31. CANNED FRUITS AND VEGETABLES

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I. SUMMARY

This profile envisages the establishment of a plant for the production of canned fruits and vegetables with a capacity of 1,000 tonnes per annum.

The present demand for the proposed product is estimated at 762 tonnes per annum. The demand is expected to reach at 1,122 tonnes by the year 2010.

The plant will create employment opportunities for 24 persons.

The total investment requirement is estimated at Birr 5.75 million, out of which Birr 4.5 million is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 44.3 % and a net present value (NPV) of Birr 13.5 million, discounted at 8.5 %.

II PRODUCT DESCRIPTION AND APPLICATION

Caned fruits and vegetables are processed and filled into tin -cans which are seamed and sterilized for the purpose of long term preservation. Canning also adds taste in addition to extending the shelf-life of the otherwise perishable food. It would, thus, make the food available long time after it is harvested and becomes exportable to far away markets.

The fruits and vegetables envisaged for canning in the present project are tomatoes, carrots, red beets, pineapple, etc.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply And Present Demand

Consumption of fruits and vegetables in Ethiopia is largely in fresh form or as harvested, because processing and packaging/canning entails an increase in cost which pushes its price beyond the purchasing power of lower income groups. In fact, due to the wide availability of fresh fruits at a comparatively low price, few high income households currently buy expensive canned fruits imported from overseas.

Hence, the domestic canning of fruits will have good market prospect only if it is competitive in price and quality *vis-a-vis* fresh fruit which is strongly entrenched in the market.

As there is no fruit canning plant in the country, all of the supply derives from imports. Table 3.1 depicts the import of canned fruits in the past 12 years (1991 – 2003).

Table 3.1
IMPORT OF CANNED FRUITS (1991 - 2003)

Year	Imported Quantity (Tonnes)
1991	14.2
1992	41.7
1993	34.2
1994	8.6
1995	184
1996	103
1997	369.2
1998	1004.6
1999	465.4
2000	511.5
2001	709.4
2002	682.3
2003	1147.1

Source: *Customs Authority, External Trade Statistics, Annual Issue.*

A glance at Table 3.1 easily reveals that the import of canned fruits has exhibited very high growth in the past. Except for a low import figure of 8.6 tonnes registered in 1994, the data set is characterized by an increasing trend. The surge in imports is particularly marked since 1995, reaching a peak figure of about 1,147 tonnes in the year 2003. Whether this latest high figure will be maintained in the future or is an exception to be followed by lower quantities in other years is, however, difficult to mention.

In view of the above factors, the average of the last four years (2000 - 2003) import, i.e, 762 tonnes is considered to reflect the current demand for canned fruits.

2. Projected Demand

"Food processing in the early stages of development of a country is usually concerned with processing low-cost staples, such as milling grain. As income rises there is a shift towards more expensive foods, such as meat, milk, eggs, fruits and vegetables" (UNIDO: Food Processing Industry). In the major cities of Ethiopia, there are sufficient numbers of residents who can afford more expensive food products such as canned fruits.

As mentioned earlier, the opportunity that this offers can only be exploited if the price is not very much higher than fresh fruit and the quality on a par with imported items. The future demand for canned fruits is, thus, mainly a function of income, price and change in the consumption habits of the population. After considering all the above factors, demand for canned fruits is forecasted to grow at the average rate of growth of the national economy during the recent past, i.e 7% per annum. Accordingly, as shown in Table 3.2 the demand ranges from 815 tonnes in year 2005 to 1,928 tonnes by the year 2018.

Table 3.2
PROJECTED DEMAND FOR CANNED FRUITS

Year	Projected Demand (Tonnes)
2004	762
2005	815
2006	856
2007	916
2008	980
2009	1049
2010	1122
2011	1200
2012	1285
2013	1375
2014	1471
2015	1574
2016	1684
2017	1802
2018	1928

3. Pricing and Distribution

The current selling price of the most common canned fruit, pineapple, is Birr 8.60 per 565 gramme (15.22/kg). Taking this price as a reference and allowing a 40% margin for wholesalers and retailers, a factory-gate price of Birr 5.20 per gm (9.2 /kg) is proposed for the envisaged project. For canned vegetables a factory-gate price of Birr 7.00 per kg is proposed.

A suitable distribution system for the product is one which relies on wholesalers, who in turn would ensure proper distribution through the existing retail channels.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

The capacity of the envisaged plant is 4 tonnes per day of canned fruits and vegetables or 1,000 tonnes per annum. The plant will operate 8 hours a day, in a single shift, and for 250 days a year. Production can be increased by operating the plant in double shifts.

2. Production Programme

Considering the time required to gain plant operation experience and market penetration, it is anticipated that the plant would start production at 75% of its capacity and would reach at 85% during the second year, and 100% during the third and subsequent years of its operation. The detailed production programme is depicted in Table 3.3.

Table 3.3
PRODUCTION PROGRAMME

Year	1	2	3-10
Capacity utilization (%)	75	85	100
Production (Tonne)	750	850	1000

IV. RAW MATERIALS AND INPUTS

A. RAW MATERIALS

The major raw materials required for the manufacture of canned fruit are fresh fruits and vegetables. Proper maturity and the degree of freshness are very important aspects that determine the quality of the product. It means that the fruits and vegetables to be canned have to be fresh and clean.

Out of the annual quantity, fruits constitute about 80%, and the rest 20% are vegetables (tomato, carrot, etc). Various types of fruits like orange, papaya, lemon, grapes, etc. can be processed. The potential source of raw materials will be the commercial farms to be established in the near future as well as small farmers or out growers.

Table 4.1
RAW MATERIALS REQUIREMENT & COST

Sr. No.	Description	Qyt. (Tonnes)	Unit Price (Birr)	Cost (Birr)
1	Fruits	800	1500	1,200,000
2	Vegetables (tomato, carrot, beet roots)	200	750	150,000
	Total	**1000**		**1,350,000**

B. AUXILIARY MATERIALS

Auxiliary materials required for the production of canned fruits and vegetables include preservatives such as salt, vinegar and tin cans (1000 ml and 500 ml). Both sizes of tin cans are to be imported since such tin cans are not manufactured in the country. For the purpose of this study, the proportion of these cans is 50%.

Table 4.2
AUXILIARY MATERIALS REQUIREMENT & COST

Sr. No.	Description	Qty	Unit price (Birr)	Cost Total (Birr)
1	Sugar (Tonnes)	50	4.22	211,000
2	Salt (Tonnes)	10	1.5	15,000
3	Tin can (1000 ml)	500,100	2.10	1050210
4	Tin can (500 ml)	1,000,200	1.20	1200240
	Grand Total	**-**	**-**	**2,476,450**

C. UTILITIES

The plant requires steam, electricity, water and fuel-oil for its operation. Annual requirement of inputs at full operation capacity of the plant is given in Table 4.3.

Table 4.3
UTILITIES REQUIREMENTS & COST

Sr. No.	Description	Qty.	Unit Price (Birr)	Cost Total (Birr)
1	Electricity (kWh)	100,000	0.474	47,400
2	Water (m^3)	1,000	1.5	1,500
3	Fuel oil (Tonnes)	330	2.67	881,100
4	Steam (Tonnes)	4,000	1.5	6,000
	Grand Total	-	-	**936,000**

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The canning process mainly consists of four stages of operation. These are adjustment of materials which include: washing, steaming, salting, filling into tin cans, seaming the tin can, and sterilization under heat.

The seaming and sterilization operations have the effect of repressing the action of bacteria in and out of the container. Seaming prevents air flow between the outside and the inside of the can. This prevents entry of bacteria into the food contained in the can. Sterilization under heat decimate any bacteria inside the can and thus enhances the preservation of the food.

2. Source of Technology

The technology of production of canned fruits and vegetables is available in many developed and developing countries like UK, Italy, Holland, Germany, China and India. Address of technology supplier is given below.

a) GOENKA'S GROUP OF INDUSTRIES
Tel: 27671754, 27672401
Fax: 91-11-27671754
E-mail: goenkasgroup@trade-india.com
360,NANIWALA BAGH,BEHIND AAKASH
CENEMA, AADPUR, DELHI-110033

B. ENGINEERING

1. Machinery and Equipment

The list of machinery and equipment required for the production of canned fruits and vegetables and estimated cost is given in Table 5.1 below.

Table 5.1
MACHINERY AND EQUIPMENT REQUIREMENT
FOR CANNED FRUITS & VEGETABLES PRODUCTION PLANT & COST

Sr No.	Description	Qty.	Cost, ['000 Birr]		
			LC	FC	TC
1	Washing tank	1			
2	Salt soaking tank	1			
3	Empty can conveyor	1			
4	Table for balance	1			
5	Tray	1			
6	Can assembling table	1			
7	Steamer	1			
8	Drainer	1			
9	Can supplying table	1			
10	Rotary filler	3			
11	Vacuum seamer	1			
12	Vacuum pump	1			
13	Laboratory equipment	set			
14	Steam boiler	1			
	FOB price	**-**	**-**	**4300**	**4300**
	Freight, insurance, bank & material handling charges		200	-	200
	CIF landed cost		**200**	**4300**	**4500**

2. Land, Building and Civil Works

The total land requirement is estimated at 1500 m^2, of this the area to be covered by factory building, warehouses, offices and other utility building will be in the order of 600 m^2.

Land lease value in the region at a rate of Birr 2 per m^2 per year & for 70 years land holding will be Birr 210,000. Considering a unit cost of building to be Birr 1000 per m^2, the cost of building and civil works will be Birr 600,000.

Thus, the aggregate investment cost for land, building and civil works, assuming that the total land lease cost will be paid in advance, will be Birr 810,000.

3. Proposed Location

Proximity to raw material availability is very important for canned fruits and vegetables processing plant. Therefore, Assosa, zone or Metekel zone where the agro climatic conditions are suitable for production of fruits and vegetables would be an appropriate location for the establishment of the plant. The availability of infrastructue in Assosa is better than the other towns of the region, and therefore is an advantage for the envisaged plant.

VI. MANPOWER AND TRAINING REQUIREMENTS

A. MANPOWER REQUIREMENT

The envisaged palnt will have the employment capacity of 24 persons. The details of manpower requirement for the plant and annual labour cost is shown a Table 6.1 below.

Table 6.1
MANPOWER REQUIREMENT AND ANNUAL LABOUR COST

Sr. No.	Description	Req. No.	Monthly Salary (Birr)	Annual Salary (Birr)
1	Plant manager	1	1800	21,600
2	Industrial biologist	1	1200	14,400
3	Machine operators	6	600	43,200
4	Assistant operators	4	300	14,400
5	Technicians	2	500	12,000
6	Clerks	2	400	9,600
7	Secretary	2	600	14,400
8	General services	3	200	7,200
9	Guard	3	200	7,200
	Sub -total	**24**		**144,000**
	Employee benefit (25% BS)			36,000
	Grand Total			**180,000**

B. TRAINING REQUIREMENT

The industrial biologist, machine operators and technicians need two weeks on-the-job training by the technology supplier during errection & commissioning. Training cost is estimated to be Birr 10,000.

VII. FINANCIAL ANALYSIS

The financial analysis of the canned fruits and vegetables project is based on the data presented in the previous chapters and the following assumptions:-

Construction period	1 years
Source of finance	30 % equity
	70 % loan
Tax holidays	3 years
Bank interest	7.5 %
Discounted cashflow	8.5 %
Repair and maintenance	3 % of the total plant and machinery
Accounts receivable	30 days
Raw material, local	10 days
Raw materials, import	90 days
Work in progress	2 days
Finished products	30 days
Cash in hand	5 days
Accounts payable	30 days

A. TOTAL INITIAL INVESTMENT COST

The total initial investment cost of the project including working capital is estimated at about 7.4 million, of which 58.5 per cent will be required in foreign currency.

The major breakdown of the total initial investment cost is shown in Table 7.1

Table 7.1
INITIAL INVESTMENT COST

Sr. No.	Cost Items	Total ('000 BIRR)
1	Land lease value	210
2.	Building and Civil Work	600
3.	Plant Machinery and Equipment	4,500
4.	Office Furniture and Equipment	65
5.	Vehicle	375
6.	Pre-production Expenditure*	411.2
7.	Working Capital	1,190.6
	Total Investment cost	**7,351.79**
	Foreign share	**58.5**

* *N.B Pre-production expenditure includes interest during construction (Birr39 thousand), training (Birr 10 thousand), and (Birr5 thousand) costs of registration, licensing and formation of the company including legal fees, commissioning expenses, etc.*

B. PRODUCTION COST

The annual production cost at full operation capacity of the plant is estimated at Birr 5.9 million (see Table 7.2). The material and utility cost accounts for 81 percent, while repair and maintenance take 0.8 per cent of the production cost.

Table 7.2

ANNUAL PRODUCTION COST AT FUL CAPACITY ('000 BIRR)

Items	Unit Cost	%
Raw Material and Inputs	3,826	64.8
Utilities	936	15.8
Maintenance and repair	50	0.8
Labour direct	84	1.4
Factory overheads *	4	0.1
Administration Cost **	101	1.7
Total Operating Costs	**5,002**	**84.7**
Depreciation	575	9.7
Cost of Finance	329	5.6
Total Production Cost	**5,906**	**100**

C. FINANCIAL EVALUATION

1. Profitability

According to the projected income statement, the project will start generating profit in the first year of operation. Important ratios such as profit to total sales, net profit to equity (Return on equity) and net profit plus interest on total investment (return on total investment) show an increasing trend during the life time of the project.

The income statement and the other indicators of profitability show that the project is viable.

* *Factory overhead cost includes salaries and wages of supervisors, insurance of factory workers, social costs on salaries of direct labour, etc.*

** *Administrative cost includes salaries and wages, insurance, social costs, materials and services used by administrative staff etc.*

2. Break-even Analysis

The break-even point of the project including cost of finance when it starts to operates at full capacity (year 3) is estimated by using income statement projection.

$$BE = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable cost}} = 26.5\ \%$$

3. Pay-Back Period

The investment cost and income statement projection are used to project the pay-back period. The project's initial investment will be fully recovered within 3 years.

4. Internal Rate of Return and Net Present Value

Based on the cash flow statement, the calculated IRR of the project is 44.3 % and the net present value at 8.5% discount rate is Birr 13.5 million.

D. ECONOMIC BENEFITS

The project can create employment for 24 persons. In addition to supply of the domestic needs, the project will generate Birr 0.9 million per annum in terms of tax revenue when it starts to operate at full capacity. Moreover, the Regional Government can collect employment, income tax and sales tax revenue. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports.