

# **PROFILE ON ORGANGE SQUASH**

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## **I. SUMAMRY**

This profile envisages the establishment of a plant for the production of 460 tonnes of orange squash per annum.

The present demand for proposed product is estimated at 264 tonnes and it is projected to reach at 685 tonnes by the year 2010.

The plant will create employment opportunities for 24 persons.

The total investment requirement is estimated at Birr 9.99 million, out of which Birr 7.6 million is for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 15% and a net present value (NPV) of Birr 2.24 million, discounted at 10.5%.

## **II. PROUDCT DESCRIPTION AND APPLICATION**

Orange is a common name for citrus fruit of several varieties including the sweet orange, the sour orange, and the mandarin orange or tangerine. The fruit consists of several easily separated carpals or sections, each containing several seeds and many juice cells, covered by leathery exocarp, or skin containing numerous oil glands.

## **III. MARKET STUDY AND PLANT CAPACITY**

### **A. MARKET STUDY**

#### **1. Past Supply and Present Demand**

The total sweet orange produced in Ethiopia is currently almost sold as whole fruit, without further processing or preparing into other forms. A very insignificant amount of it is used for preparing frozen and canned orange juice, extracts and preserves. However, import statistics shows that the country is importing canned fruits of various types from

different countries. Annual canned fruit import for the period 1995-1998 averaged 415 tonnes. More importantly, the level of import has shown almost a steady rise over the last eight years. It has increased from 14.2 tonnes in year 1991 to 1004.6 in year 1998 showing an average annual growth rate of 83 per cent.

**Table 3.1**  
**IMPORT OF CANNED FRUITS**  
**(1991-1998)**

Year	Quantity (Tonnes)
1991	14.2
1992	41.7
1993	34.2
1994	8.6
1995	184
1996	103
1997	369.2
1998	1004.6

**Source:** External Trade Statistics

The major sources of import for canned fruits are Germany, Netherlands and Malaysia. The total share of these countries, according to 1995 import data, is more than 75 per cent.

Canned fruits imported to the country vary in type. However, pineapples are the predominant ones followed by oranges. The other fruits account for less than 5% of the total. According to the 1995 import data, the proportion of pineapples to oranges was approximately 4:1.

The current demand for orange squash is estimated on the basis of the historical supply of the product. Taking the recent past four years data, 1995-1998, the annual average demand for canned fruits was 415 tonnes, out of which the amount of orange squash is about 80 tonnes. Applying an annual average growth rate of 83 per cent observed in the past seven years, the current (2000) demand for orange squash would be 264 tonnes.

## 2. Demand Projection

The current consumption of orange squash is limited to domestic market. However, if acceptable quality can be produced there is a potential for export to neighbouring countries like Djibouti, Yemen, Saudi Arabia and the Arab Emirates. These countries are known to be large consumers of fruits and vegetables including orange squash. Hence, the envisaged project not only will substitute import but also supply to the export market.

In light of the above future prospects, the demand for orange squash is anticipated to increase at a higher growth rate, but to be on the conservative side an annual growth rate of 10 per cent is assumed. Accordingly the demand for the product will grow from 264 tonnes in the year 2000 to 685 tonnes by the year 2010. The projection detail is shown in Table 3.2.

**Table 3.2**

**PROJECTED DEMAND FOR ORANGE SQUASH**

Year	Projected Demand (in Tonnes)
2001	290
2002	320
2003	351
2004	387
2005	425
2006	468
2007	515
2008	566
2009	623
2010	685

### **3. Pricing and Distribution**

The current selling price of orange squash in supermarkets is Birr 13 per liter. Allowing 20% profit mark up for retailers and distributors, the envisaged project can charge a factory-gate price of Birr 10.40 per liter.

The product can be distributed through specialized groceries and supermarkets.

## **B. PLANT CAPACITY AND PRODUCTION PROGRAMME**

### **1. Plant Capacity**

The plant envisages the production of 460 tonnes of orange squash per annum. It is proposed to operate single shift of 8 hours a day for 270 days a year.

### **2. Production Programme**

The unit is suggested to operate 80% and 90% of the installed capacity in the first and second years of operation, respectively and reach full capacity in the third year. The fact that production equipment are new, and operators usually take sometime to develop the specific skills and knowhow, the production build up programme is made to start at relatively lower level (80%) and then gradually rise to full capacity (100%).

## **IV. MATERIALS AND INPUT**

### **A. MATERIALS**

Most of the materials and inputs required for manufacturing of orange squash are locally available. The major raw materials are available at Erer or Shinele. The estimated annual material cost at full capacity is Birr 2.5 million .

The raw materials requirement and the corresponding costs are shown in Table 4.1.

**Table 4.1**  
**RAW MATERIAL REQUIREMENT AND COST**

Ser. No.	Material	Qty. (MT)	Unit Cost (Birr/kg)	Cost ('000 Birr)		
				FC	LC	TC
1	Orange	644	1.00	-	644	644
2	Sugar	64	3.00	-	192.00	192.00
3	Citric acid and other chemicals	8	20.00	160.00	-	160.00
4	Cans	966,000 (N <sup>o</sup> s)	1.25	-	1,207.50	1,207.50
5	Packaging materials	47,000 (N <sup>o</sup> s)	7.00	-	329.00	329.00
<b>TOTAL</b>				<b>160.00</b>	<b>2,372.50</b>	<b>2,532.50</b>

## **B. UTILITIES**

Utilities required by the plant are electricity, water, and air. The annual consumption of electricity, water, and air is 216,000Kwh, 100,000m<sup>3</sup> and 50 m<sup>3</sup>, respectively. The total annual cost of utilities is estimated at Birr 202,000.

## **VI. TECHNOLOGY AND ENGINEERING**

### **A. TECHNOLOGY**

#### **1. Production Process**

The raw material is washed off by stream water to remove foreign matters. The orange fruit, which has traveled through the stream of water and which has been lifted up by the bucket conveyor, is sent to the washing tank to wash and clean the coated wax and chemical onto the surface of the peel.

The orange is carried on the screening conveyor to take away diseased, green, old and damaged oranges by the workers. The orange fruit is then transferred to the scalding by the bucket conveyor to heat by steam in order to make the peel soft for easy peeling. After the peeling process is carried out by the peeler, the peel is sent to the hopper by the conveyor and the peeled orange is dropped into the hopper of the juice extractor.

The peeled orange is then charged into the chopper pulper. Here, the peeled orange fruit is crushed and filtered through the screen and separated into orange squash and pulp. After de-airing process, instantaneous pasteurization is done and fine pulp is separated by a centrifugal separator to produce clear orange squash.

The blending process is carried out and in order to restore the flavor and colour, 7-10% of raw fruit juice is added to get 420 Brix orange squash.

The orange squash is then filled into cans after cooled down by the cooling medium of a freezer. After filling in cans using piston type filler, the concentrated orange squash is sent to freezing unit. The product which has been frozen to sufficiently low temperature is sent to the storage.

## **2. Source of Technology**

The machinery and equipment required can be obtained from the following companies.

i) Dong yang alona Electro Co. Ltd.

220-1 Samsu-ri, Hasuk-myon,

Yang San-shi, Kyongnam

Tel: 0523-382-68180021

Fax: 0523 -382-6822

ii) H.J. IRANI

89, Hill Road, Bandra (West)

Mumbai 400050

Tel: 6423068, 6433299

Fax: 91-22-6416737



## B. ENGINEERING

### 1. Machinery and Equipment

The major machinery and equipment involved in the production process are conveyor, bucket elevator, boiler and tanks. The total machinery and equipment cost is estimated at Birr 9.1 million, of which Birr 1.6 million is in local currency.

The list of machinery and equipment required is given in Table 5.1.

**Table 5.1**  
**LIST OF MACHINERY AND EQUIPMENT**

Ser. No.	Description	Qty (No)
1	Bucket Conveyor	2
2	Washing Tank	1
3	Brushing Conveyor	1
4	Screening Conveyor	1
5	Scalder	1
6	Screener	1
7	Pealer	2
8	Peeled peel conveyor	1
9	Segment Conveyor	1
10	Screw Conveyor	1
11	Peeled Peel Hopper	1
12	Pulper	1
13	Pump With Hopper	1
14	Balance Tank	2
15	Juice Circulation Pump	2
16	Dearator	1
17	Plate Type Heat Exchanger	1
18	Surge Tank	1
19	Centrifugal Separator	1
20	Pulp Circulation Pump	1
21	Storage Tank	2
22	Blending Tank	1
23	Quick Freezer	1
24	Boiler	1
25	Testing Equipment	Set

## **2. Land, Building and Civil Works**

The plant will require a total land area of 600m<sup>2</sup> of which 500 m<sup>2</sup> will be covered by the factory and office buildings, stores, etc. The total cost of buildings and civil works at a unit cost rate of Birr 500 per m<sup>2</sup> will be about Birr 750,000. The cost of land holding for 95 years, at the lease rate of Birr 1.5 per m<sup>2</sup> is about Birr 85,500.

## **3. Proposed Location**

It is proposed to locate the plant at Erer or Shinele woreda as the Shinille zone has a good potential for fruit production and are located a few kms from the market place (Dire Dawa).

# **VI. MANPOWER & TRAINING REQUIREMENT**

## **A. MANPOWER REQUIREMENT**

The manpower requirement of the plant and the corresponding labour costs are shown in Table 6.1.

**Table 6.1**  
**MANPOWER REQUIREMENT AND LABOUR COST**

Ser. No.	Description	No. Required	Monthly Salary (Birr)	Annual Salary (Birr/'000)
<b>A. Administration</b>				
1	Manager	1	2,000	24.00
2	Secretary	1	600	7.20
3	Personnel	1	1,000	12.00
4	Accountant/Cashier	1	800	9.60
5	Sales Man	1	500	6.00
6	Clerks	1	250	3.00
7	Driver	1	350	4.20
8	General Service	3	200	7.20
<b>Total</b>		<b>10</b>		<b>73.20</b>
<b>B. Production</b>				
1	Supervisor - Chemist	1	1,200.-	14.4
2	Mechanic	1	1,000.-	12.0
3	Skilled Worker-filter mechanic	4	700.-	28.8
4	Unskilled worker laborer	8	200.-	19.2
<b>Total</b>		<b>14</b>	<b>-</b>	<b>74.4</b>
<b>Sub Total</b>		<b>24</b>	<b>-</b>	<b>147.60</b>
Employee's Benefits (25% of Basic Salary)		-	-	28.60
<b>Grand Total</b>		<b>24</b>	<b>-</b>	<b>171.60</b>

## B. TRAINING REQUIREMENT

It is suggested that training should be given for the production staff during the period of erection and commissioning. The machinery suppliers are supposed to train the relevant technical personnel for the period of about two months. The training fee is estimated at Birr 20,000.

## VII. FINANCIAL ANALYSIS

The financial analysis of orange squash 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	4 years
Bank interest	10.5%
Discounted cash flow	10.5%
Land value	Based on estimated lease rate of the region
Repair and maintenance	1% of Plant machinery and equipment
Accounts receivable	30 days
Raw material (local)	30 days
Raw materials (import)	90 days
work in progress	5 days
Finished products	30 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 9.99 million, out of which about 66% will be required in foreign currency. Details are indicated in Table 7.1.

**Table 7.1**  
**INITIAL INVESTMENT COST ('000 BIRR)**

No.	Cost Items	Foreign Currency	Local Currency	Total
1	Land	-	85.50	85.50
2	Building and Civil Work	-	750	750
3	Plant Machinery and Equipment	6,513.50	1,088.60	7,602.10
4	Office Furniture and Equipment	-	50.00	50.00
5	Vehicle	-	200.00	200.00
6	Pre-production Expenditure*	-	792.40	792.40
	<b>Total Investment Cost</b>	<b>6,513.50</b>	<b>2,966.50</b>	<b>9,480.00</b>
7	Working Capital	67.55	452.05	519.60
	<b>Total</b>	<b>6,581.05</b>	<b>3,418.55</b>	<b>9,999.60</b>

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\* *Pre-production expenditure include interest during construction (Birr 692,400), training (Birr 20,000) and cost 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 4.4 million (see Table 7.2). The material and utility cost accounts for 61 per cent while repair and maintenance take 1.71 per cent of the production cost.

**Table 7.2**  
**ANNUAL PRODUCTION COST**  
**(‘000 BIRR)**

Items	Year			
	3	4	7	10
Raw Material and Inputs	2,026.00	2,279.20	2,532.50	2,532.50
Labour Direct	59.50	67.00	74.40	74.40
Utilities	161.60	181.80	202.00	20.200
Energy and power	-	-		
Spare parts	-	-		
Maintenance and repair	60.80	68.40	76.00	76.00
Factory overheads	22.90	25.70	28.60	28.60
Administration Overheads	58.60	65.90	73.20	73.20
<b>Total operating costs</b>	<b>2,389.40</b>	<b>2,688.00</b>	<b>2,986.70</b>	<b>2,986.70</b>
Depreciation	863.60	863.60	863.60	803.60
Cost of Finance	695.40	680.10	605.90	505.20
<b>Total Production Cost</b>	<b>3,948.30</b>	<b>4,231.70</b>	<b>4,456.30</b>	<b>4,295.50</b>

## 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.

$$\text{BE} = \frac{\text{Fixed Cost}}{\text{Sales-Variable Cost}} = 48\%$$

## **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 8 years time.

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

Based on the cashflow statement, the calculated IRR of the project is 15% and the net present value at 10.5% discount rate is Birr 2.24 million.

## **D. ECONOMIC BENEFITS**

The project can create employment opportunities for 23 persons. In addition to supply of the domestic needs, the project will generate Birr 3.6 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.