

**PROFILE ON THE PRODUCTION OF DEFATTED  
SOYA BEAN FLOUR (DSF)**

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## **I. SUMMARY**

This profile envisages the establishment of a plant for the production of defatted soya bean flour (DSF) with a capacity of 7,400 tons per annum. DSF is very rich in protein and hence, it is an important food item for weaning pre-school children, pre-acquaint, lactating mothers and school children to supplement nutritional deficiencies.

The country`s requirement of DSF is largely met through import. The present (2012) local and export demand for DSF is estimated at 10,074 tons. The local and export demand for the product is projected to reach 14,453 tons and 16,356 tons in the year 2018 and year 2022, respectively.

The principal raw material required is food grade soy bean which is available locally.

The total investment cost of the project including working capital is estimated at Birr 60.62 million. From the total investment cost the highest share (Birr 44.69 million or 73.72%) is accounted by initial working capital followed by fixed investment cost (Birr 11.33 million or 18.69%) and pre operation cost (Birr 4.60 million or 7.58%). From the total investment cost Birr 5.28 million or 8.72% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 31.77% and a net present value (NPV) of Birr 75.35 million, discounted at 10%.

The project can create employment for 43 persons. The establishment of such factory will have a foreign exchange saving and earning effect to the country by substituting the current imports and exporting its products to the international market. The project will also create backward linkage with the agricultural sector and salt producers and forward linkage with the food processing sub sector and also generates income for the Government in terms of tax revenue and payroll tax.

## **II. DESCRIPTIONS OF THE RODUCTS**

Soya bean is rich source of protein which can also be in the form of defatted soya bean flour (DSF), protein concentrates, and protein isolates. Its nutritional importance persuades to make available a good grade soya bean proteins, protein concentrates and protein isolates for weaning pre-school children, pre-acquaint, lactating mothers and school children to supplement nutritional deficiencies.

Soya protein is also consumed by the general public in bakery products, pastas and biscuits. Therefore, incorporation of soya flour in wheat flour that is to be used in bread, pasta and biscuits preparation increases the protein content and as the result improves the nutritional properties of foods.

To get a well mixed such food requires the supply of defatted soya flour (DSF) that can enrich baking flour with 13% protein content. The minimum standardized mix is also recommended to bet 3% DSF with wheat flour.

For now, this preparation concentrates on defatted soya flour (DSF) for the purpose of a wide perspective of nutritional supplement of soya flour proteins through mixing with foods for babies, school children, lactating mothers and the general public as well.

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

#### **A. MARKET STUDY**

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

Soya protein is consumed by the general public in bakery products, pastas and biscuits. Incorporation of soya flour in wheat flour that is to be used in bread, pasta and biscuits preparation increases the protein content and as the result improves the nutritional properties of foods. The minimum standardized mix is also recommended to bet 3% DSF with wheat flour.

At present, Faffa Foods S.C and some others have been producing babies' food of soya flour mix. In order to estimate the demand for DSF, the production of wheat and other flours has been utilized. Accordingly, the domestic production of wheat and other flours is shown in Table 3.1.

**Table 3.1**  
**SUPPLY OF WHEAT AND OTHER FLOURS (TONS)**

<b>Year</b>	<b>Wheat Flour</b>	<b>Other Flours</b>	<b>Total</b>
2002	142,541	891	143,432
2003	136,669	881	137,550
2004	155,692	293	155,985
2005	148,786	-	148,786
2006	173,787	204	173,991
2007	140,128	7,916	148,044
2008	152,103	5,840	157,943
2009	261,409	9,337	270,746
2010	314,053	13,644	327,697
2011	314,053 <sup>1</sup>	13,644*	327,697

**Source:** - *CSA, Report on Large and Medium Scale Manufacturing and Electricity Industries Surveys (2007 and 2011).*

The total domestic production of flour during the years 2002-2008 ranged from the lowest 137,550 tons in 2003 to the highest 173,991 ton in 2006, with a mean figure of 151,949 tons. A huge increase in the domestic production of flour is observed during the recent three years. The production of 270,746 tons by the year 2009 has shown an increase of 77.8% as compared to the average production in the previous seven years. Similarly, the production in 2010 and 2011 has reached a level of 327,697 tons.

The data from Ethiopian Revenue and Custom Authority (ERCA) revealed that the country has been importing and exporting soya flour sporadically. The data on imports and exports of soya flour is depicted in Table 3.2.

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<sup>1</sup> *The production in year 2011 is assumed to be same with 2010.*

**Table 3.2**  
**IMPORT AND EXPORT OF SOYA FLOUR (TONS)**

<b>Year</b>	<b>Import</b>	<b>Export</b>
2002	-	-
2003	1,318.37	-
2004	964.74	1,728.01
2005	-	-
2006	-	-
2007	0.10	259.79
2008	366.51	4,160.40
2009	2.22	-
2010	0.72	-
2011	607.52	-

**Source:** - *Ethiopian Revenue & Customs Authority.*

As it could be observed from Table 3.2, import of soya flour was highly erratic during the past ten years. Imported quantity in the six years of the data set was either nil or negligible. In the remaining four years i.e. 2003, 2004, 2008, and 2011 the imported quantity ranged from the lowest 336.5 tons (2008) to the highest 1,318.4 tons in the year 2003.

In the past ten years, export was made only in the three years of 2004, 2007 and 2008. In the remaining seven years there was no export. The export figure indicated intermittent import and it was 1,728 tons in 2004 and then nil from 2005 to 2006. It then increased to 259.4 tons in 2007 and a sharp increase registered in 2008, which was 4,160.4 tons. After that, no export figure was registered from 2009 to 2011.

In estimating the year 2012 domestic effective demand and export of soya flour, the following assumptions are applied.

- Current production is assumed to remain same as year 2011, which is 327,697 tons;
- The import is assumed to be the average of the recent four years (2008-2011), which is estimated at 244 tons;

- The requirement for DSF to mix with wheat and other flour has been taken 3% as a standard mix with the food to be delivered; and
- Export is assumed to be the average of 2007-2008; which is calculated at 2,210 tons.

Based on the above indicated assumptions, the current demand (2012) for domestic consumption and export is estimated at 7,864 tons and 2,210.1ton, respectively.

## **2. Demand Projection**

Following the requirement for protein supplement food for different end-users, the domestic demand for DSF is assumed to increase by 5%. With regard to export, the country's intent in advancing the industrial sector has been considered, and; therefore, a conservative estimate of 10% growth assumed in the future. Having taken the above indicated DSF requirement and exports, the domestic and export demands are projected in Table 3.3.

**Table 3.3**  
**DEMAND PROJECTION (TONS)**

<b>Year</b>	<b>Domestic Demand</b>	<b>Export Demand</b>	<b>Total Demand</b>
2013	8,257	2,431	10,688
2014	8,670	2,674	11,344
2015	9,103	2,942	12,045
2016	9,559	3,236	12,795
2017	10,037	3,559	13,596
2018	10,538	3,915	14,453
2019	11,065	4,306	15,371
2020	11,619	4,737	16,356
2021	12,200	5,211	17,411
2022	12,810	5,732	18,542

The total demand (domestic plus export) for DSF in will increase from 10,688 tons in the year 2013 to 14,453 tons and 16,356 tons in the year 2018 and year 2022, respectively.

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

Based on the current CIF price of the product and allowing 30% for import duty and other import related expenses, the proposed factory-gate price is Birr 23.78 per kg or 33,780 per ton.

The customers for the DSF product will be flour mills that supply a final product with sufficient proteins content. Hence, direct distribution to flour mills without involving other intermediaries is recommended.

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

### **1. Plant Capacity**

On the basis of the above demand projection and considering the minimum economic scale of production, the envisaged project will have a production capacity of 7,400 tons of soya bean products per annum. This production capacity is selected on the basis of single shift of 8 hours per day and 300 working days per annum.

### **2. Production Program**

With an assumption that at the initial stage of the production period the plant will require enough time to penetrate the market and to develop technical skill, it will start production at 70% of its installed capacity which will grow to 90% in the second year. Full production capacity will be attained in the third year and onwards. Details of annual production program are shown in Table 3.4.

**Table 3.4**  
**ANNUAL PRODUCTION PROGRAM**



Sr. No.	Description	Unit of Measure	Production Year		
			1st	2nd	3rd --10
1	Soya bean flour, protein concentrates, protein isolates	ton	5,180	6,660	7,400
2	Capacity utilization rate	%	70	90	100

## IV. MATERIAL AND INPUTS

### A. RAW MATERIALS

The major and principal raw material required for production of soya bean products is food grade soy bean. In addition, common salt is needed for the production of soya bean products. All raw materials are available locally. The annual requirement for raw materials at full capacity production of the envisaged plant and the estimated costs are given in Table 4.1.

**Table 4.1**  
**ANNUAL RAW MATERIALS REQUIREMENT AND COST**

Sr. No.	Description	Unit of Measure	Required Qty	Unit Price, Birr/Unit	Cost ( '000 Birr)		
					F. C.	L. C.	Total
1	Food grade soya bean	ton	9,600	14,000.0		134,400	134,400
2	Common salt	kg	5,448	2.5		14	14
<b>Total</b>						<b>134,414</b>	<b>134,414</b>

The auxiliary materials required for the envisaged plant comprise packing materials like polyethylene bags of 25 kg and 50 kg. The annual requirement for auxiliary materials at full capacity production of the plant and the estimated costs are given in Table 4.2.

**Table 4.2**

## ANNUAL AUXILIARY MATERIALS REQUIREMENT AND COST

Sr. No.	Description	Unit of Measure	Required Qty.	Unit Price,	Cost,('000 Birr)		
					F.C.	L.C.	Total
1	Polypropylene bag,50 kg	pc	693,750	8.5	4,717.50	1,179.38	5,896.88
2	Polypropylene bag,25 kg	pc	1,387,500	5.0	5,550.00	1,387.50	6,937.50
<b>Total</b>					<b>10,267.50</b>	<b>2,566.88</b>	<b>12,834.38</b>

### B. UTILITIES

The major utilities required for the envisaged project include electric power and water. The annual requirement for utilities at full capacity production of the plant and the estimated costs are shown in Table 4.3.

**Table 4.3**

### ANNUAL UTILITIES REQUIREMENT AND COSTS

Sr. No.	Description	Unit of Measure	Required Qty.	Unit Price, Birr/Unit	Cost, ('000 Birr)		
					F.C.	L.C.	Total
1	Electric power	kWh	2,220,000	0.5778		1,282.71	1,282.71
2	Water	m <sup>3</sup>	1,850	10.00		18.50	18.50
3	Furnace oil	lt	296,000	14.34		4,244.64	4,244.64
<b>Total</b>						<b>5,545.85</b>	<b>5,545.85</b>

## V. TECHNOLOGY AND ENGINEERING

### A. TECHNOLOGY

#### 1. Production Process

The production of defatted soya flour (DSF) and soya protein involves beans storage, drying and dehulling, separation, preconditioning, drying and cooling, milling, and packing. Each operation of the production process is described briefly as follows.

**Bean storage:** Soya beans dried immediately after harvesting should be stored removing the soil, stones, leaves and broken as well as split beans. Moisture content should not exceed 12% and the bean will be stored at a temperature of 30<sup>0</sup> C.

**Drying and dehulling:** While processing whole soya bean flour, soya beans should be well dried to make the hulls brittle. After being broken into 8 – 10 parts in the roller mill, the brittle hulls will be separated from the cotyledons.

**Separation of hulls from the cotyledons:** The light hulls are separated using ventilation and/or aspiration. The hulls are expelled through a tube together with the air, leaving the heavier cotyledons to fall.

**Pre - conditioning:** The cotyledons are pre – humidified using water and steam until their moisture content reaches 25 – 30% in a horizontal cylinder with agitation paddles in a helical distribution on an axle. The slid parts are agitated while water and steam are injected and then absorbed.

**Milling (Crushing):-** In order to avoid the flat plastering problems, the whole soya bean flour is milled using an alpine type of pin mill

**Packing and dispatching:** The final products are packed in polyethylene bags of 25 kg and 50 kg and dispatched for sale.

## **2. Environmental Impact**

The plant does not have any pollutant emitted from the production process. Thus the envisaged project is environment friendly.

## **B. ENGINEERING**

### **1. Machinery and Equipment**

The list of plant machinery and equipment required for the envisaged project and the estimated costs are indicated in Table 5.1. The total cost of machinery is estimated at Birr 6,609,210; of which Birr 5,287,370 is required in foreign currency.

**Table 5.1**

**MACHINERY AND EQUIPMENT AND ESTIMATED COST**

<b>Sr. No.</b>	<b>Description</b>	<b>Unit of Measure</b>	<b>Required Qty.</b>	<b>Cost, ('000 Birr)</b>		
				<b>F.C.</b>	<b>L.C.</b>	<b>Total</b>
1	Soya bean storage tank	set	1.00	378.00	94.50	472.50
2	Dehuller	set	1.00	1,612.80	403.20	2,016.00
3	Grinder	set	1.00	687.40	171.85	859.25
4	Drier - cooler	set	1.00	429.80	107.45	537.25
5	Pin mill	set	1.00	623.00	155.75	778.75
6	Packing machine	set	1.00	215.60	53.90	269.50
7	Vibratory cleaner	set	1.00	279.42	69.85	349.27
8	Crusher	set	1.00	279.42	69.85	349.27
14	Submersible pump	set	1.00	199.58	49.90	249.48
15	Boiler	set	1.00	239.50	59.88	299.38
16	Water Reservoir	set	1.00	199.58	49.90	249.48
17	Water treatment laboratory	set	1.00	143.27	35.82	179.08
<b>Total</b>				<b>5,287.37</b>	<b>1,321.84</b>	<b>6,609.21</b>

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

The total area of land required for the envisaged project is 1,800 m<sup>2</sup>; out of which 750 m<sup>2</sup> is built – up area. The construction cost of buildings and civil works at a rate of Birr 4,500 per square meter is estimated at Birr 3.375 million.

According to the Federal Legislation on the Lease Holding of Urban Land (Proclamation No 721/2004) in principle, urban land permit by lease is on auction or negotiation basis, however, the time and condition of applying the proclamation shall be determined by the concerned regional or city government depending on the level of development.

The legislation has also set the maximum on lease period and the payment of lease prices. The lease period ranges from 99 years for education, cultural research health, sport, NGO , religious and residential area to 80 years for industry and 70 years for trade while the lease payment period ranges from 10 years to 60 years based on the towns grade and type of investment.

Moreover, advance payment of lease based on the type of investment ranges from 5% to 10%. The lease price is payable after the grace period annually. For those that pay the entire amount of the lease will receive 0.5% discount from the total lease value and those that pay in installments will be charged interest based on the prevailing interest rate of banks. Moreover, based on the type of investment, two to seven years grace period shall also be provided.

However, the Federal Legislation on the Lease Holding of Urban Land apart from setting the maximum has conferred on regional and city governments the power to issue regulations on the exact terms based on the development level of each region.

In Addis Ababa, the City's Land Administration and Development Authority is directly responsible in dealing with matters concerning land. However, regarding the manufacturing sector, industrial zone preparation is one of the strategic intervention measures adopted by the City Administration for the promotion of the sector and all manufacturing projects are assumed to be located in the developed industrial zones.

Regarding land allocation of industrial zones if the land requirement of the project is below 5,000 m<sup>2</sup>, the land lease request is evaluated and decided upon by the Industrial Zone Development and Coordination Committee of the City's Investment Authority. However, if the land request is above 5,000 m<sup>2</sup> the request is evaluated by the City's Investment Authority and passed with recommendation to the Land Development and Administration Authority for decision, while the lease price is the same for both cases.

Moreover, the Addis Ababa City Administration has recently adopted a new land lease floor price for plots in the city. The new prices will be used as a benchmark for plots that are going to be auctioned by the city government or transferred under the new "Urban Lands Lease Holding Proclamation."

The new regulation classified the city into three zones. The first Zone is Central Market District Zone, which is classified in five levels and the floor land lease price ranges from Birr 1,686 to Birr 894 per m<sup>2</sup>. The rate for Central Market District Zone will be applicable in most areas of the city that are considered to be main business areas that entertain high level of business activities. The second zone, Transitional Zone, will also have five levels and the floor land lease price ranges from Birr 1,035 to Birr 555 per m<sup>2</sup>. This zone includes places that are surrounding the city and are occupied by mainly residential units and industries.

The last and the third zone, Expansion Zone, is classified into four levels and covers areas that are considered to be in the outskirts of the city, where the city is expected to expand in the future. The floor land lease price in the Expansion Zone ranges from Birr 355 to Birr 191 per m<sup>2</sup> (see Table 5.2).

**Table 5.2**  
**NEW LAND LEASE FLOOR PRICE FOR PLOTS IN ADDIS ABABA**

Zone	Level	Floor Price/m <sup>2</sup>
Central Market District	1 <sup>st</sup>	1686
	2 <sup>nd</sup>	1535
	3 <sup>rd</sup>	1323
	4 <sup>th</sup>	1085
	5 <sup>th</sup>	894
Transitional zone	1 <sup>st</sup>	1035
	2 <sup>nd</sup>	935
	3 <sup>rd</sup>	809
	4 <sup>th</sup>	685
	5 <sup>th</sup>	555
Expansion zone	1 <sup>st</sup>	355
	2 <sup>nd</sup>	299
	3 <sup>rd</sup>	217
	4 <sup>th</sup>	191

Accordingly, in order to estimate the land lease cost of the project profiles it is assumed that all new manufacturing projects will be located in industrial zones located in expansion zones. Therefore, for the profile a land lease rate of Birr 266 per m<sup>2</sup> which is equivalent to the average floor price of plots located in expansion zone is adopted.

On the other hand, some of the investment incentives arranged by the Addis Ababa City Administration on lease payment for industrial projects are granting longer grace period and

extending the lease payment period. The criteria are creation of job opportunity, foreign exchange saving, investment capital and land utilization tendency etc. Accordingly, Table 5.3 shows incentives for lease payment.

**Table 5.3**

**INCENTIVES FOR LEASE PAYMENT OF INDUSTRIAL PROJECTS**

<b>Scored Point</b>	<b>Grace Period</b>	<b>Payment Completion Period</b>	<b>Down Payment</b>
Above 75%	5 Years	30 Years	10%
From 50 - 75%	5 Years	28 Years	10%
From 25 - 49%	4 Years	25 Years	10%

For the purpose of this project profile, the average i.e. five years grace period, 28 years payment completion period and 10% down payment is used. The land lease period for industry is 60 years.

Accordingly, the total land lease cost at a rate of Birr 266 per m<sup>2</sup> is estimated at Birr 478,800 of which 10% or Birr 47,880 will be paid in advance. The remaining Birr 430,920 will be paid in equal installments within 28 years i.e. Birr 15,390 annually.

**NB:** The land issue in the above statement narrates or shows only Addis Ababa's city administration land lease price, policy and regulations.

Accordingly the project profile prepared based on the land lease price of Addis Ababa region.

To know land lease price, policy and regulation of other regional state of the country updated information is available at Ethiopian Investment Agency's website [www.eia.gov.et](http://www.eia.gov.et) on the factor cost.

## VI. HUMAN RESOURCE AND TRAINING REQUIREMENT

### A. HUMAN RESOURCE REQUIREMENT

The total human resource required for the envisaged project is 43 persons. Details of the human resource required and the estimated annual labor cost, including fringe benefits, are indicated in Table 6.1.

**Table 6.1**

#### **HUMAN RESOURCE REQUIREMENT AND LABOR COST**

Sr. No.	Job Title	Required No. of Persons	Salary, Birr	
			Monthly	Annual
1	Plant manager	1	5,000	60,000
2	Secretary	1	850	10,200
3	Personnel	1	850	10,200
4	Accountant	2	1,700	20,400
5	Cashier	1	850	10,200
6	Salesman	2	1,800	21,600
7	Purchaser	1	800	9,600
8	Store keeper	2	1,700	20,400
9	Production supervisor	1	2,000	24,000
10	Quality	2	3,600	43,200
11	Shift leader	1	1,200	14,400
12	Mechanic	2	1,800	21,600
13	Electrician	1	900	10,800
14	Operator	6	3,000	36,000
15	Laborer	14	5,600	67,200
16	Driver	2	1,600	19,200
17	Guard	3	1,200	14,400
<b>Sub - total</b>		<b>43</b>	<b>34,450</b>	<b>413,400</b>
<b>Employees benefit, 20% of basic salary</b>			<b>6,890</b>	<b>82,680</b>
<b>Total</b>			<b>41,340</b>	<b>496,080</b>

### B. TRAINING REQUIREMENT

The production supervisor, two quality controllers, a shift leader and 6 operators should be given a two weeks on – the – job training on the production technology, quality control, operation and



maintenance of machinery and equipment by advanced technician of the equipment supplier during plant erection and commissioning. The total cost of training is estimated at Birr 165,000.

## **VII. FINANCIAL ANALYSIS**

The financial analysis of the soya bean flour project is based on the data presented in the previous chapters and the following assumptions:-

Construction period	1 year
Source of finance	30 % equity
	70 % loan
Tax holidays	5 years
Bank interest	10%
Discount cash flow	10%
Accounts receivable	30 days
Raw material local	30 days
Work in progress	1 day
Finished products	30 days
Cash in hand	5 days
Accounts payable	30 days
Repair and maintenance	5% of machinery cost

### **A. TOTAL INITIAL INVESTMENT COST**

The total investment cost of the project including working capital is estimated at Birr 60.62 million (see Table 7.1). From the total investment cost the highest share (Birr 44.69 million or 73.72%) is accounted by initial working capital followed by fixed investment cost (Birr 11.33 million or 18.69%) and pre operation cost (Birr 4.60 million or 7.58%). From the total investment cost Birr 5.28 million or 8.72% is required in foreign currency.

**Table 7.1**

**INITIAL INVESTMENT COST ( '000 Birr)**

Sr. No	Cost Items	Local Cost	Foreign Cost	Total Cost	% Share
<b>1</b>	<b>Fixed investment</b>				
1.1	Land Lease	47.88		47.88	0.08
1.2	Building and civil work	3,375.00		3,375.00	5.57
1.3	Machinery and equipment	1,321.84	5,287.37	6,609.21	10.90
1.4	Vehicles	900.00		900.00	1.48
1.5	Office furniture and equipment	400.00		400.00	0.66
	<b>Sub total</b>	<b>6,044.72</b>	<b>5,287.37</b>	<b>11,332.09</b>	<b>18.69</b>
<b>2</b>	<b>Pre operating cost *</b>				
2.1	Pre operating cost	630.46		630.46	1.04
2.2	Interest during construction	3,965.77		3,965.77	6.54
	<b>Sub total</b>	<b>4,596.23</b>		<b>4,596.23</b>	<b>7.58</b>
<b>3</b>	<b>Working capital **</b>	<b>44,691.25</b>		<b>44,691.25</b>	<b>73.72</b>
	<b>Grand Total</b>	<b>55,332.19</b>	<b>5,287.37</b>	<b>60,619.56</b>	<b>100</b>

\* *N.B Pre operating cost include project implementation cost such as installation, startup, commissioning, project engineering, project management etc and capitalized interest during construction.*

\*\* *The total working capital required at full capacity operation is Birr 49.73 million. However, only the initial working capital of Birr 44.69 million during the first year of production is assumed to be funded through external sources. During the remaining years the working capital requirement will be financed by funds generated internally (for detail working capital requirement see Appendix 7.A.1).*

## **B. PRODUCTION COST**

The annual production cost at full operation capacity is estimated at Birr 160.78 million (see Table 7.2). The cost of raw material account for 91.58% of the production cost. The other major

components of the production cost are utilities, financial cost and depreciation, which account for 3.45%, 2.71% and 1.12%, respectively. The remaining 4.59% is the share of labor, repair and maintenance, labor overhead and administration cost. For detail production cost see Appendix 7.A.2.

**Table 7.2**

**ANNUAL PRODUCTION COST AT FULL CAPACITY (year two)**

<b>Items</b>	<b>Cost (in 000 Birr)</b>	<b>%</b>
Raw Material and Inputs	147,248.00	91.58
Utilities	5,545.86	3.45
Maintenance and repair	330.46	0.21
Labour direct	413.40	0.26
Labour overheads	82.68	0.05
Administration Costs	250.00	0.16
Land lease cost	-	-
Cost of marketing and distribution	750.00	0.47
<b>Total Operating Costs</b>	<b>154,620.40</b>	<b>96.17</b>
Depreciation	1,802.93	1.12
Cost of Finance	4,362.34	2.71
<b>Total Production Cost</b>	<b>160,785.68</b>	<b>100</b>

**C. FINANCIAL EVALUATION**

**1. Profitability**

Based on the projected profit and loss statement, the project will generate a profit throughout its operation life. Annual net profit after tax ranges from Birr 13.29 million to Birr 14.81 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 168.58 million. For profit and loss statement and cash flow projection see Appendix 7.A.3 and 7.A.4, respectively.

## **2. Ratios**

In financial analysis financial ratios and efficiency ratios are used as an index or yardstick for evaluating the financial position of a firm. It is also an indicator for the strength and weakness of the firm or a project. Using the year-end balance sheet figures and other relevant data, the most important ratios such as return on sales which is computed by dividing net income by revenue, return on assets (operating income divided by assets), return on equity (net profit divided by equity) and return on total investment (net profit plus interest divided by total investment) has been carried out over the period of the project life and all the results are found to be satisfactory.

## **3. Break-even Analysis**

The break-even analysis establishes a relationship between operation costs and revenues. It indicates the level at which costs and revenue are in equilibrium. To this end, the break-even point for capacity utilization and sales value estimated by using income statement projection are computed as followed.

$$\text{Break- Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 73,908,000$$

$$\text{Break- Even Capacity utilization} = \frac{\text{Break -even Sales Value}}{\text{Sales revenue}} \times 100 = 11.55\%$$

## **4. Pay-back Period**

The pay -back period, also called pay – off period is defined as the period required for recovering the original investment outlay through the accumulated net cash flows earned by the project.

Accordingly, based on the projected cash flow it is estimated that the project's initial investment will be fully recovered within 4 years.

## **5. Internal Rate of Return**

The internal rate of return (IRR) is the annualized effective compounded return rate that can be earned on the invested capital, i.e., the yield on the investment. Put another way, the internal rate of return for an investment is the discount rate that makes the net present value of the investment's income stream total to zero. It is an indicator of the efficiency or quality of an investment. A project is a good investment proposition if its IRR is greater than the rate of return that could be earned by alternate investments or putting the money in a bank account. Accordingly, the IRR of this project is computed to be 31.77% indicating the viability of the project.

## **6. Net Present Value**

Net present value (NPV) is defined as the total present (discounted) value of a time series of cash flows. NPV aggregates cash flows that occur during different periods of time during the life of a project in to a common measuring unit i.e. present value. It is a standard method for using the time value of money to appraise long-term projects. NPV is an indicator of how much value an investment or project adds to the capital invested. In principle, a project is accepted if the NPV is non-negative.

Accordingly, the net present value of the project at 10% discount rate is found to be Birr 75.35 million which is acceptable. For detail discounted cash flow see Appendix 7.A.5.

## **D. ECONOMIC AND SOCIAL BENEFITS**

The project can create employment for 43 persons. The project will generate Birr 30.11 million in terms of tax revenue. The establishment of such factory will have a foreign exchange saving and earning effect to the country by substituting the current imports and exporting its products to the international market. The project will also create backward linkage with the agricultural

sector and salt producers and forward linkage with the food processing sub sector and also generates income for the Government in terms of payroll tax.

## **Appendix 7.A**

### **FINANCIAL ANALYSES SUPPORTING TABLES**



**Appendix 7.A.1**  
**NET WORKING CAPITAL ( in 000 Birr)**

<b>Items</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Year 7</b>	<b>Year 8</b>	<b>Year 9</b>	<b>Year 10</b>	<b>Year 11</b>
Total inventory	33,130.80	36,812.00	36,812.00	36,812.00	36,812.00	36,812.00	36,812.00	36,812.00	36,812.00	36,812.00
Accounts receivable	11,602.78	12,885.03	12,885.03	12,885.03	12,886.32	12,886.32	12,886.32	12,886.32	12,886.32	12,886.32
Cash-in-hand	13.46	14.95	14.95	14.95	15.17	15.17	15.17	15.17	15.17	15.17
<b>CURRENT ASSETS</b>	<b>44,747.04</b>	<b>49,711.99</b>	<b>49,711.99</b>	<b>49,711.99</b>	<b>49,713.48</b>	<b>49,713.48</b>	<b>49,713.48</b>	<b>49,713.48</b>	<b>49,713.48</b>	<b>49,713.48</b>
Accounts payable	55.79	61.99	61.99	61.99	61.99	61.99	61.99	61.99	61.99	61.99
<b>CURRENT LIABILITIES</b>	<b>55.79</b>	<b>61.99</b>	<b>61.99</b>	<b>61.99</b>	<b>61.99</b>	<b>61.99</b>	<b>61.99</b>	<b>61.99</b>	<b>61.99</b>	<b>61.99</b>
<b>TOTAL WORKING CAPITAL</b>	<b>44,691.25</b>	<b>49,650.00</b>	<b>49,650.00</b>	<b>49,650.00</b>	<b>49,651.49</b>	<b>49,651.49</b>	<b>49,651.49</b>	<b>49,651.49</b>	<b>49,651.49</b>	<b>49,651.49</b>



**Appendix 7.A.2**  
**PRODUCTION COST ( in 000 Birr)**

<b>Item</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Year 7</b>	<b>Year 8</b>	<b>Year 9</b>	<b>Year 10</b>	<b>Year 11</b>
Raw Material and Inputs	132,523	147,248	147,248	147,248	147,248	147,248	147,248	147,248	147,248	147,248
Utilities	4,991	5,546	5,546	5,546	5,546	5,546	5,546	5,546	5,546	5,546
Maintenance and repair	297	330	330	330	330	330	330	330	330	330
Labour direct	372	413	413	413	413	413	413	413	413	413
Labour overheads	74	83	83	83	83	83	83	83	83	83
Administration Costs	225	250	250	250	250	250	250	250	250	250
Land lease cost	0	0	0	0	15	15	15	15	15	15
Cost of marketing and distribution	750	750	750	750	750	750	750	750	750	750
<b>Total Operating Costs</b>	<b>139,233</b>	<b>154,620</b>	<b>154,620</b>	<b>154,620</b>	<b>154,636</b>	<b>154,636</b>	<b>154,636</b>	<b>154,636</b>	<b>154,636</b>	<b>154,636</b>
Depreciation	1,803	1,803	1,803	1,803	1,803	175	175	175	175	175
Cost of Finance	0	4,362	3,817	3,272	2,726	2,181	1,636	1,091	545	0
<b>Total Production Cost</b>	<b>141,036</b>	<b>160,786</b>	<b>160,240</b>	<b>159,695</b>	<b>159,165</b>	<b>156,992</b>	<b>156,447</b>	<b>155,901</b>	<b>155,356</b>	<b>154,811</b>

**Appendix 7.A.3**  
**INCOME STATEMENT ( in 000 Birr)**

Item	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Sales revenue	158,37 5	175,97 2	175,97 2	175,97 2	175,97 2	175,97 2	175,97 2	175,97 2	175,97 2	175,97 2
Less variable costs	138,48 3	153,87 0	153,87 0	153,87 0	153,87 0	153,87 0	153,87 0	153,87 0	153,87 0	153,87 0
<b>VARIABLE MARGIN</b>	<b>19,892</b>	<b>22,102</b>	<b>22,102</b>	<b>22,102</b>	<b>22,102</b>	<b>22,102</b>	<b>22,102</b>	<b>22,102</b>	<b>22,102</b>	<b>22,102</b>
in % of sales revenue	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56
Less fixed costs	2,553	2,553	2,553	2,553	2,568	940	940	940	940	940
<b>OPERATIONAL MARGIN</b>	<b>17,339</b>	<b>19,549</b>	<b>19,549</b>	<b>19,549</b>	<b>19,533</b>	<b>21,161</b>	<b>21,161</b>	<b>21,161</b>	<b>21,161</b>	<b>21,161</b>
in % of sales revenue	10.95	11.11	11.11	11.11	11.10	12.03	12.03	12.03	12.03	12.03
Financial costs		4,362	3,817	3,272	2,726	2,181	1,636	1,091	545	0
<b>GROSS PROFIT</b>	<b>17,339</b>	<b>15,186</b>	<b>15,732</b>	<b>16,277</b>	<b>16,807</b>	<b>18,980</b>	<b>19,525</b>	<b>20,071</b>	<b>20,616</b>	<b>21,161</b>
in % of sales revenue	10.95	8.63	8.94	9.25	9.55	10.79	11.10	11.41	11.72	12.03
Income (corporate) tax	0	0	0	0	0	5,694	5,858	6,021	6,185	6,348
<b>NET PROFIT</b>	<b>17,339</b>	<b>15,186</b>	<b>15,732</b>	<b>16,277</b>	<b>16,807</b>	<b>13,286</b>	<b>13,668</b>	<b>14,049</b>	<b>14,431</b>	<b>14,813</b>
in % of sales revenue	10.95	8.63	8.94	9.25	9.55	7.55	7.77	7.98	8.20	8.42

**Appendix 7.A.4**  
**CASH FLOW FOR FINANCIAL MANAGEMENT ( in 000 Birr)**

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Scrap
<b>TOTAL CASH INFLOW</b>	<b>11,963</b>	<b>207,088</b>	<b>175,978</b>	<b>175,972</b>	<b>175,972</b>	<b>175,972</b>	<b>175,972</b>	<b>175,972</b>	<b>175,972</b>	<b>175,972</b>	<b>175,972</b>	<b>55,690</b>
Inflow funds	11,963	48,713	6	0	0	0	0	0	0	0	0	0
Inflow operation	0	158,375	175,972	175,972	175,972	175,972	175,972	175,972	175,972	175,972	175,972	0
Other income	0	0	0	0	0	0	0	0	0	0	0	55,690
<b>TOTAL CASH OUTFLOW</b>	<b>11,963</b>	<b>187,946</b>	<b>169,401</b>	<b>163,890</b>	<b>163,345</b>	<b>162,817</b>	<b>167,964</b>	<b>167,582</b>	<b>167,200</b>	<b>166,819</b>	<b>160,984</b>	<b>0</b>
Increase in fixed assets	11,963	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	44,747	4,965	0	0	1	0	0	0	0	0	0
Operating costs	0	138,483	153,870	153,870	153,870	153,886	153,886	153,886	153,886	153,886	153,886	0
Marketing and Distribution cost	0	750	750	750	750	750	750	750	750	750	750	0
Income tax	0	0	0	0	0	0	5,694	5,858	6,021	6,185	6,348	0
Financial costs	0	3,966	4,362	3,817	3,272	2,726	2,181	1,636	1,091	545	0	0
Loan repayment	0	0	5,453	5,453	5,453	5,453	5,453	5,453	5,453	5,453	0	0
<b>SURPLUS (DEFICIT)</b>	<b>0</b>	<b>19,142</b>	<b>6,578</b>	<b>12,082</b>	<b>12,627</b>	<b>13,155</b>	<b>8,008</b>	<b>8,390</b>	<b>8,772</b>	<b>9,153</b>	<b>14,988</b>	<b>55,690</b>
<b>CUMULATIVE CASH BALANCE</b>	<b>0</b>	<b>19,142</b>	<b>25,719</b>	<b>37,801</b>	<b>50,428</b>	<b>63,583</b>	<b>71,591</b>	<b>79,981</b>	<b>88,752</b>	<b>97,906</b>	<b>112,894</b>	<b>168,584</b>

**Appendix 7.A.5**  
**DISCOUNTED CASH FLOW ( in 000 Birr)**

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Scrap
<b>TOTAL CASH INFLOW</b>	<b>0</b>	<b>158,375</b>	<b>175,972</b>	<b>175,972</b>	<b>175,972</b>	<b>175,972</b>	<b>175,972</b>	<b>175,972</b>	<b>175,972</b>	<b>175,972</b>	<b>175,972</b>	<b>55,690</b>
Inflow operation	0	158,375	175,972	175,972	175,972	175,972	175,972	175,972	175,972	175,972	175,972	0
Other income	0	0	0	0	0	0	0	0	0	0	0	55,690
<b>TOTAL CASH OUTFLOW</b>	<b>56,654</b>	<b>144,192</b>	<b>154,620</b>	<b>154,620</b>	<b>154,622</b>	<b>154,636</b>	<b>160,330</b>	<b>160,493</b>	<b>160,657</b>	<b>160,821</b>	<b>160,984</b>	<b>0</b>
Increase in fixed assets	11,963	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	44,691	4,959	0	0	1	0	0	0	0	0	0	0
Operating costs	0	138,483	153,870	153,870	153,870	153,886	153,886	153,886	153,886	153,886	153,886	0
Marketing and Distribution cost	0	750	750	750	750	750	750	750	750	750	750	0
Income (corporate) tax		0	0	0	0	0	5,694	5,858	6,021	6,185	6,348	0
<b>NET CASH FLOW</b>	<b>-56,654</b>	<b>14,183</b>	<b>21,352</b>	<b>21,352</b>	<b>21,350</b>	<b>21,336</b>	<b>15,642</b>	<b>15,479</b>	<b>15,315</b>	<b>15,151</b>	<b>14,988</b>	<b>55,690</b>
<b>CUMULATIVE NET CASH FLOW</b>	<b>-56,654</b>	<b>-42,471</b>	<b>-21,119</b>	<b>232</b>	<b>21,582</b>	<b>42,919</b>	<b>58,561</b>	<b>74,039</b>	<b>89,354</b>	<b>104,506</b>	<b>119,494</b>	<b>175,184</b>
Net present value	-56,654	12,894	17,646	16,042	14,582	13,248	8,830	7,943	7,145	6,426	5,778	21,471
Cumulative net present value	-56,654	-43,760	-26,114	-10,073	4,510	17,758	26,588	34,531	41,675	48,101	53,879	75,350

NET PRESENT VALUE                   75,350  
INTERNAL RATE OF RETURN       31.77%  
NORMAL PAYBACK                    4 years

