

96. PROFILE ON CATTLE MEAT PROCESSING

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I. SUMMARY

This profile envisages the establishment of a plant for the processing of cattle meat with a capacity of 1000 tonnes per annum.

The present demand for the proposed product is estimated at 499.14 tonnes per annum. The demand is expected to reach at 1,365 tonnes by the year 2020.

The plant will create employment opportunities for 95 persons.

The total investment requirement is estimated at Birr 19.07 million, out of which Birr 7.5 million is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 25 % and a net present value (NPV) of Birr 13.7 million discounted at 8.5%.

II. PRODUCT DESCRIPTION

Canned meat is a product prepared from beef, pig and other ingredients used for preserving and giving suitable taste. Processed and packed meat now a days is used in hospitals, hotels, restaurants, clubs and supermarkets. Moreover, it has an export market potential. The major raw materials required are cattle meat and table salt. There is a considerable amount of livestock in SNNPR and neighboring regions that could support a meat processing plant. The project requires capital investment of medium scale and can create medium employment opportunity. The plant will have a backward linkage effect with the livestock sector.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The product envisaged here is mainly for export. Thus to estimate the potential market for the product, it was found more appropriate to rely on export market rather than local demand. In the annual report published by National Bank of Ethiopia, cattle meat is reported lumped with other types of meat products. To determine the volume of cattle meat exported annually, it was therefore necessary to employ opinions of knowledgeable persons in the field. Accordingly, the share of cattle meat in the total meat products exported is assumed to constitute 30%. Table 3.1. depicts the total annual volume of meat products exported during the period 1997 to 2000 and the corresponding estimated share of cattle meat volume.

Table 3.1
EXPORT OF CANNED MEAT

Year	Total (Tonnes)	Estimated Share of Cattle Meat (Tonnes)
1997	1716	515
1998	1910	573
1999	2078	623
2000	1977	593
2001	870	261
2002	662	199
2003	1722	517
2004	1036	311
2005	904	271
Average	1430.5	429

Source: NBE, Annual Report.

To estimate the present foreign market for the product, time trend analysis based on the historical export figure is adopted. Hence, the equation $y = 366 + 66.57x$ is used. According to this equation, the present (2007) export demand for cattle meat is estimated at 499.14 tones.

2. Projected Demand

As it is used to estimate the present demand, the future export market for canned meat is also projected based on the hypothetical assumption that the market for the product should grow following the time trend analysis made on the export quantity of cattle meat over the years 1997-2005. Hence, the equation $Y=366 + 66.57 X$ is used to project the future export market as depicted in Table 3.2.

Table 3.2
PROJECTED DEMAND (TONNES)

Year	Demand
2008	566
2009	632
2010	699
2011	765
2012	832
2013	899
2014	965
2015	1032
2016	1098
2017	1165
2018	1231
2019	1298
2020	1365

3. Pricing and Distribution

Based on the present world market an ex-factory price of Birr 20,000 per tone is adopted for financial analysis.

Since the project is envisaged for export purpose, it is recommended that the factory should engage itself in exporting the products directly.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

Based on the market study depicted above and the availability of major raw material (cattle) in the SNNPR, the annual capacity of the envisaged cattle meat processing and packing plant is chosen to be 1,000 tonnes per annum.

2. Production Programme

The plant is assumed to start production at 75% of its rated capacity in the first year and increase its production to 85% in the second year. The plant will operate at full capacity (100%) starting from third year. The envisaged plant will operate eight hours in a single shift for 300 days a year and boost its production by operating in three-shift basis.

IV. MATERIALS AND INPUTS

A. RAW & AUXILIARY MATERIALS

The major raw materials required for cattle meat processing and packing plant are oxen (bulls, bullocks, and cows), empty can and salt. The source of cattle, empty can and salt will be local. The total material cost is about Birr 13,801,000. The list of raw materials requirement broken up by source is presented in the Table 4.1.

Table 4.1**RAW MATERIALS REQUIREMENT AND COST ('000 BIRR)**

Sr. No.	Material	Qty	Unit Cost (Birr)	LC	FC	Total
1	Cattle (head)	7,200	1,500	10,800	-	10,800
2	Empty can (Pcs)	1,800,000	1	1,800	-	1,800
3	Table salt (Tonnes)	1	1,000	1	-	1
4	Packing material (carton)	150,000	8	1,200	-	1,200
Grand Total		-	-	13,801		13,801

B. UTILITIES

The utilities required for the plant are electricity, furnace oil and water. The total annual cost of utilities at full capacity is estimated to be Birr 956,040. The annual requirement of these utilities along with cost is shown in Table 4.2.

Table 4.2**UTILITIES REQUIREMENT AND COST**

Sr. No.	Material	Qty.	Unit Cost	Cost ('000 Birr)
1	Electricity	150,000 kWh	0.4736	71,040
2	Water	70,000 m ³	3.10	217,000
3	Furnace fuel	200,000lt.	3.34	668,000
Grand Total		-	-	956,040

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The cattle supplied to the slaughterhouse are weighed on a cattle balance and then unloaded along the reception ramp into pens for rest.

The cattle undergo a medical check up for the presence of any disease before they are slaughtered. They are stunned by a gun in a box and afterwards slaughtered and removed to the bleeding line where blood is collected in a basin. The carcasses are loaded by electric hoist from the slaughter line to the processing line. Loading, spreading of rear legs and dehiding are carried out on a three level platform, and final dehiding done on a two level platform by means of a pneumatic knife.

The horns are removed by electric saw, and the heads inspected and washed. The brisket is opened by electric saw, the entails inspected and extracted. Stomach and casings are transported for cleaning. Carcasses are split into halves, which are washed and inspected. The meat is cut on tables in a cutting room by means of electric or hand operated saws and knives. Then, the meat is washed to remove blood and kept in the chilled room.

The meat is then dressed and superficial fat is removed before processing further after trimming and chopping. The bones are removed and the meat is then cut to uniform size of sliced chunks of 1.25 cm thickness. The meat is then soaked into salt water for giving a salty taste and to kill the microorganisms. It is weighed and filled into cans and seaming process will be carried out. After seaming the cans are fed into a jet-spraying can washer for cleansing with a neutral cleanser. Then, the seamed cans undergo sterilization immediately. The by products of cattle meat processing industry represent a substantial part of the sales value of production derived from the slaughter cattle. By products include edible fat, non-edible fat, hides, blood, bone meal, glue etc. The efficient utilization of by products is essential for the economic operation of a processing plant. The total annual revenue obtained from the sale of these by-products is estimated at Birr 1,368,000.

The envisaged plant needs waste water treatment plant that uses physico-chemical system in order to abate the environmental pollution. The treatment process involves settling, filtration, addition of flocculates and mixing, and floatation. The sludge from the treatment plant is used as fertilizer.

2. Source of Technology

The machinery and equipment required by the cattle meat processing & packing plant can be obtained by contacting the following companies through the address given below:

a) **KPSAR ENGINEERING WORKS.**

Tel. 91-11-5440092.

Fax 91 - 11-546 2626.

INDIA.

b) **Endeco S.P.A.**

Prato Della Valle 81-padova

Tel. +39049655433

Fax. +39049655697

E-mail: endeco@endeco.it

Web site: www.endeco.it

B. ENGINEERING

1. Machinery and Equipment

The total cost of equipment and machinery required to produce 1,500 tonnes of processed meat per annum is estimated to be about 7.5 million Birr, of which 6.5million is required in foreign currency. The list of machinery and equipment is given in Table 5.1.

Table 5.1**LIST OF MACHINERY AND EQUIPMENT**

Sr. No.	Description	Qty.
1.	Electric hoists	4
2.	Stunning box	1
3.	Stunning gun	1
4.	Platforms for cattle processing	7
5.	Electric saw for cutting and splitting	4
6.	Pneumatic knife	1
7.	Hooks for various purposes	260
8.	Pneumatic spreader	1
9.	Sterilizer for processing tools	5
10.	Processing and inspection tables	13
11.	Pipe rail with supporting construction	650m
12.	Rail balances up to 500kg	2
13.	Cattle balance up to 2000kg	1
14.	Floor balance up to 200kg	1
15.	Machine for Washing and cleaning of stomach	1
16.	Devise for casing processing	1
17.	High effect pumps for washing	2
18.	Pumps for discharging manure	2
19.	Laboratory equipment	1 set
20.	Stainless Tank	2
21.	Gear Pump	1
22.	Balance	20
23.	Seaming Micrometer	2
24.	Seaming Wire Gauge	2
25.	Seaming Scale	2
26.	Seam Band Saw Frame	2
27.	Seam Band Saw	10
28.	Vacuum Can Tester	2
29.	Hand Can Tester	2
30.	Saccharimeter	2
31.	Inspection Bar	2
32.	Thermometer	15
33.	Salinometer	2
34.	Boiler	1

2. Land, Building and Civil Work

The envisaged plant will require a total land area of 7,500 m², of which 3000 m² will be covered by factory and office buildings, stores, etc. The total cost of building and civil works at a rate of Birr 2,500 per m², will be Birr 7,500,000. Cost for holding of land at lease rate of Birr 0.10 per m² for 80 years is estimated at Birr 60,000. Therefore, the total cost for land holding, building and civil works is estimated at Birr 7,560,000

3. Proposed Location

The envisaged plant is proposed to be located at Kuratz woreda in Omarata town.

VI. MANPOWER AND TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The manpower requirement of the plant will be 95 persons. Table 6.1 shows the details of manpower requirement of the plant and estimated annual labour cost including fringe benefits. The total man power cost including fringe benefit is estimated at Birr 895,680.

Table 6.1
MANPOWER REQUIREMENT AND ESTIMATED
ANNUAL LABOUR COST

Sr. No.	Description	Req. No.	Monthly Salary	Annual Salary
1.	Plant Manager	1	2,500	30,000
2.	Secretary	2	1,400	16,800
3.	Finance & Administration Manager	1	2000	24,000
4.	General Service	1	1500	18,000
5.	Production and Technic Manager	1	2000	24,000
6.	Production Head	1	1800	21,600
7.	Technic Head	1	1800	21,600
8.	Commercial Manager	1	2000	24,000
9.	Purchaser	1	1300	15,600
10.	Salesman	1	1300	15,600
11.	Accountant	2	3000	36,000
12.	Personnel	1	1300	15,600
13.	Time-keeper	3	1350	16,200
14.	Store-keeper	2	1200	14,400
15.	Veterinary Doctor	1	2500	30,000
16.	Quality control head	1	1500	18,000
17.	Chemist	3	2700	32,400
18.	Food Technologist	1	1500	18,000
19.	General Mechanic	3	1800	21,600
20.	Assistant Mechanic	3	1350	16,200
21.	Electrician	3	1800	21,600
22.	Operators	20	12,000	144,000
23.	Laborers	30	9,000	108,000
24.	Driver	3	1350	16,200
25.	Guard	6	1800	21,600
26.	Cleaner	3	450	5,400
	Sub-total	95	62,200	746,400
	Employees benefit 20% of basic salary			149,280
	Grand Total	95		895,680

B. TRAINING REQUIREMENT

It is suggested, to train production and technical manager, production and technical head, and quality control head, mechanics, electricians and operators on-the-job training at the actual site on the actual working condition by competent expert of the machinery & technology supplier for about one month during erection & commissioning period. The training cost is estimated to be Birr 50,000.

VII. FINANCIAL ANALYSIS

The financial analysis of the cattle meat 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	10 days
Work in progress	2 days
Finished products	15 days
Cash in hand	5 days
Accounts payable	30 days

A. TOTAL INITIAL INVESTMENT COST

The total investment cost of the project including working capital is estimated at Birr 19.07 million, of which 53 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	60.0
2	Building and Civil Work	7,500.0
3	Plant Machinery and Equipment	7,500.0
4	Office Furniture and Equipment	125.0
5	Vehicle	200.0
6	Pre-production Expenditure*	1,083.3
7	Working Capital	2,603.7
	Total Investment cost	19,072.0
	Foreign Share	53

** N.B Pre-production expenditure includes interest during construction (Birr 933.30 thousand) training (Birr 50 thousand) and Birr 100 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 18.06 million (see Table 7.2). The material and utility cost accounts for 81.69 per cent, while repair and maintenance take 1.55 per cent of the production cost.

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

Items	Cost	%
Raw Material and Inputs	13,801.00	76.40
Utilities	956.04	5.29
Maintenance and repair	280	1.55
Labour direct	537.41	2.98
Factory overheads	179.14	0.99
Administration Costs	358.27	1.98
Total Operating Costs	16,111.86	89.19
Depreciation	1207.5	6.68
Cost of Finance	744.58	4.12
Total Production Cost	18,063.94	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.

$$\text{BE} = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable Cost}} = 47 \%$$

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 4 years.

4. Internal Rate of Return and Net Present Value

Based on the cash flow statement, the calculated IRR of the project is 25 % and the net present value at 8.5% discount rate is Birr 13.7 million.

D. ECONOMIC BENEFITS

The project can create employment for 95 persons. In addition to supply of the domestic needs, the project will generate Birr 9.12 million in terms of tax revenue.