# 29. PROFILE ON TOMATO KETCHUP AND SAUCE

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# I. SUMMARY

This profile envisages the establishment of a plant for the production of 250 tonnes of tomato ketchup and 750 tonnes of tomato sauce per annum.

The current demand for the proposed product is estimated at 2,225 tonnes per annum and it is projected to reach 5,032 tonnes by the year 2010.

The plant will create employment opportunities for 31 persons.

The total investment requirement is estimated at Birr 11.02 million, out of which Birr 3.99 million is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 26% and a net present value (NPV) of Birr 11.09 million, discounted at 10.5%.

# II. PRODUCT DESCRIPTION AND APPLICATION

Tomato ketchup and sauce are produced by processing fresh tomato which is clean and wholesome. With some additives, they have high acidity taste and rich flavor. Tomato ketchup and sauce are consumed by households, restaurants, hotels and institutions like hospitals, schools, etc. Processing of tomato ketchup and sauce mainly depends on the availability of a large and stable supply of fresh, quality tomato and the availability of a vast supply of water.

# III. MARKET STUDY AND PLANT CAPACITY

## A. MARKET STUDY

### 1. Past Supply and Present Demand

Although tomato is consumed by the urban and rural population, industrially processed ketchup and sauce are consumed only by the urban population. Apart from households,

hotels, restaurants, snack bars and various other catering establishments are major users of tomato ketchup and sauce for food preparation.

The major domestic supplier is the Merti Horticultural Processing Plant, while imports originate from various countries. Table 3.1 depicts the supply from these sources.

**Table 3. 1**

**SUPPLY OF TOMATO KETCHUP AND SAUCE (1993-2002)**

| Year | [1]Domestic Production(tonne) | Import[2] (tonne) | Total |
|---|---|---|---|
| 1992 | 1,005 | 2.1 | 1,007.1 |
| 1993 | 1,223 | 10 | 1,233 |
| 1994 | 1,012 | 11.8 | 1,023.8 |
| 1995 | 1,648 | 12.1 | 1,660.1 |
| 1996 | 1,949 | 34.8 | 1,983.8 |
| 1997 | 825 | 33.6 | 858.6 |
| 1998 | 951 | 23.1 | 974.1 |
| 1999 | 1,949 | 433.5 | 2,382.5 |
| 2000 | 2,424 | 81.2 | 2,505.2 |
| 2001 | 1,730 | 57.5 | 1,787.5 |
| 2002 | 555 | 234.7 | 789.7 |

**Source: -** 1. CSA, Survey of the Manufacturing and Electricity Industries, Annual Issues.

2. Excise and Tax Authority, External Trade Statistics, Annual Issues.

Table 3.1 shows that the bulk of demand for tomato ketchup and sauce is being supplied through local production, imports constituting less than 10% of the total supply in most years. However, in both imports and domestic production a growth trend is observable.

The average total supply during the years 1999 - 2001 was about 2,225 tonnes; and this amount is considered to fairly approximate present demand for the product.

## 2. Projected Demand

The future demand for tomato ketchup and sauce is a function of income and the urban population growth. Assuming that demand will grow at a rate higher by half than the urban population growth rate of 4%, the demand projection is executed by applying a growth rate of 6% annually on the estimated present demand. Accordingly, as shown in Table 3.2, unsatisfied demand for tomato ketchup and sauce is projected to range from 858 tonnes by the year 2005 to about 4,000 tonnes by the year 2019.

**Table 3. 2**

**PROJECTED DEMAND OF TOMATO KETCHUP & SAUCE (IN TONNES)**

| Year | Projected Demand | Existing Capacity | Demand Gap |
|---|---|---|---|
| 2004 | 2225 | 1500 | 725 |
| 2205 | 2358 | " | 858 |
| 2006 | 2500 | " | 1000 |
| 2007 | 2650 | " | 1150 |
| 2008 | 2809 | " | 1309 |
| 2009 | 2977 | " | 1477 |
| 2010 | 3156 | " | 1656 |
| 2011 | 3345 | " | 1845 |
| 2012 | 3346 | " | 2046 |
| 2013 | 3359 | " | 2259 |
| 2014 | 3985 | " | 2485 |
| 2015 | 4224 | " | 2724 |
| 2016 | 4477 | " | 2977 |
| 2017 | 4746 | " | 3246 |
| 2018 | 5030 | " | 3530 |
| 2019 | 5032 | " | 4032 |

### 3. Pricing and Distribution

The current retail price of tomato ketchup ranges from Birr 10 to 12/Kg and tomato sauce from Birr 30 to 40 /Kg. Taking the least price and allowing a 35% margin for wholesalers and retailers, the factory-gate price for the proposed plant is recommended to be Birr 6.5/Kg and Birr 22.22/Kg for tomato ketchup and tomato sauce, respectively. Distribution of the product could be effected through the existing wholesale and retail trade channels for food items.

## B. PLANT CAPACITY AND PRODUCTION PROGRAMME

### 1. Plant Capacity

The envisaged plant will have a capacity of producing 1,000 tonnes of tomato ketchup and sauce per annum, out of which 250 tonnes will be tomato ketchup and 750 tonnes tomato sauce.

### 2. Production Programme

The plant will start operation at 75% of its rated capacity, and raise its capacity to 85% and 100% in the second and third year, respectively.

# IV. MATERIALS AND INPUTS

## A. RAW AND AUXILIARY MATERIAL

The basic raw material required by the processing plant is fresh tomato. The plant will process 5,500 tonnes of fresh tomato per year. At the rate of Birr 2 per kg of fresh tomato, the total annual cost of raw material will be Birr 11,000,000.

Auxiliary materials required by the plant and which are added to impart good taste consist of salt, sugar, vinegar, spices, and other ingredients.

There are various recipes employed for producing tomato ketchup and sauce. The recipe applied for tomato ketchup shows a considerable variation from the recipe used to produce tomato sauce.

For production of tomato ketchup, spices are added to the vinegar and cooked at about 85$^{o}$C, covered in a dried kettle for about 2-3 hours. Onion, garlic and paprika are then added directly to the ketchup.

The annual requirement for different auxiliary materials and their estimated costs are given in Table 4.1.

**Table 4.1**

**ANNUAL AUXILIARY MATERIALS REQUIREMENT AND ESTIMATED COST**

| Sr. No. | Description | For Ketchup production (kg) | For Sauce Production (kg) | Total Requirement (kg) | Cost (Birr) |
|---|---|---|---|---|---|
| 1 | Salt | 3.90 | 16.44 | 20.34 | 24.41 |
| 2 | Sugar | 12.00 | 51.05 | 63.05 | 346.78 |
| 3 | Vinegar | 12.00 | 13.84 | 25.84 | 374.68 |
| 4 | Spices | 2.10 | 5.19 | 7.29 | 1,283.04 |
| 5 | Others | 2.20 | 3.67 | 5.87 | 917.19 |
| 6 | Glass bottles | 625,000 pc | - | 625,000 pc | 625,000.00 |
| 7 | Cans | - | 1,875,000 pc | 1,875,000 pc | 2,343,750.00 |
| 8 | Cartons | - | - | 104,492 pc | 83,593.60 |
| | **Grand Total** | **-** | **-** | **-** | **3,055,290** |

The bottles and all other auxiliary materials can be procured locally, except laminated cans which have to be imported.

## B. UTILITIES

Utilities required by the plant consist of electricity, water and fuel oil for boiler. The total annual requirement is shown in Table 4.2.

**Table 4.2**

**ANNUAL UTILITIES REQUIREMENT AND COST**

| Sr. No. | Description | Requirement | Cost (Birr) |
|---|---|---|---|
| 1 | Electricity | 17,152 kWh | 8,113.00 |
| 2 | Water | 5,197 $m^3$ | 7,795 |
| 3 | Fuel oil | 38,980 | 89,654 |
| | **Total** | **-** | **105,562.00** |

# VI. TECHNOLOGY & ENGINEERING

## A. TECHNOLOGY

### 1. Production Process

The major operations involved are:

- Collection of fresh tomato
- Charging
- Washing
- Sorting
- Crushing
- Concentration
- Filtration
- Homogenization
- Flavoring
- Bottling/canning
- Cooling
- Packing and dispatching

Fresh tomato transported to the plant will be cleaned by washing in water. To accomplish this task, a special washing technique has been developed that allows for preservation of the fresh, natural qualities of ripened tomato.

Washed tomato is crushed into tomato pulp, which is strained and filtered. This is followed by preheating and concentration to about one-third of its original volume by means of a continuous concentrator, for which a boiler plant is used. Since the concentration would be achieved in a very short time, a special technical knowhow have to be employed as concentration is necessary. Otherwise, heating the tomato pulp would cause oxidization giving it a dark-reddish, disagreeable colour, as opposed to the colour of natural tomato.

Concentrated tomato pulp is homogenized, and salt, sugar, spices, vinegar and other ingredients are added in the SEASONING ROOM to give it the flavour associated with tomato sauce and tomato ketchup. The products are, then, filled into bottles and cans after which they are packed into dozen or gross cartons for delivery.

### 2. Source of Technology

Machinery & equipment as well as technology required by the envisaged plant can be obtained from abroad.

The adders of a firm that can be a source of technology supplier is given below.
Frelgmdires International,
Maharastera, Mumbai - 400 013, India.
Fax; + ( 91)-(22)-24944108/22186046/22187756.

## B. ENGINEERING

### 1. Machinery and equipment

Machinery and equipment required by the tomato processing plant and their estimated costs are given in Table 5.1.

**Table 5.1**

**MACHINERY AND EQUIPMENT AND ESTIMATED COSTS**

| Sr. No. | Description | Qty. | Cost, Birr | | |
|---|---|---|---|---|---|
| | | | FC | LC | Total |
| 1 | Tomato charging m/c | 1 set | 208,858 | 36,857 | 245,715 |
| 2 | Tomato washing and sorting m/c | 1 | 234,965 | 41,465 | 276,430 |
| 3 | Continuous concentrator | 1 | 208,858 | 36,857 | 245,715 |
| 4 | Filter | 1 | 182,750 | 32,250 | 215,000 |
| 5 | Homogenizer | 1 | 130,536 | 23,036 | 153,572 |
| 6 | Seasoning mixer | 1 | 156,643 | 27,643 | 184,286 |
| 7 | Bottling m/c | 2 | 234,965 | 41,465 | 276,430 |
| 8 | Cooler | 1 | 208,858 | 36,857 | 245,715 |
| 9 | Labeler | 1 | 208,858 | 36,857 | 245,715 |
| 10 | Packing m/c | 1 | 261,072 | 46,072 | 307,144 |
| 11 | Water treatment facility | 1set | 182,750 | 32,250 | 215,000 |
| 12 | Boiler | 1 | 234,965 | 41,465 | 276,430 |
| 13 | Other auxiliary equipment | 1 set | 156,645 | 27,643 | 184,288 |
| | Total FOB cost | | 2,610,723 | 460,717 | 3,071,440 |
| | Freight, insurance, inland transport, Bank and Customs charges, etc. | | - | 921,432 | 921,432 |
| | **Total landed cost** | | **2,610,723** | **1,382,149** | **3,992,872** |

## 2. Land, Building & Civil Works

Total land requirement is estimated at 2,000 $m^2$. The total built-up area is estimated to be 1,500 $m^2$. This includes production hall, finished products and raw materials stores, offices and social facilities and open spaces. The total cost of buildings and civil work at a unit cost rate of Birr 1400 per $m^2$, is estimated at Birr 2,100,000. The total land lease cost, at the rate of Birr 2.5 per $m^2$ for a period of 70 years of land holding, is estimated at Birr 350,000. The total land lease cost is assumed to be paid in advance.

### 3. Proposed location

The envisaged plant should be located in areas where fresh tomato can be abundantly supplied and infrastructure is available. Thus, suburbs of towns like Assosa, Chagni, etc. can be possible locations.

## VI. MANPOWER AND TRAINING REQUIREMENT

### A. MANPOWER REQUIREMENT

The plant requires both skilled and unskilled labour to carry out production activities. Indirect manpower will be engaged in carrying out administrative activities. The total manpower requirement together with monthly and annual salaries including fringe benefits is presented in Table 6.1.

**Table 6.1**

**MANPOWER REQUIREMENT AND LABOUR COST**

| Sr. No. | Description | Req.No. | Monthly Salary (Birr) | Annual Expenditures (Birr) |
|---|---|---|---|---|
| | **A. Administration** | | | |
| 1 | Plant Manager | 1 | 2,000 | 24,000 |
| 2 | Secretary | 1 | 800 | 9,600 |
| 3 | Accountant | 1 | 700 | 8,400 |
| 4 | Salesman | 1 | 550 | 6,600 |
| 5 | Personnel | 1 | 550 | 6,600 |
| 6 | Clerks | 2 | 500 | 6,000 |
| 7 | General Services | 4 | 600 | 7,200 |
| | **Sub-Total** | **11** | **5,700** | **68,400** |
| | **B. Production** | | | |
| 1 | Production Supervisor | 1 | 900 | 10,800 |
| 2 | Technicians | 2 | 900 | 10,800 |
| 3 | Skilled labour (operators) | 3 | 1,200 | 14,400 |
| 4 | Unskilled labour (labourers) | 12 | 1,920 | 23,040 |
| 5 | Chemists | 2 | 1,400 | 16,800 |
| | **Sub-Total** | **20** | **6,320** | **75,840** |
| | **Total** | **31** | **12,020** | **144,240** |
| | Workers Benefits (20% of basic salary) | | 2,404 | 28,848 |
| | **Grand Total** | | **14,424** | **173,088** |

## B. TRAINING REQUIREMENT

One technologist should be given a one month on- the-job training in Merti Processing Plant during erection & commissioning period. The cost of such training is estimated at Birr 15,000.

## VII. FINANCIAL ANALYSIS

The financial analysis of the tomato sauce and ketchup project is based on the data provided in the previous chatpers 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 |
| Work in progress | 2 days |
| Raw materials | |
| - Tomato | 2 days |
| - Others | 60 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 11.02 million, out of which about 24 %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 | - | 350.00 | 350.00 |
| 2 | Building and Civil Work | - | 2,100.00 | 2,100.00 |
| 3 | Plant Machinery and Equipment | 2,610.72 | 1,382.18 | 3,992.90 |
| 4 | Office Furniture and Equipment | - | 150.00 | 150.00 |
| 5 | Vehicle | - | 300.00 | 300.00 |
| 6 | Pre-production Expenditure* | - | 1,470.60 | 1,470.60 |
| | **Total Investment Cost** | **2,610.72** | **5,752.78** | **8,363.50** |
| 7 | Working Capital | | 2,659.37 | 2,659.37 |
| | **Grand Total** | **2,610.72** | **8,412.15** | **11,022.84** |

## B. PRODUCTION COST

The annual production cost at full operation capacity of the plant is estimated at Birr 15.58 million (see Table 7.2). The material and utility cost accounts for 91 per cent while repair and maintenance take 1.28 per cent of the production cost.

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* *Pre-production expenditure include interest during construction (Birr 1.12 million ), training (Birr 15,000 ) 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 | 10,541.5 | 11,935.3 | 14,055.3 | 14,055.3 |
| Labour Direct | 64.9 | 73.5 | 86.5 | 86.5 |
| Utilities | 79.2 | 89.6 | 105.6 | 105.6 |
| Maintenance and repair | 149.7 | 169.5 | 199.6 | 199.6 |
| Labour overheads | 21.6 | 24.5 | 28.8 | 28.8 |
| Administration Overheads | 43.3 | 49.0 | 57.7 | 57.7 |
| **Total operating costs** | **10,900.2** | **12,341.4** | **14,533.6** | **14,533.6** |
| Depreciation | 654.3 | 654.3 | 654.3 | 524.3 |
| Cost of Finance | 650.0 | 585.0 | 390.0 | 195.0 |
| **Total Production Cost** | **12,204.5** | **13,580.7** | **15,577.9** | **15,252.9** |

## 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 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.

$$BE = \frac{\text{Fixed Cost}}{\text{Sales-Variable Cost}} = 19\ \%$$

## 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 5 years time.

## 4. Internal Rate of Return and Net Present Value

Based on the cash flow statement, the calculated IRR of the project is 26 % and the net present value at 10.5% discount rate is Birr 11.09 million.

# D. ECONOMIC BENEFITS

The project can create employment opportunities for 31 persons. In addition to supply of the domestic needs, the project will generate Birr 11.48 million in terms of tax revenue. 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.