being careful not include the shell.
3. Add the meat to the water of the coconut. Add a bit of sugar to taste. Stir, then chill.

6. PINEAPPLE JUICE

WHAT YOU NEED

One fully ripe pineapple, peeled, 'eyes' removed.

water

sugar to taste

What To Do

1. Using a scraper, scrape the pineapple meat.
2. Strain through a wire mesh. Collect the juice in a deep bowl. Add enough water and sugar to taste.
3. Chill if desired.

7. KUMARA LEAF JUICE (PURPLE VARIETY)

WHAT YOU NEED

1. one big bunch kumara leaves, washed
2. 6-7 pieces bush lime, extract the juice
3. sugar
4. about 7 cups water

What To Do ... of boiling water

1. In a pot, put the kumara leaves. Boil for five minutes.
2. Remove the pot from fire, Remove the leaves out of the water, set aside for kumara leaf salad if desired.
3. Into the pot with the kumara water, add the extracted lime juice. Then add sugar to taste.

Let cool. Transfer to a water bottle or jar. Chill

Ingredients for demonstration

Shelled peanuts -

1 bo. oil

1 dry coconut, grated

1 med. ripe papaya

2 fully ripe papaya

1 pineapple ripe

2 ripe soursop

2 kilos sugar

10 pcs. lime fruit

10 pcs. mango - (ripe)

citric acid

Empty marmalade or jelly bottles with lid paraffin or candles (white)

Utensils

Wok

Copper sieve

Heavy - saucepan

Wood spoon

Jelly bag

COURSE EVALUATION

1. Is the training course of any use for you?

Yes

2. Which part of the training was most important for you?

The entire training

3. Indicate the training sessions which did not meet your needs

-

4. Please list other subjects which were not in the course but which you feel should have been included.

5. Did you improve your entrepreneurial behaviour by attending the course? Yes

6. Please give us your opinion about the course as a whole.

A very worthwhile training. Things like local fruits, I never thought that one in the Solomon Islands would make juices, jam/marmalade or make business out of it. After attending, the Course I have learnt alot.

COURSE EVALUATION

1. Is the training course of any use for you?

Yes it is both the theory learnt and demonstration made are useful for me.

2. Which part of the training was most important for you?

I feel every part of the training is most important. Food processing and sales and marketing were not important for me.

3. Indicate the training sessions which did not meet your needs.

All training sessions seem to meet my needs.

4. Please list other subjects which were not in the course but which you feel should have been included.

-

5. Did you improve your entrepreneurial behaviour by attending the course?

Yes, to some degree I never ever anticipated prior to the course

6. Please give us your opinion about the course as a whole.

The whole course is relevant to me as an entrepreneur in that it offers me options and opportunities to enter the food processing industry in helping to address the problem of my nations sick economy as well as helping me to help my community.

COURSE EVALUATION

1. Is the training course of any use for you?

It certainly gives me a lot of things to think about in our present and for future operation

2. Which part of the training was most important for you?

Management and processing are both very important.

3. Indicate the training sessions which did not meet your needs

All of them meet my needs in one way or the other.

4. Please list other subjects which were not in the course but which you feel should have been included. 1. Coconut grating & preservation
2. Use of Transport means.

5. Did you improve your entrepreneurial behaviour by attending the course? Yes, it gives me a lot of insight which already improves my behaviour.

6. Please give us your opinion about the course as a whole.

The course comes in the right time in which this country needs to venture out in small industrial activities in order to exploit its own raw material or resources. It has been suffering for a longtime in buying everything it consumes. Our people should have learned these things long time ago exploring the domestic and overseas markets for their products.

Thank you for organizing for the first time in Solomon Islands. Hope you continue this good work. Congratulation.

COURSE EVALUATION

1. Is the training course of any use for you?

   Yes

2. Which part of the training was most important for you?

   What is food processing & Sales and Marketing

3. Indicate the training sessions which did not meet your needs

   Food Regulations

4. Please list other subjects which were not in the course but which you feel should have been included.

   Costing of Products

5. Did you improve your entrepreneurial behaviour by attending the course? Yes

6. Please give us your opinion about the course as a whole.

   The course is well presented and I believe have achie the main objectives and technically Create more Understanding to food processing aspects.

COURSE EVALUATION

1. Is the training course of any use for you?

   Yes

2. Which part of the training was most important for you?

   The most part of the training important to me is the Food Processing

3. Indicate the training sessions which did not meet your needs

   Food REGULATION

4. Please list other subjects which were not in the course but which you feel should have been included.

   ~~X~~ Good cost of Product etc

5. Did you improve your entrepreneurial behaviour by attending the course?

   YES

6. Please give us your opinion about the course as a whole.

   YES The course is well given by the Lecture Especially Doctor Clu And the other Co-Ordinator

COURSE EVALUATION

1. Is the training course of any use for you?

   Yes it gave me ideas of what to do and not to do.

2. Which part of the training was most important for you?

   Cooking demonstration of Jam and jelly and peanuts roasting plus the lectures on business proposals by Doctor Olu.

3. Indicate the training sessions which did not meet your needs.

   None

4. Please list other subjects which were not in the course but which you feel should have been included.

   - Packing sand
   - Pizza and cake making production
   - How to prepare vegetables

5. Did you improve your entrepreneurial behaviour by attending the course?

   Yes.

6. Please give us your opinion about the course as a whole.

   - Next time arrange accommodation for provincial participants.
   - Some courses of the same kind to go to provinces not always in Town Honiara.
   - Provide morning/afternoon snacks becuase the view too far from mark and Town food shops.

COURSE EVALUATION

1. Is the training course of any use for you?

Yes. It gives bright ideas of what to expect when in business.

2. Which part of the training was most important for you?

Both theory and practical are useful.

3. Indicate the training sessions which did not meet your needs

None

4. Please list other subjects which were not in the course but which you feel should have been included.

5. Did you improve your entrepreneurial behaviour by attending the course? Yes

6. Please give us your opinion about the course as a whole.

The course is excellent. Presentation of topics by each lecturer is of high standard. Group discussions is very helpful and I wish to encourage you to do more of that in any future courses.

A standby person should be in place when somebody do not turn up e.g. in the cases of B. Cool Ice-cream and H.M.A. Reps.

COURSE EVALUATION

1. Is the training course of any use for you?
Yes it helps me to identify which business I am going to involve in.

2. Which part of the training was most important for you?
The part which deals with food preservation and food processing and Smoke fish.

3. Indicate the training sessions which did not meet your needs,
Every training sess. can meet my requirements.

4. Please list other subjects which were not in the course but which you feel should have been included, The introduction of equipt should be included in the course. The types of machines used for such a processing. (Also coconut oil processing

5. Did you improve your entrepreneurial behaviour by attending the course? Yes.

6. Please give us your opinion about the course as a whole.

The course as a whole is very encouragi But 4 days is not adequate. We should be given more time to study other produc There should be a follow up course on Specific products. The government should arrange for those who interested in mini industries to go for a look and learn either abroad or locally. This should enable them to know which road to follow. Also such a workshop allowa should be given to participants.

COURSE EVALUATION

1. Is the training course of any use for you?
Yes, Very much indeed.

2. Which part of the training was most important for you?
How to initiate a new business and what factor to consider. Also the marketing and processing part of it.

3. Indicate the training sessions which did not meet your needs
I have learnt many things in every training sessions and it meet most side of my needs.

4. Please list other subjects which were not in the course but which you feel should have been included. Should include how to make a proposal on a small business.

5. Did you improve your entrepreneurial behaviour by attending the course? Yes. If I start a small business I think I will improve it through what I have learnt.

6. Please give us your opinion about the course as a whole.
The course as a whole is more relevent at this point of time. Where most of us have very little knowledge of starting a food processing business this course opens our mind and we are able to see the factors that will involve in starting a small business.

COURSE EVALUATION

1. Is the training course of any use for you?

   Very much. Gives me more idea on hygiene practices and very new receipe ideas for home use and insight on possibility to setting up cottage business.

2. Which part of the training was most important for you?

   The actual food processing activities like peanut roasting, jam making, jelly, fish smoking

. Indicate the training sessions which did not meet your needs.

   N.A.

4. Please list other subjects which were not in the course but which you feel should have been included.

   Simple bookkeeping practices

5. Did you improve your entrepreneurial behaviour by attending the course?

   Yes, especially on the marketing aspect and hygiene

6. Please give us your opinion about the course as a whole.

   - should organise more of such centres
   - health and hygiene personnel should be present in such courses at all times.
   - health inspectors must at all times be present in such courses.
   - the course is very worthwhile and if all participants put into us what were learnt the country will in the long run benefit through import substitute products and increase/diversity export products.

COURSE EVALUATION

1. Is the training course of any use for you?

   Yes. I have learned many things about food processing.....

2. Which part of the training was most important for you?

   The part on Raw material Selection and Marketing and Sales is the most important part of the course which I enjoyed and wish if more elaboration could be made on it.

3. Indicate the training sessions which did not meet your needs

   The session on National food Consumption pattern and types of food Commonly used.

4. Please list other subjects which were not in the course but which you feel should have been included. I want more should be said on technology which are available in the country.

5. Did you improve your entrepreneurial behaviour by attending the course? Yes very much and the course is an eye opening for me.

6. Please give us your opinion about the course as a whole.

   Very good but short.

COURSE EVALUATION

1. Is the training course of any use for you?

   Yes, the course is very useful to me.

2. Which part of the training was most important for you?

   All the areas were important but the area on hygiene is most important becuase it is where most of the customers consider. If you are not careful in this area, you are going to lose your customer.

3. Indicate the training sessions which did not meet your needs.

   N.A.

4. Please list other subjects which were not in the course but which you feel should have been included.

   How we should make a business proposal.

5. Did you improve your entrepreneurial behaviour by attending the course?

   Yes, it has really improved my behaviour as an entrepreneur.

6. Please give us your opinion about the course as a whole.

   - It was very good, weli prepared and planned even though some of the appointments were not fully fulfilled.

COURSE EVALUATION

SCORE

1 = Very Good
2 = Good
3 = 50 – 80
4 = Bad
5 = Very Bad

(A) Relevance of training content (1)

(B) Suitability of training approach (1)

(C) Performance of the trainer (1)

(D) Administration (2)

(E) Your comments: Something that could be done every year in Solomon Islands, especially the follow up workshops.

COURSE EVALUATION

SCORE

1 = Very Good
2 = Good
3 = 50 - 80
4 = Bad
5 = Very Bad

(A) Relevance of training content (1)

(B) Suitability of training approach (1)

(C) Performance of the trainer (1)

(D) Administration (2)

(E) Your comments: It should take it least 6 weeks

COURSE EVALUATION

SCORE

1 = Very Good
2 = Good
3 = 50 - 80
4 = Bad
5 = Very Bad

(A) Relevance of training content 1

(B) Suitability of training approach 1

(C) Performance of the trainer (2)

(D) Administration (2)

(E) Your comments: I personally like the whole course and have to be able to put what has been learnt into practice.

COURSE EVALUATION

SCORE

1 = Very Good
2 = Good
3 = 50 - 80
4 = Bad
5 = Very Bad

(A) Relevance of training content - 1

(B) Suitability of training approach 1

(C) Performance of the trainer 1

(D) Administration - 1

(E) Your comments: - I am very priviledged to have attended this Course/workshop because I have learned many new things that if put into practice my family would benefit from eg. make my own jam/marmalade + fruit juices from local fruits instead of buying expensive imported ones and maybe if I attend more courses/workshop I would gain skills to produce more for local markets to make a small scale business.

COURSE EVALUATION

SCORE

1 = Very Good
2 = Good
3 = 50 - 80
4 = Bad
5 = Very Bad

(A) 1 Relevance of training content

(B) 2 Suitability of training approach

(C) 1 Performance of the trainee

(D) 1 Administration

(E) 1 Your comments: This course is a very new kind of course that I've attend and in many ways or another I to look forword for the betterment of small bissiness in Homes and even further bussiness in the future.

COURSE EVALUATION

SCORE

1 = Very Good

2 = Good

3 = 50 - 80

4 = Bad

5 = Very Bad

(A) Relevance of training content 1

(B) Suitability of training approach 1

(C) Performance of the trainer 1

(D) Administration 2

(E) Your comments:

As I was attending the course. I'm so very happy in hearing many variety of subjects which refers to Business Courses which can help us in our whatsoever small business we made. We are very privilege to attend such course. As a whole, we should start business in Small and Cottage before so on to bigger ones.

COURSE EVALUATION

SCORE

1 = Very Good
2 = Good
3 = 50 - 80
4 = Bad
5 = Very Bad

(A) Relevance of training content 1

(B) Suitability of training approach 2

(C) Performance of the trainee 2

(D) Administration 2

(E) Your comments:

- Course duration is too short.
- More involving on practical and factory visits.

COURSE EVALUATION

SCORE

1 = Very Good

2 = Good

3 = 50 - 80

4 = Bad

5 = Very Bad

(A) Relevance of training content 1

(B) Suitability of training approach 2

(C) Performance of the trainer 1

(D) Administration 1

(E) Your comments:

Training should be given more time in order to give ample time for participants to do more practical tasks.

PRODUCT EVALUATION

Rank the following products according to your degree of likeness for them.

(1) Mango juice 5
(2) Pawpaw juice 5
(3) Coconut jam 5
(4) Pineapple/Pawpaw marmalade 5
(5) Pawpaw jelly 4
(6) Roasted peanuts 5
(7) Tamarin preserve 3
(8) Cardied Tamarin 3
(9) Dried pineapple 3

SCORE

5 - Like Extremely
4 - Like Very Much
3 - Like Moderately
2 - Dislike
1 - Dislike Extremely

PRODUCT EVALUATION

Rank the following products according to your degree of likeness for them.

(1) Mango juice 5
(2) Pawpaw juice 3
(3) Coconut jam 5
(4) Pineapple/Pawpaw marmalade 5
(5) Pawpaw jelly 4
(6) Roasted peanuts 4
(7) Tamarin preserve 3
(8) Cardied Tamarin 3
(9) Dried pineapple 5

SCORE

5 - Like Extremely
4 - Like Very Much
3 - Like Moderately
2 - Dislike
1 - Dislike Extremely

PRODUCT EVALUATION

Rank the following products according to your degree of likeness for them.

(1) Mango juice - 5
(2) Pawpaw juice - 3
(3) Coconut jam - 3
(4) Pineapple/Pawpaw marmalade - 5
(5) Pawpaw jelly - 5
(6) Roasted peanuts - 4
(7) Tamarin preserve - 3
(8) Cardied Tamarin - 3
(9) Dried pineapple - 4

SCORE

5 - Like Extremely
4 - Like Very Much
3 - Like Moderately
2 - Dislike
1 - Dislike Extremely

PRODUCT EVALUATION

Rank the following products according to your degree of likeness for them.

(1) Mango juice 4
(2) Pawpaw juice 5
(3) Coconut jam 4
(4) Pineapple/Pawpaw marmalade 5
(5) Pawpaw jelly 5
(6) Roasted peanuts 4
(7) Tamarin preserve 2
(8) Cardied Tamarin 2
(9) Dried pineapple 1

SCORE

5 - Like Extremely
4 - Like Very Much
3 - Like Moderately
2 - Dislike
1 - Dislike Extremely

Food processing course a success

The recent four-day workshop on food processing has been described as very useful by the 25 participants from Honiara and provinces.

Called "Introduction to Food Processing", the workshop was organized to assist the participants who were interested to start small-scale food processing.

They were taught about suitable equipment, technique, marketing and business management for food processing.

The instructions included demonstrations of various kinds by resource persons and visiting established food processing businesses in Honiara.

Some of the participants were promised to be helped with finance for their new businesses through the Local Food Processing Entrepreneur Development Programme which is administered by the Ministry of Commerce and Primary Industries.

The fund for the small-businesses programme has been given by the New Zealand government under its bilateral assistance to Solomon Islands.

The programme provides guarantee for start up cost as well as technical, business training and assistance.

The workshop was conducted by Dr Otu Omosaiye (a Honiara-based UNDP/-UNIDO food technologist), staff members of MAL and SICHE and several private business people.

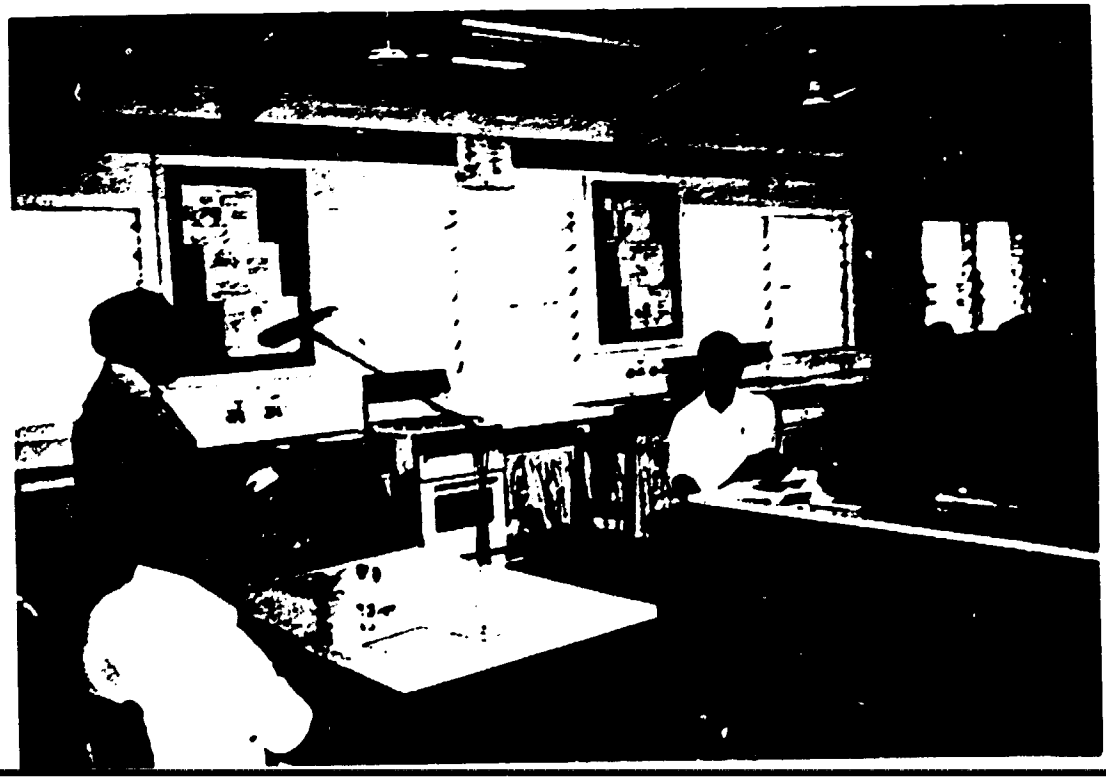
A representative from South Malaita looking at a peanut roaster at Kolomola Marketing.

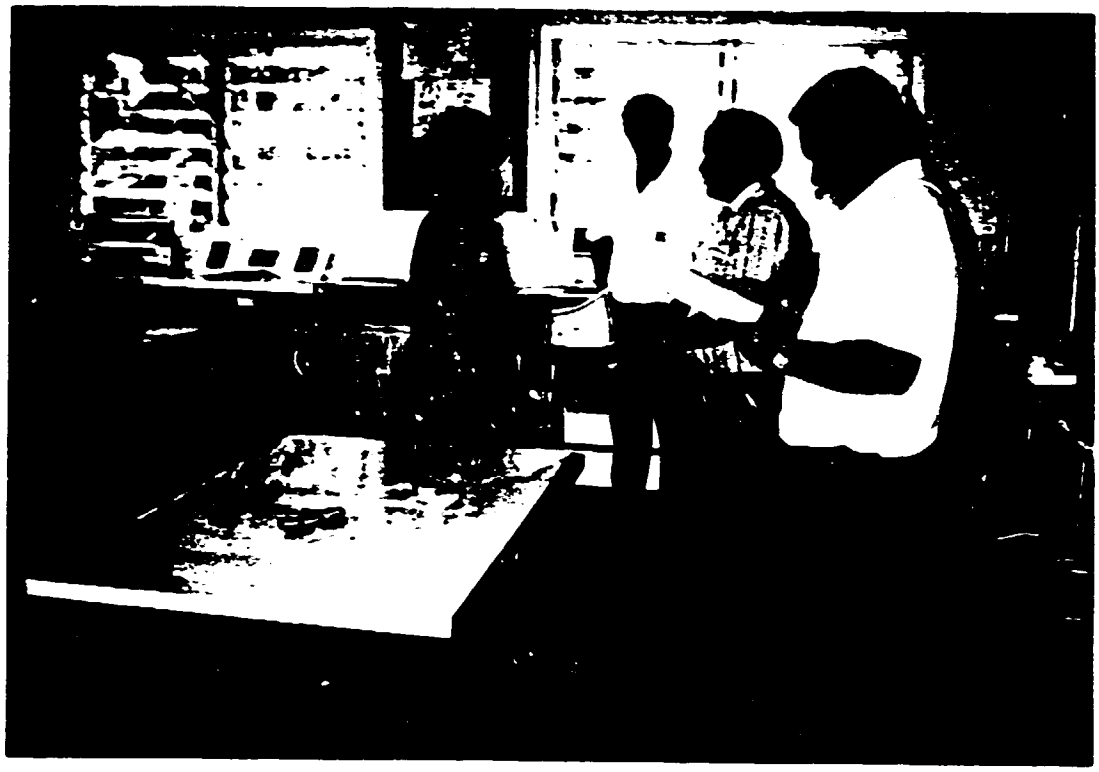
Minnie Lave receiving her certificate from Undersecretary of Ministry of Commerce and Primary Industries Joseph Harold after a workshop on food processing. Minnie and her husband own a peanut farm on Kolombangara.

Pictures of the 'Introduction to Food Processing Course'

PERMANENT SECRETARY, MINISTRY OF COMMERCE AND PRIMARY INDUSTRIES OPENING FOOD PROCESSING COURSE

UNDER SECRETARY OF THE MINISTRY OF COMMERCE AND PRIMARY CLOSING FOOD PROCESSING COURSE





COURSE PARTICIPANTS RECEIVING THEIR CERTIFICATE
AT THE END OF THE COURSE.

PREPARATION OF CASSAVA LEAVES FOR COOKING INTO STEW AT THE FAO ROOT CROPS WORKSHOP

DEMONSTRATION OF CASSAVA CHIPS, FLOUR AND 'GARI' AT THE FAO ROOT CROPS WORKSHOP

ROASTING OF GARI AT THE FAO ROOT CROPS WORKSHOP

THE CONSULTANT DEMONSTRATING THE USE OF THE PEANUT ROASTER

Proforma Invoice for Fish Smoker

FAX MESSAGE

DATE: 13 November 1992

COMPANY: Ministry of Commerce & Primary Industries

FOR THE ATTENTION OF: Dr. Olu Omosaiye

FROM: Bernadette Martin

FAX NUMBER: 010 677 21651

YOUR REF: OUR REF: BM/JS/FP423/92

NO OF PAGES (INCLUDING THIS ONE) 3

Thank you for your telefax dated 3 November 1992.

Please find attached our proposal for the Afos Maxi Smoker. As requested we have prepared one for the Maxi Smoker only and a second to include the optional accessories.

We trust we have interpreted your requirements correctly and look forward to hearing from you in the near future.

Regards,

Bernadette Martin
Sales Office Manager

Fish & Meat Processing Equipment Division

Manufacturers of
Torry Fish Smoking Kilns
Meat Smokehouses
Fish & Meat Defrosters
Stock Fish Dryers
Salt Fish Dryers
Automatic Brining Equipment
Tray Washers
Automatic Smoke Producers
Rotary Fish Washers
Trolleys, Trays, etc
Filleting Lines
Non Ferrous & S/S Fabrications

quotation

One Afos Maxi Smoker complete with:

2 Trolleys
14 Stainless Steel Trays
24 Stainless Steel Banjoes
32 Stainless Steel Speats
2 Drip Trays
8 Speat Carriers
2 Plastic Brine Tubs
1 Container of Kiln Clean

220/240v, 50Hz, 1ph

Total Price Ex Works	£6,642.00
Delivery CIF Honiara	£ 529.00
Total	£7,171.00

Delivery

Delivery is currently 4-5 weeks from receipt of order.

Terms of Payment

30% deposit with order, balance payable prior to despatch by swift bank transfer.

The above prices remain open for acceptance for a period of 30 days.

Fish & Meat Processing Equipment Division

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2 Plastic Brine Tubs
1 Container of Kiln Clear

220/240v, 50Hz, 1ph.	£6,642.00	Ex works
Stainless Steel Support Frame	£1,024.00	Ex Works
Stainless Steel Trolley Carriage	£ 541.00	Ex works
Total Ex works	£8,207.00	
Delivery CIF Honiara	£ 822.00	
	£9,029.00	

Delivery

Delivery is currently 4-5 weeks from receipt of order.

Terms of payment

30% deposit with order, balance payable prior to despatch by swift bank transfer.

The above prices remain open for acceptance for a period of 30 days.

THE SIMPLE WAY TO VERSATI

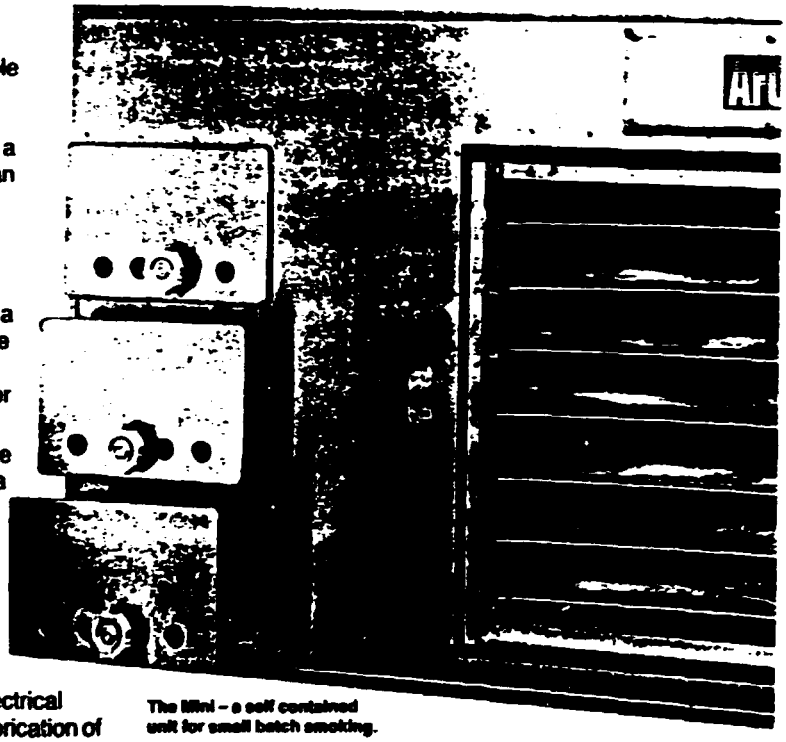
The Mini and Maxi Smokers are designed for small batch smoking and/or drying of a range of fish, meat, poultry and other products. With outputs ranging from 12 kg to 50 kg, they are ideal for small companies new to the smoking industry, or in the research and development of new smoked and dried products for larger enterprises. Easy to operate and maintain, the Afos Smokers offer maximum throughput for minimum cost.

Afos smokers are self-contained units capable of both hot and cold smoking a wide variety of products. Their compact construction means they are easy to install, and will conveniently stand on a metal bench or table. These can be provided as an optional extra if required.

Simple to operate, these semi-automatic smokers can be quickly adjusted to suit individual product smoking requirements. Automatic control of temperature is maintained by a pre-set thermostat and slide dampers regulate the required smoke density for the product. A period timer will automatically switch off the fan and heater after expiry of the selected process time.

Air and smoke are drawn horizontally over the products by an integral, centrifugal fan driven by a continuously rated motor. To simulate the conditions in the larger Afos smokers produced by the *reversing* horizontal airflow, trolleys are turned manually, once, half way through the process to ensure a uniform controlled cure.

The units are easy to clean and maintain, simply requiring a weekly washdown. Regular electrical check ups of the control system and occasional lubrication of hinges and bearings are the only other essential maintenance items.



The Mini – a self contained unit for small batch smoking.

Some products may be hung on spools.

CONSTRUCTION

Both the Mini and Maxi smokers are manufactured as single units and are constructed from stainless steel. All joints are sealed ensuring no leakage of smoke.

Trolley access is provided by a double skinned door on single pivot type hinges. A perimeter sealing strip gives a positive seal.

The smoke producers which are incorporated in the unit comprise three drawer type hearths, each having a sliding air inlet control to provide regulated air throughput. The smoke generator is easy to light and clean.

AIR FAN

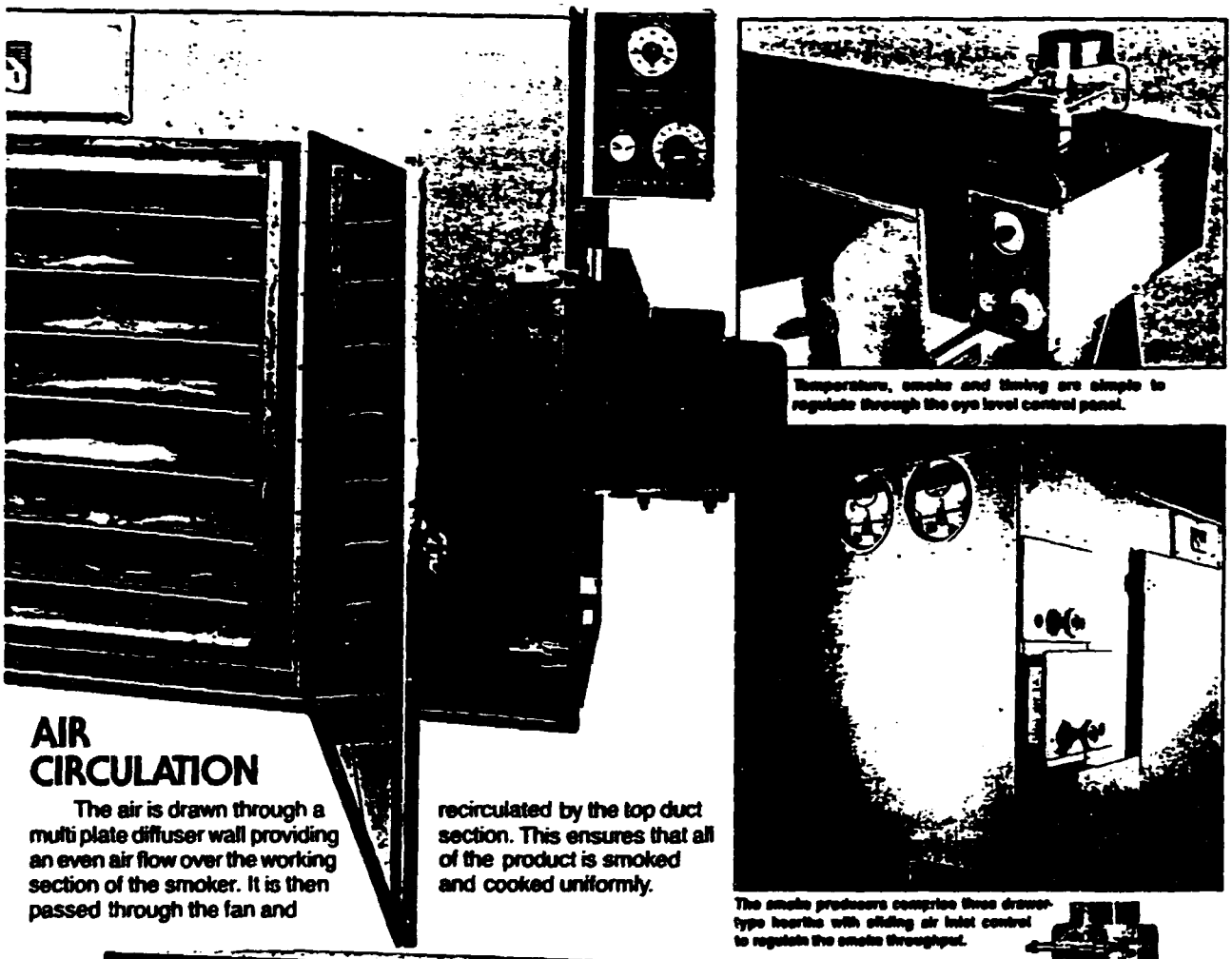
Air flow is provided by an integral, centrifugal fan driven by a continuously rated motor. The exhaust volume is controllable using the integral dampers.

HEATER BATTERY

The electrical heater battery is thermostatically controlled to maintain the pre-set temperature required in the smoker. An indicating unit is incorporated so that working temperature can be seen immediately by the operator. In the event of thermostat failure the unit is protected by a high limit thermostat which can be pre-set to provide fail safe conditions.

LE, SMALL BATCH SMOKING

STANDARD ACCESSORIES	Mini	Maxi		Mini	Maxi
Multipurpose trolley	1	2	Spear carriers	4	8
Trays	7	14	Plastic brine tub	1	2
Benjoes – stainless steel	12	24	Container "Kiln Clean"	1	1
Spears (56cm) – stainless steel	16	32	Operating Instructions	1	1
Drip tray – stainless steel	1	2			

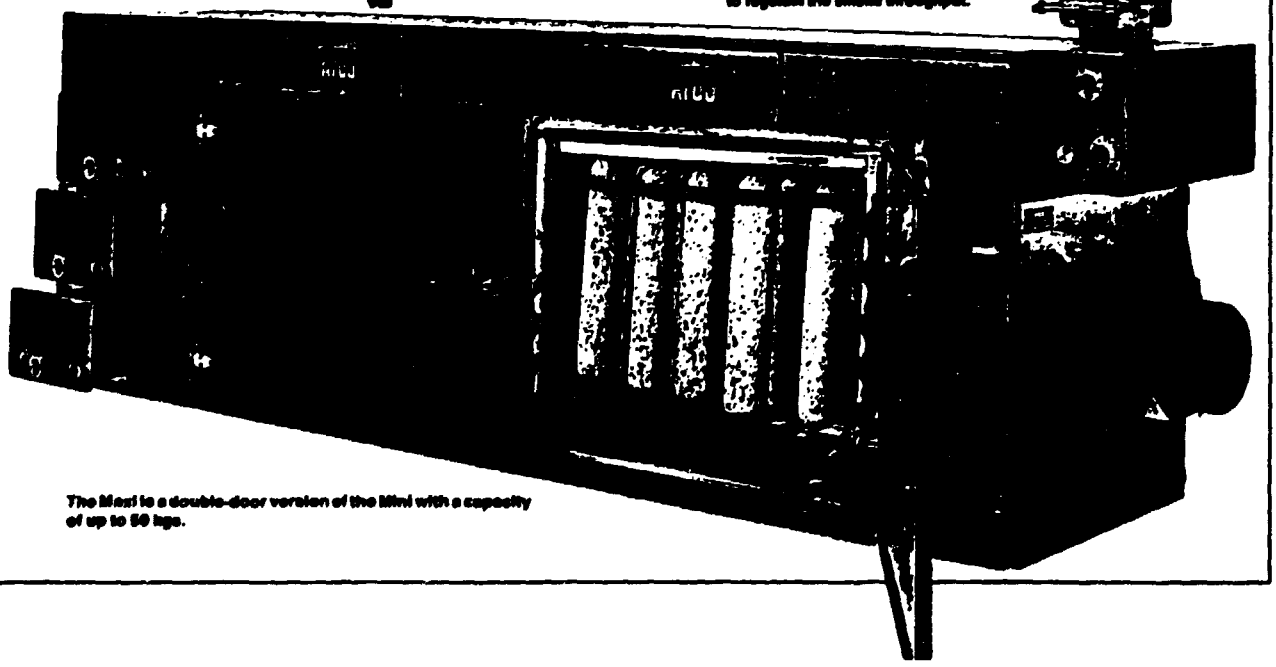


Temperature, smoke and timing are simple to regulate through the eye level control panel.

The smoke producers comprise three drawer-type hearths with sliding air inlet control to regulate the smoke throughput.

AIR CIRCULATION

The air is drawn through a multi plate diffuser wall providing an even air flow over the working section of the smoker. It is then passed through the fan and recirculated by the top duct section. This ensures that all of the product is smoked and cooked uniformly.



The Maxi is a double-door version of the Mini with a capacity of up to 50 kgs.

MINI AND MAXI SMOKER

OPTIONAL EXTRAS

The following variations and additions to the standard specification are available – prices on application.

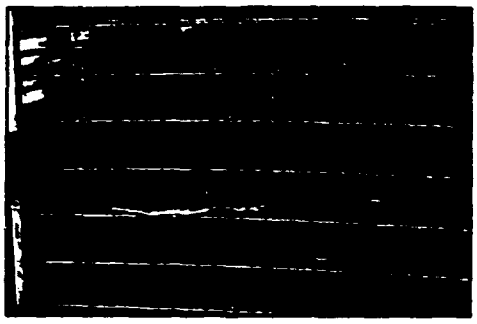
1. Special voltage and frequency
2. Export packing
3. Delivery
4. Stainless steel table stand supplied complete with trolley platform

SPECIFICATIONS	MINI	MAXI
Dimensions		
Length	185 cm	268 cm
Height	94 cm	94 cm
Width	66 cm	66 cm
Crated Dimensions		
Length	198 cm	283 cm
Height	94cm	94 cm
Width	71 cm	71 cm
Weight		
Net	155 kg	240 kg
Gross (export crated)	225 kg	350 kg
Nominal Capacities	25 kg	50 kg
Electricity Supply		
Power	4.25 kW	7.25 kW
Amps (240v, 50Hz, single phase)	20 amps	33 amps
	(other voltage models available on request)	

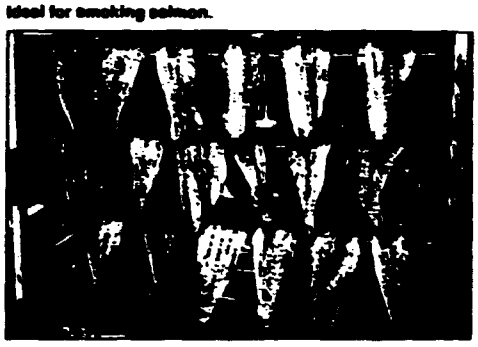
SERVICES

Technical and sales information can be obtained from Afos Ltd. at their head office in Hull, England or from accredited agents and distribution. A consultancy service covering smokers and the many associated pieces of equipment manufactured by Afos is available to assist in factory layouts etc. Prices are available for packing and delivery costs, U.K. or export.

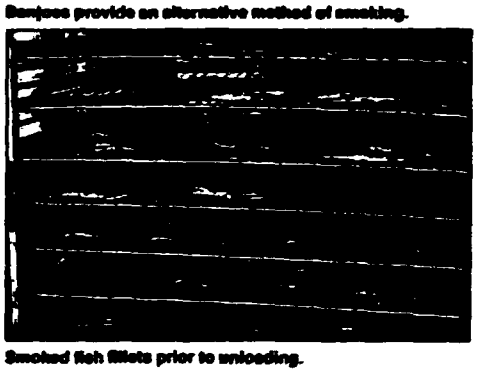
All contracts are entered into subject to the Company's Standard Terms and Conditions of Sale in accordance with our product development and improvement programme. The Company reserves the right to change prices and specifications without notification.



Ideal for smoking salmon.



Banjoes provide an alternative method of smoking.



Smoked fish fillets prior to unloading.

The units lend themselves perfectly to smoking all kinds of meats, sausages and cheeses.

Designed and Produced by The Glover Consortium Hull - England

Agent/Distributor