

23. PROFILE ON JAM AND MARMALADE

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I. SUMMARY

This profile envisages the establishment of a plant for the production of 650 tonnes of jam and marmalade per year.

The current demand for the proposed products is estimated to be 2,021 tonnes per annum.

The demand is expected to reach 2,991 tonnes by the year 2014.

The total investment requirement is estimated at Birr 12.48 million, out of which Birr 8.8 million is required for machinery and equipment.

The plant will create employment opportunities for 36 persons.

The project is financially viable with internal rate of return (IRR) of 14% and a net present value (NPV) of Birr 3 million, discounted at 10.5%.

II. PRODUCT DESCRIPTION AND APPLICATION

Jam and marmalade are bread dressings served alone or together with margarine or fresh butter. Jam is produced by boiling fruit pulp with sugar to yield thick consistency while marmalade is prepared from the pulp and rinds of the fruits. They are usually packed in 1,000 gramme cans.

The major consumers are pastries, households, hotels, and military camps.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The source of supply of jam and marmalade to the country is both local production and import. The only local producer in the country is the Upper Awash Agro-industry Enterprise through its Merti Fruit and vegetable processing Plant. The volumes supplied fluctuates from year to year but on the average about 1,905 tonnes of jam and marmalade has been supplied to the domestic market annually, during the period 1996/97-2001/02 (see Table 3.1)

Table 3.1
LOCAL PRODUCTION AND IMPORT OF JAM AND MARMALADE IN
/TONNES/

Year (G.C)	Local Production	Import	Total
1996/97	1066	371.9	1438
1997/98	656	351.9	1008
1998/99	2867	98.7	2965.7
1999/00	2873	105.8	2978.8
2000/01	1649	96.6	1745.6
2001/02	1172	122.1	1294.1
Total	10283	1147.0	11430.0
Average	1714	191.00	1905

Source:- *CSA for Domestic Production*
- *Customs Authority for Import*

As could be seen from the production and import statistics presented in Table 3.1, the maximum level of production registered is 2,873 tonnes in 1999/00, and the average level of production of this plant during the period under consideration is 1,714 tonnes. Assuming that production was driven by demand, i.e., the level of production was indicated by the level of demand, the share of this plant in the jam and marmalade market is on the average 90%.

The present demand for jam and marmalade is estimated based on the historical supply of the product. This approach presupposes that what has been supplied to the market is consumed in the same period. Accordingly, the data depicted in Table 3.1. has been used to estimate the present demand. But since no discernible trend could be observed, the average of the six year is taken as an effective demand for the year 2001/02. To arrive at the 2004 effective demand a 3% annual growth rate is applied. Accordingly, the present effective demand is estimated at 2,021 tonnes.

2. Projected Demand

Jam and marmalade are not popular consumer items in Ethiopia. Past consumption data of the products did not show increase despite a rapid growth of urban population. This may be partly explained by a result of poor marketing efforts made by the suppliers of the product. In any case, it would be prudent to be conservative in projecting future demand for the product.

Since the urban population, which is the consumer of the product, is anticipated to grow at an annual growth rate of 4%, a four per cent growth rate is applied on the base year demand in projecting the future demand.

Merti Fruit and Vegetables Processing Plant, the only local producer of jam and marmalade is currently, on the average, covering 90 per cent of the national demand for the product. If it is assumed that the plant will continue to produce the same amount as in the past six years, the market share for new entrant will, therefore, be the projected demand level for each year less the annual market share of Merti processing plant.

This assumption is based on the assessment of the existing situation of Merti Processing Plant. According to the available information the plant has been in operation for more than 23 years and the machinery in use are very old. Moreover, it has problems associated with machine design and canning facilities. Hence, its jam and marmalade production volume is not expected to exceed more than the average of the past six years at least in the short to medium term.

Table 3.2 depicts the projection and the unsatisfied level of demand. Thus, market share for new entrant will grow from 650 tonnes by the year 2008 to 1,052 tonnes by the year 2012.

Table 3.2
PROJECTED DEMAND FOR JAM AND MARMALADE (IN TONNES)

Year (G.C)	Total Projected Demand	Market Share	
		Melka Jeddu	New Entrant
2004	2021	1714	307
2005	2102	1714	388
2006	2186	1714	472
2007	2273	1714	559
2008	2364	1714	650
2009	2459	1714	745
2010	2552	1714	838
2011	2659	1714	945
2012	2766	1714	1052
2013	2876	1714	1162
2014	2991	1714	1277

3. Pricing and Distribution

The price of a product is, generally, a function of the perceived value to consumers. Currently, two distinct price levels are observed in the jam and marmalade market.

Melka Jeddu's Merti which is packed in a metallic can of 1,000 g is sold at Birr 12.00 in retail shops. But the imported ones, usually packed in a glass jar of 450g. capacity, are sold at Birr 10.00. The price range between imported and locally produced varieties is, therefore, wide.

For the envisaged project, the selling price of Merti has been considered as an entry price. Accordingly, the ex-factory price is set at Birr 10.43 per kg (Birr 10,430/tonne) by allowing 15 per cent for distributors profit and other marketing costs.

The product can get market outlet through general merchandise shops, supermarkets and specialized food item department/stores.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

Considering the market study and minimum economics of scale, the envisaged plant will have a production capacity of 650 tonnes per annum, working in single shift of 8 hours a day and 270 days a year. The plant can increase its capacity by changing the production programme in to two or three shifts per day.

2. Production Programme

The plant will starts operation at 80% and 90% of the installed capacity in the first and second years, respectively due to the problems in market penetration and skill development. The plant will operate at full capacity at the third year and thereafter.

IV. MATERIALS AND INPUTS

A. RAW MATERIALS

The major raw materials are fruits (orange, mandarin, lemon etc) sugar & citric acid. All the raw materials are locally available except citric acid which is imported. Orange, mandarin and lemon will be supplied by the envisaged commercial plantation that is to be established in the region in addition to the supply by out growers. Sugar will be bought locally from the existing factories in the country. Moreover, in the medium to long term it is envisaged that a sugar plant will be established in the region. Based on the following recipe as a guideline because the composition of the fruit in jam and marmalade accordingly to can vary; test of the consumers concerning the consistency, the sweetness and acidity, the raw materials requirement and the corresponding cost is depicted in Table 4.1.

Guideline Recipe to get 68% Brix at finished product

Fruit	-	11 kg at 10% TSS
Sugar	-	9 kg
Citric Acid	-	55 g

Table 4.1
ANNUAL REQUIREMENT OF RAW MATERIALS AND COST

Sr. No.	Description	Quantity	Cost (Birr '000)		
			L.C	F.C	T.C
1	Fruits (Mandarin, Orange, Lemon)	975 tonnes	975	-	975
2	Sugar	292.5 tonnes	1,170	-	1,170
3	Citric Acid	1800 kg	-	43.20	43.20
4	Empty Can	650,000 pcs	975	-	975
5	Packing carton	43,500	217.50	-	217.50
	Grand Total		3337.50	43.20	3380.7

B. UTILITIES

The utilities required by the envisaged plant are electricity, furnace oil and water. The annual requirement and their cost is shown in Table 4.2. The total cost of utilities is estimated at Birr 488,717.

Table 4.2
UTILITIES REQUIREMENT AND COST

Sr. No.	Description	Quantity	Unit Cost	Total Cost (in Birr)
1	Electricity	58,500 kwh	0.4738 kWh	27,717
2	Furnace oil	150 m ³	2.50/lt.	375,000
3	Water	43,000 m ³	2/m ³	86,000
	Grand Total			488,717

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

Even though there are different production process applicable in the preparation of fruit and basic recipe from fruit to fruit. The general processing steps for the production of jam and marmalade is presented as follows.

- a) Fresh fruit after sorting on control belt and washed in a washing machine is brought to continuous boiling equipment, then is brought to pulper and to storage tank,
- b) Weighing the required amount of pulp and boiling with water, when necessary,
- c) Add the pectin
 - to the batch while stirring very vigorously, and
 - pectin which has previously been mixed with 5 times its weight in sugar taken from the recipe.
- d) Boil for about 2 minute to assure a complete dissolution,
- e) Add the sugar while keeping the batch boiling,
- f) Boil down quickly to desired brix
- g) Add the acid (usually citric acid) and remove the forth.
- h) Fill hot into (the previously cleaned) container and seam it.
- i) Invert the containers for three minutes to pasteurize the cover and label it.

2. Source & Technology

The machinery and equipment required for the manufacture of jam and marmalade can be obtained from the following suppliers;-

1. yuncos a ce dillo del condado
Nave 21, Pol. Ind. Yuncos
Yuncos 45210, castilla – La Macha
Spain

2. BcH limited
 Spring place
 Mill fold, whit worth
 Rochdale, Lancs OL128 DN
 United Kingdom
 Phone + 44 1706 852122
 Fax: + 44 1706 85 3010

B. ENGINEERING

1. Machinery and Equipment

The major machinery and equipment required by the envisaged plant are conveyor, washing machine, pulper, scalar, boiling kettle, tinning and labeling machine. The total cost of plant machinery and equipment cost is estimated at Birr 8.8 million, of which Birr 7.5 million is required in foreign currency. The list of machinery and equipment is given in Table 5.1.

Table 5.1
MACHINERY AND EQUIPMENT

Sr. No.	Description	Qty.
1	Washing and Sorting equipment	1
2	Pulp crusher	1
3	Screen	1
4	Pulp storage tank	2
5	Pasteurize	1
6	Boiling kettle	1
7	Filling and labeling machine	1
8	Seamier	1
9	Steam generator	1
10	Desecrator	1
11	Laboratory equipments (refraction meter, oven, thermometer, pH meter and analytic balances)	1

2. Land, Building and Civil Work

The total area required by the plant is estimated to be 1000 m², out of which 600 m² is built-up area. Hygiene requirements should be integrated in the construction of buildings. Total construction cost estimate at a rate of Birr 1,700 per m² is Birr 1,020,000. Land lease value at a rate of Birr 1.2 per m² and 70 years of holding is estimated at Birr 84,000. Total land lease cost is assumed to be paid in advance. The total cost for land, building and civil work is estimated at Birr 1,104,000.

3. Proposed Location

The envisaged plant is preferably be located near the major raw material (citrus fruits) supply base in order to avoid the bulk transportation of these raw materials. So, the plant is proposed to be located near Tana Belese, Metekel zone in a site where there is utilities like electricity and water, and also means of transportation and road access.

VI. MANPOWER AND TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The plant requires 36 workers out of which, 18 workers are for administrative unit and 18 are for production unit. The total amount of labour cost including employee benefit is estimated at Birr 351,000 as shown in Table 6.1.

Table 6.1
MANPOWER REQUIREMENT AND LABOUR COST

Sr. No.	Description	Req. No.	Monthly Salary (Birr)	Annual Salary (Birr)
1	Plant Manager	1	2,000	24,000
2	Secretary	1	800	9,600
3	Administrative and Finance Manager	1	1,500	18,000
4	Personnel Officer	1	1,200	14,400
5	General Service Head	1	1,200	14,400
6	Accountant	2	900	21,600
7	Sales man	1	900	10,800
8	Store man	2	600	14,400
9	Clerks	2	450	10,800
10	Driver	2	300	7,200
11	Guard	4	250	12,000
12	Production & Tech. Man.	1	1,800	21,600
13	Supervisor/chemist	1	1,000	12,000
14	General mechanic	1	600	7,200
15	Electrician	1	600	7,200
16	Operators	8	600	57,600
17	Labourers	6	250	18,000
	Sub – Total	36		280,800
	Employees benefit (25% of basic salary)			70,200
	Grand Total	36		351,000

B. TRAINING REQUIREMENT

Supervisors, operators and technic personnel need training on the production, maintenance and operation of machinery and quality control by the expert of the machinery supplier for one month period during erection and commissioning. The total cost of training is estimated at Birr 50,000.

VII. FINANCIAL ANALYSIS

The financial analysis of the jam and marmalade project is based on the data provided in the previous chapters and the following assumptions:-

Construction period	2 years
Source of finance	30% equity
	70% loan
Tax holidays	3 years
Bank interest	10.5%
Discounted cash flow	10.5%
Repair and maintenance	5 % of Plant machinery and equipment
Accounts receivable	30 days
Raw material (local)	
- Fruits	3 days
- Others	30 days
Raw material (import)	90 days
Work in progress	2 days
Finished products	15 days
Cash at 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 Birr 12.58 million, out of which about 60% will be required in foreign currency. Details are indicated in Table 7.1.

Table 7.1
INITIAL INVESTMENT COST ('000 BIRR)

Sr. No.	Cost Items	Foreign Currency	Local Currency	Total
1	Land	-	84.00	84.00
2	Building and Civil Work	-	1,020.00	1,020.00
3	Plant Machinery and Equipment	7,500.00	1,300.00	8,800.00
4	Office Furniture and Equipment	-	75.00	75.00
5	Vehicle	-	250.00	250.00
6	Pre-production Expenditure*	-	1,755.81	1,755.81
	Total Investment Cost	7,500.00	4,484.81	11,984.81
7	Working Capital	103.83	493.91	597.74
	Grand Total	7,603.83	4978.72	12,582.56

B. PRODUCTION COST

The annual production cost at full operation capacity of the plant is estimated at Birr 6.1 million (see Table 7.2). The material and utility cost accounts for 63 per cent while repair and maintenance take 3.6 per cent of the production cost.

* *Pre-production expenditure include interest during construction (Birr 1.6 million), (Birr 50,000) and cost of registration, licensing and formation of the company including legal fees, commissioning expenses, etc.*

Table 7.2
ANNUAL PRODUCTION COST
(‘000 BIRR)

Items	Year			
	3	4	7	10
Raw Material and Inputs	2,703.48	3,045.01	3,380.70	3,380.70
Labour Direct	134.73	151.75	168.48	168.48
Utilities	390.82	440.19	488.72	488.72
Maintenance and repair	173.91	195.88	217.47	217.47
Labour overheads	56.14	63.23	70.20	70.20
Administration Cost	89.82	101.17	112.32	112.32
Total operating costs	3,548.89	3,896.06	4,437.89	4,437.89
Depreciation	1,019.70	1,019.70	1,019.70	939.70
Cost of Finance	931.47	874.41	664.70	381.76
Total Production Cost	5,500.06	5,891.34	6,122.29	5,759.35

C. FINANCIAL EVALUATION

1. Profitability

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

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

2. Break-even Analysis

The break-even point of the project is estimated by using income statement projection.

$$\text{BE} = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable Cost}} = 45 \%$$

3. Pay-Back Period

The investment cost and income statement projection are used to project the pay-back period, the project will fully recover the initial investment and working capital within 7 years.

4. Internal Rate of Return and Net Present Value

Based on the cash flow statement, the calculated IRR of the project is 14% and the net present value at 10.5% discount rate is Birr 3 million.

D. ECONOMIC BENEFITS

The project can create employment opportunities for 36 persons. In addition to supply of the domestic needs, the project will generate Birr 5.35 million in terms of tax revenue. Moreover, the Regional Government can collect employment, income tax and sales tax revenue.