

**19. PROFILE ON THE PRODUCTION OF
POULTRY FEED**

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I. SUMMARY

This profile envisages the establishment of a plant for the production of poultry feed with a capacity of 3,500 tons per annum. Poultry feed is a kind of balanced livestock feed which aids proper development of chicks and pullets and hence used for feeding the domesticated birds such as chickens, turkeys, ducks, geese, etc..

The country's requirement of poultry feed is met through local production. The present (2012) demand for poultry feed is estimated at 25,749 tons. The demand for the products is projected to reach at 34,453 tons and 41,889 tons by the year 2018 and year 2022, respectively.

The principal raw materials required are oil cake, wheat bran, molasses, cereals, limestone, bone - meal (blood - meal), vitamins, minerals and salt. All the raw materials are locally available, except vitamins which have to be imported.

The total investment cost of the project including working capital is estimated at Birr 9.81 million. From the total investment cost the highest share (Birr 4.53 million or 46.19%) is accounted for by initial working capital followed by fixed investment cost (Birr 4.42 million or 45.09%) and pre operation cost (Birr 855.60 thousand or 8.72%). From the total investment cost Birr 1.7 million or 17.33 % is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 32.11% and a net present value (NPV) of Birr 12.22 million, discounted at 10%.

The project can create employment for 29 persons. The project will create backward linkage with the agricultural and agro processing sectors and forward linkage with the livestock sector and also generates income for the Government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTION & APPLICATION

Poultry feed is a kind of balanced livestock feed which aids proper development of chicks and pullets and hence used for feeding the domesticated birds such as chickens, turkeys, ducks, geese, etc. that serve as a source of eggs or meat.

Poultry feed can be prepared from raw materials like oil cake, wheat bran, molasses, cereals, vitamins and minerals. Proteins, largely of vegetable origin, encourage the normal development of pullets and help them to lay eggs longer.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

There is no planned feeding of chickens under traditional village production in Ethiopia and scavenging is almost the only source of diet. The scavenging feed resource base for local birds is inadequate and variable depending on season.

Commercial Processed poultry feed consisting mainly of cereal grains, cereal grain by-products and oilseed cakes are available from feed mills that are largely concentrated in and around the capital, Addis Ababa. None of the feed mills have pelleting facilities. This is a serious shortcoming especially for efficient broiler production. The quality of mixed feed used is generally poor. Most formulations available do not have vitamin/mineral premixes. Ingredients and processed feeds vary in nutritive value and there is no regular quality control mechanism in the country. The absence of bulk deliveries and storage facilities increases feed costs and in some cases wastage occurs due to weevil infestation. In many instances, the cost of mixed feed does not seem to follow reductions in ingredient cost. Prices of mixed feed remains unduly high even at times when the price of the major component of mixed rations (e.g. corn) fall by more than 50%.

There are about 20 feed mixers in the country. However, only five of them are manufacturing purely for sale. The rest produces primarily for own consumption. Occasional sales are also undertaken when there is excess production over their own demand (ILRI 2010&ILRI 2011). The mixers and millers produce feed mixes for poultry, dairy and beef, in order of importance based on volume and the average annual sale is 66 tons (ILRI 2010&2011). Poultry feed production constitutes 80 % sales of these the mixers and the yearly production is 52.8 tons (Based on ILRI 2011).

There are currently various initiatives being undertaken to promote the poultry sector in Ethiopia including genetic improvement (typically focusing on distributing of exotic breeds) and addressing veterinary health issues by government agencies, international organizations and Non-Governmental Organizations. There are complementarities between these initiatives and feed improvement. Therefore, investment in feed can fill the gap.

Studies shows that the poultry population in the country is about 42,915,628 and 10,490,015 households are engaged in it with a no. of chicken per household of 4.1 (FAO 2008). However, current practice of poultry birds feeding is inadequate and not dependable. Hence, it is necessary to supply assorted feed. According to experts estimate annual consumption of assorted feed per bird is about 3 kilograms. Hence, if the total poultry population is to be fed with assorted feed annual requirement would be 128,746.9 tons. However, since there are various factors which limit the marketability of the product such as awareness of farmers, accessibility of the product to remote villages, etc. only 20 % of poultry population is assumed to be fed with assorted poultry feed initially. Accordingly, the current effective demand is estimated at 25,749.4 tons.

2. Demand Projection

The demand for poultry feed is mainly influenced by the awareness of farmers on the importance of the product, size of poultry population and development of modern poultry farms. By taking into account the extension programmers being undertaken by the Ministry of Agriculture and Rural Development, various projects of International organizations and other NGOs an annual and development of modern poultry farms, a modest growth rate of 5% is applied in projecting the demand. Existing production assumed to be maintained (52.8 tons). In 2013 the projected demand will be 27,036 tons and the unsatisfied demand 26,983 tons. Furthermore, the enterprise(s) to be established in Addis Ababa is assumed to capture 15% of the market i.e., 4,047 tons (considering Addis Ababa's advantage; central location, availability of better infrastructure and other facilities). Table 3.1 depicts the projected unsatisfied poultry feed demand and for firm's to be established in Addis Ababa.

Table 3.1
PROJECTED DEMAND FOR POULTRY FEED (TONS)

Year	Projected Unsatisfied Demand	Addis Ababa's firms share
2013	26,983	4,047
2014	28,335	4,250
2015	29,754	4,463
2016	31,245	4,687
2017	32,810	4,921
2018	34,453	5,168
2019	36,178	5,427
2020	37,990	5,698
2021	39,892	5,984
2022	41,889	6,283

3. Pricing and Distribution

Prices of poultry feed depends upon the composition of the mix and the nutrients. Current average factory gate price by the existing poultry feed producers is Birr 690 per quintal. To be competitive a factory gate price of Birr 630 per quintal is recommended for this project.

Current practice of feed product distribution involves sales at factory gate and to supply to major towns by opening sales store. The project can use both distribution mechanisms to expand its market outlets.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

Based on the demand projection shown in the market study section and considering the economic scale of production, the envisaged plant is planned to have a production capacity of 3,750 tons of poultry feed per annum. The plant will operate 1 shift of 8 hours per day for 300 working days per annum.

2. Production Program

The envisaged plant will start operation at 80% of its installed capacity during the first year and this will then grow to 90% in the second year. Full capacity production will be achieved in the third year and onwards. Since there is no any by – product to be released from the production process, the production program is prepared for only for the main product. The details of the production program are given in Table 3.2

Table 3.2
ANNUAL PRODUCTION PROGRAM

Sr. No.	Description	Unit of Measure	Production Year		
			1st	2nd	3rd & Onwards
1	Poultry feed	ton	3,000	3,375	3,750
2	Capacity utilization rate	%	80	90	100

IV. MATERIALS AND INPUTS

A. RAW AND AUXILIARY MATERIALS

The basic raw materials required for poultry feed production include oil cake, wheat bran, molasses, maize and other cereals, limestone, bone – meal (blood – meal), vitamins, minerals and salt. All the raw materials are locally available, except vitamins which will be imported.

The auxiliary materials required for the poultry feed production plant are sacks, twine rope and amino acids. The auxiliary materials, except amino acids which have to be imported, are available locally.

The annual requirement for the raw and auxiliary materials at 100% capacity utilization rate of the envisaged plant and the estimated costs are presented in Table 4.1.

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

Sr. No.	Description	Unit of Measure	Qty	Unit Price (Birr)	Cost ('000 Birr)		
					F. C.	L. C.	Total
1	Oil cake	ton	846	2,750	-	2,326.5	2,326.5
2	Wheat bran	ton	1,500	4,000	-	6,000.0	6,000.0
3	Molasses	ton	111	230	-	25.5	25.5
4	Maize and other cereals	ton	894	7,500	-	6,705.0	6,705.0
5	Limestone	ton	69	360	-	24.8	24.8
6	Bone - meal (blood - meal)	ton	240	660	-	158.4	158.4
7	Minerals/vitamins/	ton	9	33,000	297.0	-	297.0
8	Salt	ton	81	2,000		162.0	162.0
9	Amino acids, 0.025 kg/Qt	kg	937.5	74	68.9	-	68.9
10	Sacks	pc	60,000	11	-	660.0	660.0
11	Twine rope	Lump sum			-	15.8	15.8
Total					365.9	16,078.0	16,443.9

B. UTILITIES

The main utilities required for the plant are electric power, water and fuel oil. The power required to run the production machinery and to provide lighting is electric power, which can be available from the national grid of EEP Co. Water is required for general purpose and to supply to the boiler that generates hot water for warming the molasses. The fuel oil is required to operate the boiler. The annual requirement of the plant for power and utilities at 100% capacity utilization rate and the estimated costs are given in Table 4.2.

Table 4.2**ANNUAL UTILITIES REQUIREMENT AT FULL CAPACITY AND COSTS**

Sr. No.	Description	Unit of Measure	Annual Requirement	Unit Price, Birr/Unit	Cost, ('000 Birr)		
					F.C.	L.C.	Total
1	Electric power	kWh	72,000	0.58		41.76	41.76
2	Water	m ³	3,000	10.00		30.00	30.00
3	Furnace oil	lt	50,000	14.34		717.00	717.00
Total						788.76	788.76

V. TECHNOLOGY AND ENGINEERING**A. TECHNOLOGY****1. Production Process**

The major operations involved in the production of poultry feed are: raw materials preparation, pulverization of ingredients in a grinder or pulverizer to the required mesh size, assorting and measuring, mixing the molasses with other ingredients, meshing in a vibrating screen to the correct particle size, fine crushing pallet making, and packing.

The raw and auxiliary materials are first charged into silos and tanks where they are made ready for further processing. The ingredients are crushed in the primary crusher. The crushed materials are further separated by means of sieves, after which they are stored in assorting tanks in accordance with the kind of raw materials.

During assorting and measuring, small amounts of additives are charged into the bins containing different assortments of raw materials. The raw materials from the assorting tanks are measured in accordance to their use and then mixed by using a mixer. During mixing, fatty ingredients are added to the mix in order to raise the nutrient value of the feed. Then the whole mix is added to molasses and after mixing, it is further crushed by means of the second chamber of the machine.

Upon requirement, the second crushing is by – passed. The final product is filled onto product tanks from which it is weighed and packed.

2. Environmental Impact

The envisaged project does not have significant emission of pollutants, except a minimal amount of fine pulverized ingredients. The necessary measure to avoid such dust is taken in that the design of the production line equipment includes negative pressure fans of appropriate capacity along with dust collecting cyclones and in – mount airlocks. Thus, there is no waste which needs treatment, and therefore, the envisaged project does not have any adverse impact on the environment.

B. ENGINEERING

1. Machinery and Equipment

The total cost of the plant machinery and equipment is estimated at Birr 2.125 million, out of which Birr 1.7 million will be required in foreign currency. List of machinery and equipment required for the envisaged plant and the estimated costs are given in Table 5.1.

Table 5.1
MACHINERY & EQUIPMENT AND ESTIMATED COST

Sr. No.	Description	Unit of Measure	Qty	Cost ('000 Birr)		
				F. C.	L.C.	Total
1	Silos and tanks for raw and auxiliary materials	set	3	119.0	29.8	148.8
2	Metal screen and Shaker	set	1	170.0	42.5	212.5
3	Mixer	set	1	136.0	34.0	170.0
4	Hammer mill (crusher)	set	1	170.0	42.5	212.5
5	Bladder	set	1	136.0	34.0	170.0
6	Weighing scale (5 ton)	set	1	170.0	42.5	212.5
7	Bagging machine	set	1	170.0	42.5	212.5
8	Dust collector	set	1	119.0	29.8	148.8
9	Product tank	set	1	136.0	34.0	170.0
10	Tanks for oil cakes and molasses	set	3	119.0	29.8	148.8
11	Boiler	set	1	170.0	42.5	212.5
12	Other accessories	set	1	85.0	21.3	106.3
Total				1,700.0	425.0	2,125.0

2. Land, Buildings and Civil Works

The total area of land required for the envisaged project is 900 m² out of which 350 m² will be a built - up area. The cost of buildings and civil works at a unit construction rate of Birr 4,500/ m² is estimated at Birr 1.575 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 5000 m² 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 m² 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 m². 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 m². 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 m² (see Table 5.2).

Table 5.2

NEW LAND LEASE FLOOR PRICE FOR PLOTS IN ADDIS ABABA

Zone	Level	Floor price/m²
Central Market District	1 st	1686
	2 nd	1535
	3 rd	1323
	4 th	1085
	5 th	894
Transitional zone	1 st	1035
	2 nd	935
	3 rd	809
	4 th	685
	5 th	555
Expansion zone	1 st	355
	2 nd	299
	3 rd	217
	4 th	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 m² 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

Scored Point	Grace Period	Payment Compilation Period	Down Payment
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 m² is estimated at Birr 239,400 of which 10% or Birr 23,940 will be paid in advance. The remaining Birr 215,460 will be paid in equal installments with in 28 years i.e. Birr 7,695 annually.

VI. HUMAN RESOURCE AND TRAINING REQUIREMENT

A. HUMAN RESOURCE REQUIREMENT

The total human resource requirement of the envisaged project is 40 persons. Details of the human resource requirement and the estimated annual labor cost including fringe benefits are shown in Table 6.1.

Table 6.1
HUMAN RESOURCE REQUIREMENT AND COST

Sr. No.	Job Title	Required No. of Persons	Salary, Birr	
			Monthly	Annual
1	General manager	1	5,000	60,000
2	Secretary	1	900	10,800
3	Technical & production manager	1	4,500	54,000
4	Finance and administration manager	1	4,000	48,000
5	Commercial manager	1	4,000	48,000
6	Purchaser	1	900	10,800
7	Accountant	1	900	10,800
8	Personnel	1	800	9,600
9	Salesperson	1	900	10,800
10	Store keeper	1	900	10,800
11	Cashier	1	800	9,600
12	Shift leader	3	3,000	36,000
13	Mechanic	3	3,000	36,000
14	Electrician	2	2,000	24,000
15	Operator	10	6,500	78,000
Sub -total		29	38,100	457,200
Fringe benefits (20% Basic salary)			7,620	91,440
Total			45,720	548,640

B. TRAINING REQUIREMENT

Key production personnel like 3 shift leaders and 10 operators should be given on – the – job training for 3 weeks by the advanced technician of the equipment supplier. The total cost of training is estimated at Birr 105,000.

VII. FINANCIAL ANALYSIS

The financial analysis of the poultry feed 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
Raw material imported	120 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 9.81 million (see Table 7.1). From the total investment cost the highest share (Birr 4.53 million or 46.19) is accounted by initial working capital followed by fixed investment cost (Birr 4.42 million or 45.09%) and pre operation cost (Birr 855.60 thousand or 8.72%). From the total investment cost Birr 1.7 million or 17.33 % is required in foreign currency.

Table 7.1
INITIAL INVESTMENT COST ('000 Birr)

Sr. No	Cost Items	Local Cost	Foreign Cost	Total Cost	% Share
1	Fixed investment				
1.1	Land Lease	23.94		23.94	0.24
1.2	Building and civil work	1,575.00		1,575.00	16.05
1.3	Machinery and equipment	425.00	1,700.00	2,125.00	21.66
1.4	Vehicles	450.00		450.00	4.59
1.5	Office furniture and equipment	250.00		250.00	2.55
	Sub total	2,723.94	1,700.00	4,423.94	45.09
2	Pre operating cost *				
2.1	Pre operating cost	213.75		790.00	8.05
2.2	Interest during construction	641.85		641.85	6.54
	Sub total	855.60		855.60	8.72
3	Working capital **	4,531.55		4,531.55	46.19
	Grand Total	8,111.09	1,700.00	9,811.09	100

* *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 5.69 million. However, only the initial working capital of Birr 4.53 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 to be 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 20.15 million (see Table 7.2). The cost of raw material account for 81.60% of the production cost. The other major components of the production cost are utility, financial cost and depreciation which account for 3.91%, 3.07% and 3.20%, respectively. The remaining 8.22% 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 THREE)

Items	Cost (in 000 Birr)	%
Raw Material and Inputs	16,443.90	81.60
Utilities	788.76	3.91
Maintenance and repair	106.25	0.53
Labour direct	457.20	2.27
Labour overheads	91.44	0.45
Administration Costs	500.00	2.48
Land lease cost	-	-
Cost of marketing and distribution	500.00	2.48
Total Operating Costs	18,887.55	93.73
Depreciation	645.75	3.20
Cost of Finance	617.78	3.07
Total Production Cost	20,151.08	100

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 will grow from Birr 1.10 million to Birr 2.72 million during the life of the project. Moreover, at the end of the project life the accumulated net cash

flow amounts to Birr 27.10 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.

$$\text{Break -Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 9,607,500$$

$$\text{Break- Even Capacity utilization} = \frac{\text{Break -even Sales Value}}{\text{Sales revenue}} \times 100 = 25.70\%$$

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 32.11% 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 12.22 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 29 persons. The project will generate Birr 7.28 million in terms of tax revenue. The project will create backward linkage with the agricultural and agro processing sectors and forward linkage with the livestock sector and also generates income for the Government in terms of payroll tax.

Appendix 7.A
FINANCIAL ANALYSES SUPPORTING TABLES

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

Item	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Raw Material and Inputs	13,155	14,800	16,444	16,444	16,444	16,444	16,444	16,444	16,444	16,444
Utilities	631	710	789	789	789	789	789	789	789	789
Maintenance and repair	85	96	106	106	106	106	106	106	106	106
Labour direct	366	411	457	457	457	457	457	457	457	457
Labour overheads	73	82	91	91	91	91	91	91	91	91
Administration Costs	400	450	500	500	500	500	500	500	500	500
Land lease cost	0	0	0	0	8	8	8	8	8	8
Cost of marketing and distribution	500	500	500	500	500	500	500	500	500	500
Total Operating Costs	15,210	17,049	18,888	18,888	18,895	18,895	18,895	18,895	18,895	18,895
Depreciation	646	646	646	646	646	88	88	88	88	88
Cost of Finance	0	706	618	530	441	353	265	177	88	0
Total Production Cost	15,856	18,401	20,151	20,063	19,982	19,336	19,248	19,160	19,071	18,983

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	18,300	20,588	22,875	22,875	22,875	22,875	22,875	22,875	22,875	22,875
Less variable costs	14,710	16,549	18,388	18,388	18,388	18,388	18,388	18,388	18,388	18,388
VARIABLE MARGIN	3,590	4,039	4,487	4,487	4,487	4,487	4,487	4,487	4,487	4,487
in % of sales revenue	19.62	19.62	19.62	19.62	19.62	19.62	19.62	19.62	19.62	19.62
Less fixed costs	1,146	1,146	1,146	1,146	1,153	596	596	596	596	596
OPERATIONAL MARGIN	2,444	2,893	3,342	3,342	3,334	3,892	3,892	3,892	3,892	3,892
in % of sales revenue	13.36	14.05	14.61	14.61	14.57	17.01	17.01	17.01	17.01	17.01
Financial costs		706	618	530	441	353	265	177	88	0
GROSS PROFIT	2,444	2,187	2,724	2,812	2,893	3,539	3,627	3,715	3,804	3,892
in % of sales revenue	13.36	10.62	11.91	12.29	12.65	15.47	15.86	16.24	16.63	17.01
Income (corporate) tax	0	0	0	844	868	1,062	1,088	1,115	1,141	1,168
NET PROFIT	2,444	2,187	2,724	1,969	2,025	2,477	2,539	2,601	2,662	2,724
in % of sales revenue	13.36	10.62	11.91	8.61	8.85	10.83	11.10	11.37	11.64	11.91

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
TOTAL CASH INFLOW	4,638	23,511	20,593	22,880	22,875	22,875	22,875	22,875	22,875	22,875	22,875	7,266
Inflow funds	4,638	5,211	5	5	0	0	0	0	0	0	0	0
Inflow operation	0	18,300	20,588	22,875	22,875	22,875	22,875	22,875	22,875	22,875	22,875	0
Other income	0	0	0	0	0	0	0	0	0	0	0	7,266
TOTAL CASH OUTFLOW	4,638	20,421	19,203	20,954	21,143	21,088	21,192	21,131	21,069	21,007	20,063	0
Increase in fixed assets	4,638	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	4,569	566	566	0	1	0	0	0	0	0	0
Operating costs	0	14,710	16,549	18,388	18,388	18,395	18,395	18,395	18,395	18,395	18,395	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income tax	0	0	0	0	844	868	1,062	1,088	1,115	1,141	1,168	0
Financial costs	0	642	706	618	530	441	353	265	177	88	0	0
Loan repayment	0	0	883	883	883	883	883	883	883	883	0	0
SURPLUS (DEFICIT)	0	3,090	1,389	1,926	1,732	1,787	1,683	1,744	1,806	1,868	2,812	7,266
CUMULATIVE CASH BALANCE	0	3,090	4,479	6,405	8,137	9,924	11,607	13,351	15,157	17,025	19,838	27,103

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
TOTAL CASH INFLOW	0	18,300	20,588	22,875	22,875	22,875	22,875	22,875	22,875	22,875	22,875	7,266
Inflow operation	0	18,300	20,588	22,875	22,875	22,875	22,875	22,875	22,875	22,875	22,875	0
Other income	0	0	0	0	0	0	0	0	0	0	0	7,266
TOTAL CASH OUTFLOW	9,169	15,771	17,610	18,888	19,732	19,763	19,957	19,983	20,010	20,036	20,063	0
Increase in fixed assets	4,638	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	4,532	561	561	0	1	0	0	0	0	0	0	0
Operating costs	0	14,710	16,549	18,388	18,388	18,395	18,395	18,395	18,395	18,395	18,395	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income (corporate) tax		0	0	0	844	868	1,062	1,088	1,115	1,141	1,168	0
NET CASH FLOW	-9,169	2,529	2,978	3,987	3,143	3,112	2,918	2,892	2,865	2,839	2,812	7,266
CUMULATIVE NET CASH FLOW	-9,169	-6,641	-3,663	325	3,468	6,580	9,498	12,390	15,255	18,094	20,906	28,171
Net present value	-9,169	2,299	2,461	2,996	2,147	1,932	1,647	1,484	1,337	1,204	1,084	2,801
Cumulative net present value	-9,169	-6,870	-4,409	-1,413	733	2,666	4,313	5,797	7,133	8,337	9,421	12,223

NET PRESENT VALUE	12,223
INTERNAL RATE OF RETURN	32.11%
NORMAL PAYBACK	4 years