

8. PROFILE ON ANIMAL TALLOU PROCESSING

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I. SUMMARY

This profile envisages the establishment of a plant for the processing of animal tallow with a capacity of 150 tonnes per annum.

The present demand for the proposed product is estimated at 21,645 tonnes per annum. The demand is expected to reach at 36,041 tonnes by the year 2020.

The plant will create employment opportunities for 22 persons.

The total investment requirement is estimated at Birr 9.5 million, out of which Birr 5.6 million is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 14 % and a net present value (NPV) of Birr 2.39 million, discounted at 8.5%.

II. PRODUCT DESCRIPTION AND APPLICATION

Animal tallow is tallow extracted from solid fat or "suet" of cattle, sheep or horses by dry or wet rendering. The chief constituents of, for example, beef tallow are stearin, palmitin and olein.

Animal tallow is used in soap industries, leather dressing, candle, greases, manufacture of stearic and oleic acids, animal feed and as adherent in tire moulds.

Animal tallow is a by-product of the meat-processing industry obtained by rendering the body fat from cattle and sheep.

Tallow from different sources may vary considerably in colour, titer (solidification point of fatty acids), free fatty acid content, specification value (alkali required for specifications), and iodine value (measure of unsaturation). The better grades of tallow, judged principally from titer and colour after laboratory bleaching, are used for the preparation of fine toilet soaps; poorer grades are used for laundry soaps.

Generally, beef or mutton fat acid a titer $\geq 4.4^{\circ}\text{C}$ is classified as tallow.

In this profile, semi-processed animal tallow (rendered and bleached tallow) is planned to be produced, since the capacity, of the envisaged plant is small. Usually, high quality animal tallow production requires bigger capacity and high investment cost.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

Animal tallow is mostly used in soap production. The demand for the product is therefore derived from the demand for soap. Accordingly, the estimated demand for soap is used in determining the demand for animal tallow.

Soap is a necessity product for urban households so much so that its demand is mainly associated with urbanization. The country's requirement for soap has been met through both domestic production and import. Table 3.1 shows the supply of the product from domestic production and imports during 1997-2005. During the period under reference, total supply averaged at 40,024 tonnes, of which 14,497 tonnes constituted domestic production and the remaining 25,527 tonnes imports. Thus, domestic production, on the average, accounted for 37 percent of the country's requirement for soap, indicating much of the demand for the product (63%) is still met through imports.

Table 3.1
SUPPLY OF SOAP (TONNES)

Year	Domestic Production	Import	Total Supply	Market share (%)	
				Domestic Production	Imports
1997	12,908	20,417	33,325	39	61
1998	9,787	16,471	26,258	37	63
1999	13,135	21,081	34,216	38	62
2000	17,194	21,287	38,481	45	55
2001	14,766	26,811	41,577	36	64
2002	19,249	27,249	46,498	41	59
2003	11,632	27,715	39,347	30	70
2004	14,975	25,557	40,532	37	63
2005	16,825	43,154	59,979	28	72
Average	14,497	25,527	40,024	37	63

*Sources: Customs Authority, External Trade Statistics, various years
CSA, Statistical Abstract, Various years.*

Assuming supply was driven by demand, the average annual supply of soap for the period under reference, which constitutes domestic production and imports, is considered as the effective demand for the product for the year 2005. Since the consumption of soap is mainly associated with the urban population, the demand for the product is assumed to grow at the rate of 4% that corresponds to the annual growth rate of the urban population. The present demand for soap (i.e., for 2007) is, thus, estimated at 43,289 tonnes. According to the estimates of engineers involved in this study, animal tallow accounts for about 50 per cent of the inputs used in the production of soap. The current demand for animal tallow (i.e., for 2007) is, therefore, estimated at 21,645 tonnes.

2. Projected Demand

Since the demand for animal tallow is derived from the demand for soap, the 4% annual growth rate of the urban population used in projecting the demand for soap is applied in projecting the demand for animal tallow. In projecting the demand for animal tallow, it is also assumed that existing suppliers will maintain the 38% market share that corresponds to the market share of domestic producers in the total supply of soap. Table 3.2 presents the projected unsatisfied demand for animal tallow.

Table 3.2
PROJECTED DEMAND FOR ANIMAL TALLOW (TONNES)

Year	Projected Demand	Existing Supply	Unsatisfied Demand
2008	22,511	8329	14,182
2009	23,411	8662.16	14,749
2010	24,348	9008.64	15,339
2011	25,322	9368.99	15,953
2012	26,334	9743.75	16,591
2013	27,388	10133.5	17,254
2014	28,483	10538.8	17,945
2015	29,623	10960.4	18,662
2016	30,808	11398.8	19,409
2017	32,040	11854.8	20,185
2018	33,321	12328.9	20,993
2019	34,654	12822.1	21,832
2020	36,041	13335	22,706

3. Pricing and Distribution

Based on current market price for the product, a factory-get price of Birr 20 per kg is recommended for the envisaged plant. The product can be directly supplied to the end users.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

The production capacity of the envisaged plant is 150 tonnes per year based on 300 working days per year and single shift of (8 hrs) per day. The capacity can be increased by increasing the number of working hours per day.

2. Production Programme

During the first two years of production, full capacity utilization may not be attained. This is because of lack of manufacturing and marketing experiences. Therefore, in the first and second year of only 70% and 85% of the plant capacity will be utilized. In the third year and thereafter, full capacity can be attained. The production programme of the project is indicated in Table 3.3.

Table 3.3
PRODUCTION PROGRAMME

Sr. No.	Product	Production Year		
		2008	2009	2010-2018
1	Animal tallow	105	127.5	150
2	Capacity utilization rate (%)	70	85	100

IV. MATERIALS AND INPUTS

A. RAW & AUXILIARY MATERIALS

The major raw & auxiliary materials of the proposed project are crude tallow and wastes of slaughtering house such as bones and other fat containing materials. In addition, bleaching earth is required to improve the colour of the semi-processed tallow. The annual raw and auxiliary material requirement and its cost is indicated in Table 4.1. The total annual cost of raw materials, at full capacity operation, is estimated at Birr 749.7 thousand.

Table 4.1
RAW AND AUXILIARY MATERIALS REQUIREMENT & COST

Sr. No.	Raw Material	Qty. (Tonnes)	Cost ('000 Birr)		
			FC	LC	Total
1	Crude Tallow	146.3		512.05	512.05
2	Slaughter house wastes	643		225.05	225.05
3	Bleaching earth	3	10.5	2.1	12.6
	Grand Total		10.5	739.2	749.7

B. UTILITIES

Electricity, furnace oil and water are major utilities of the project. Annual utility requirement and its cost are indicated in Table 4.2. The total annual cost of utilities, when the plant is operating at full capacity, is estimated at Birr 351.9 thousand.

Table 4.2
ANNUAL UTILITY REQUIREMENT AND ITS COST

Sr. No.	Product	Qty.	Unit Price	Cost ('000 Birr)
1	Electricity (kWh)	110,000	0.4736	52.1
2	Furnace oil (kg)	30,000	5.41	162.3
3	Water (m ³)	25,000	5.5	137.5
	Total			351.9

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Process Description

The site of the meat processing products (crude tallow, bones and other fat containing products) shall first be reduced with bone crushers and extruders. It is then conveyed to fat rendering unit. In this unit, the raw materials are cooked in a closed vertical tank under pressure by direct steam injection, typically at 380-500 kpa (3.8-4.9 atm.) for 3 to 6 hrs. The tallow is drawn off from the top of the vessel after it has been allowed to settle for several hours. This process is called rendering.

After rendering, the fat is usually further processed outside the meat processing plant. Depending on the desired product, the fats may be hydrogenated, bleached, deodorized, plasticized, etc. In this project, the rendered fat shall only be bleached and sent as semi-finished product to laundry soap processing factories.

The bleaching process may take in batch bleacher by adding powdered bleaching earth which adsorbs the materials responsible for the colour of tallow. After bleaching, melted tallow shall be separated from bleaching earth by filter press.

B. ENGINEERING

1. Machinery & Equipment

The list of machinery and equipment is indicated in Table 5.1. The total cost of machinery and equipment is estimated at Birr 5.6 million, out of which Birr 4.48 million is in foreign currency.

Table 5.1
MACHINERY & EQUIPMENT REQUIRMENT

Sr. No.	Description
1.	Bone crusher
2.	Extruder
3.	Rendering vessel with accessories
4.	Bleacher
5.	Filter press
6.	Boiler
7.	Storage tanks
8.	Wheel barrows

2. Land, Building and Civil Work

The total land required by the project is about, 5,000 m², out of which 1,100 m² is a built-up area. The lease value of land is estimated at Birr 40,000 at a rate of 0.1 Birr/m² per year for 80 years. The cost of building is estimated at Birr 2.53 million assuming a building construction rate of Birr 2,300 per m² for building to be constructed of hollow block wall, steel truss and

EGA sheet roof and cement screed floor. The total cost of land, building and civil works is estimated at Birr 2.57 million.

3. Proposed Location

The location will be determined by the presence of cattle population and proximity to market for the product or the soap factory that can use the animal tallow can be established following the establishment of this plant. The envisaged plant is proposed to be located in Banatsemay woreda, Kayafer town.

VI. MANPOWER AND TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The total manpower requirement is 22 persons. The list of manpower and the annual labour cost is indicated in Table 6.1. The total annual labour cost is estimated at Birr 168,750.

Table 6.1
MANPOWER REQUIREMENT AND LABOUR COST

Sr. No.	Manpower	No. of Persons	Monthly Salary (Birr)	Annual Salary (Birr)
1.	General manager	1	1,500	18,000
2.	Secretary	1	700	8,400
3.	Sales /purchasing officer	1	900	10,800
5.	Accountant	1	900	10,800
6.	Cashier	1	450	5,400
7.	Production supervisor	1	800	9,600
10.	Operator technician	4	2400	28,800
11.	Labourers	6	1,800	21,600
12.	General service	6	1,800	21,600
	Sub-Total	22		13,5000
	Benefit (25% BS)			33,750
	Total			168,750

B. TRAINING REQUIREMENT

On-the-job training of manpower particularly production supervisor and machine operators will take place by the experts of machinery supplier. The cost of training is estimated at Birr 25,000.

VII. FINANCIAL ANALYSIS

The financial analysis of the animal tallow processing 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	8%
Discount cash flow	8.5%
Accounts receivable	30 days
Raw material local	30days
Work in progress	5 days
Finished products	30 days
Cash in hand	5 days

A. TOTAL INITIAL INVESTMENT COST

The total investment cost of the project including working capital is estimated at Birr 9.5 million, of which 17 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 Cost (‘000 Birr)
1	Land lease value	40.0
2	Building and Civil Work	2,530.0
3	Plant Machinery and Equipment	5,600.0
4	Office Furniture and Equipment	75.0
5	Vehicle	450.0
6	Pre-production Expenditure*	653.8
7	Working Capital	154.8
	Total Investment cost	9,503.6
	Foreign Share	17

* *N.B Pre-production expenditure includes interest during construction (Birr 503.80 thousand) training (Birr 25 thousand) and Birr 125 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 is estimated at Birr 2.54 million (see Table 7.2). The material and utility cost accounts for 43.41 per cent, while repair and maintenance take 3.94 per cent of the production cost.

Table 7.2**ANNUAL PRODUCTION COST AT FULL CAPACITY ('000 BIRR)**

Items	Cost	%
Raw Material and Inputs	749.70	29.54
Utilities	351.9	13.87
Maintenance and repair	100	3.94
Labour direct	101.25	3.99
Factory overheads	0	0.00
Administration Costs	67.5	2.66
Total Operating Costs	1,370.35	54.00
Depreciation	816	32.15
Cost of Finance	351.5	13.85
Total Production Cost	2,537.85	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.

2. Break-even Analysis

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

$$\text{BE} = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable Cost}} = 70 \%$$

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 6 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 8.5% discount rate is Birr 2.39 million.

D. ECONOMIC BENEFITS

The project can create employment for 22 persons. In addition to supply of the domestic needs, the project will generate Birr 2.12 million in terms of tax revenue.