

**83. PROFILE ON THE PRODUCTION OF WOVEN
PP BAGS**

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I. SUMMARY

This profile envisages the establishment of a plant for the production of woven bags with a capacity of 12,000,000 bags per annum. Woven bags extensively used in packaging industry due to their wide variety of usage, flexibility and strength.

The demand for woven bags is met through both local production and imports. The present (2012) demand for woven bags is 188.73 million pieces or 16,609 tons. The demand for woven bags is projected to reach 318,027,933 pieces or 27, 986 tons and 535,895,561 pieces or 47,159 tons by the year 2017 and 2022, respectively.

The principal raw materials required are polypropylene resin, ink and solvent which have to be imported.

The total investment cost of the project including working capital is estimated at Birr 46.34 million. From the total investment cost, the highest share (Birr 23.21 million or 50.08%) is accounted by fixed investment cost followed by initial working capital (19.02 million or 41.06%) and pre operation cost (Birr 4.10 million or 8.63%). From the total investment cost, Birr 12.15 million or 26.23% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 17.79% and a net present value (NPV) of Birr 21.48 million, discounted at 10%.

The project can create employment for 57 persons. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports. The project will also create backward linkage with plastic manufacturing sub sector and forward linkage with the packaging and logistics sub sector and also generates other income for the Government.

II. PRODUCT DESCRIPTION AND APPLICATION

One of the growing applications of plastic materials is packing. Among the various types of plastic materials polypropylene (PP) woven bags and sacks are extensively used in packaging industry due to their wide variety of usage, flexibility and strength. Woven polypropylene bags

are specializing in packing and transporting bulk commodities. Due to strength, flexibility, durability and lower cost, woven polypropylene bags are most popular products in industrial package, which are widely used in packing grain, feeds, fertilizer, seeds, powders, sugar, salt, powder, chemical in granulated form. The advantages of PP woven bag include:

- Very affordable, Lower cost;
- Flexible and high strength, persistent durability;
- Can be printed on both sides;
- Can be stored in an open area due to UV-stability, up to 6 months;

- Water and dust proof design due to inside PE liners or laminated on the outside; hence, packed materials are protected from outside humidity;
- Twisted weave and anti-skid print to prevent slipping; and
- Fully recycled.

As compared to jute and paper bags, the polypropylene (pp) bags have higher mechanical strength, non- contaminant, excellent appearance, flexible to be manufactured at customers needs (preferred color and texture), easy to print logos, symbols or writings, versatility of the product, water proof, etc.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The country's requirement of PP woven bags is met through both local production and imports. The data source for locally manufactured products i.e. Central Statistical Agency's "Report on large and medium scale manufacturing and electricity industries survey" does not show the local production volume of PP woven bags separately. Therefore, in order to estimate the trend in the local production of PP woven bags an indirect approach i.e. based on raw material import is employed.

PP woven bags are produced from imported polypropylene resin. During the period 2002 – 2011, on average the country has imported 9,548 tons of polypropylene resin. During the same period import of the product has registered an average annual growth rate of 23% (see Table 3.1).

Table 3.1
IMPORT OF VIRGIN POLYPROPYLENE (TONS)

Year	Import of Polypropylene Resin
2002	3,540
2003	2,828
2004	5,505
2005	8,111
2006	13,373
2007	9,270
2008	9,860
2009	13,108
2010	15,201
2011	14,605

Source: - *Ethiopian Revenue and Customs Authority.*

In Ethiopia, the major end- users of polypropylene resin are local PP woven bag producers. Accordingly, based on number of factories it is assumed that from the total import of polypropylene resin 60% is used for the production of PP woven bag, 15% for the production of PPR pipe, 5% for the production of PP mat and the remaining is used for the production of other products.

Moreover, considering that PP woven bag contain additives in order to arrive at the actual quantity of PP woven bag locally produced the additives in the final product are considered to be 40%. Accordingly, the share of PP resin from the total weight of the final woven bag is estimated to be 60%.

Moreover, currently, the weights of the available PP bags are 120 gm, 115 gm, 65 gm and 50 gm. Hence in order to convert the estimated local production in to pieces it is assumed that the weight of one PP bag is 88 gm or the average of the available weights of PP bags in the market. Accordingly, based on the above assumptions the estimated local production of PP woven bag is shown in Table 3.2.

Table 3.2
ESTIMATED LOCAL PRODUCTION OF PP WOVEN BAG

Year	Import Of Virgin Polypropylene	Amount of Virgin Polypropylene used for production of PP woven bag	Local Production of PP Woven bag considering the resin to be 60% of the final product	
			In tons	in Pcs
2002	3,540	2,124	3,526	40,066,364
2003	2,828	1,697	2,817	32,007,818
2004	5,505	3,303	5,483	62,306,591
2005	8,111	4,867	8,079	91,801,773
2006	13,373	8,024	13,320	151,358,045
2007	9,270	5,562	9,233	104,919,545
2008	9,860	5,916	9,821	111,597,273
2009	13,108	7,865	13,056	148,358,727
2010	15,201	9,121	15,140	172,047,682
2011	14,605	8,763	14,547	165,302,045

As can be seen from the above Table, the estimated local production of PP woven bag has increased from 40 million pieces in 2002 to 165.30 million pieces in 2011. However, on average local production of PP woven bag was 98.98 million pieces.

Import of PP woven bag is also a major source of the products supply. The country imports the products from different countries. The quantity of the products annually imported to during the period 2002– 2011 is shown in Table 3.3.

Table 3.3
IMPORT OF PP WOVEN BAG

Year	Import of PP bags	
	in tons	in piece
2002	4,153	47,196,943
2003	2,239	25,443,341
2004	4,076	46,316,409
2005	2,200	25,003,875
2006	355	4,028,993
2007	178.00	2,022,727
2008	157	1,784,091
2009	111	1,261,364
2010	185	2,101,750
2011	184	2,089,617

Source: - Ethiopian Revenues & Customs Authority.

As can be seen from the above Table, import of PP woven bags exhibits two distinguished trends. During the period 2002--2005, the average annual import was 35.99 million pieces. However during the next six years i.e. 2006 – 2011 import has sharply decreased to an annual average of 2.21 million pieces. This might be due to the emergence of local manufactures of PP woven bag which has substituted the previous import.

The total supply or apparent consumption of PP woven bag which comprise local production and import is summarized in Table 3.4.

Table 3.4**TOTAL SUPPLY OF PP WOVEN BAG (PCS)**

Year	Local Production	Import	Total Supply
2002	40,066,364	47,196,943	87,263,307
2003	32,007,818	25,443,341	57,451,159
2004	62,306,591	46,316,409	108,623,000
2005	91,801,773	25,003,875	116,805,648
2006	151,358,045	4,028,993	155,387,038
2007	104,919,545	2,022,727	106,942,273
2008	111,597,273	1,784,091	113,381,364
2009	148,358,727	1,261,364	149,620,091
2010	172,047,682	2,101,750	174,149,432
2011	165,302,045	2,089,617	167,391,662

As can be seen from Table 3.4, the total supply or apparent consumption of PP woven bags during the period 2002 – 2011 has ranged from 57.45 million pieces to 174.14 million pieces. The highest volume of total supply was registered in 2010 while the lowest was in 2003 however; on average total supply of PP woven bags were about 123.70 million pieces. During the period under consideration (2000--2010) total supply of PP woven bags has registered an average annual growth rate of 12.75%.

Considering the nature of the trend in the apparent consumption of PP woven bags it is assumed that the growth rate registered in the past will also continue in the near future. Accordingly, taking the apparent consumption for year 2011 as a base and applying a growth rate of 12.75% the present effective demand for PP woven bags is estimated at 188.73 million pieces or 16,609 tons.

2. Demand Projection

Currently in Ethiopia the major end users of PP woven bag are the agricultural and manufacturing sectors. According the Growth and Transformation Plan (GTP) of the

government the agriculture and industrial sectors of the country are expected to register a growth rate of 8.6% and 20%, respectively.

However, in order to be conservative growth rate of 11% is considered for PP bags which are equivalent to the expected growth rate of the country's GDP. Moreover, it is assumed that the highest local production during the period 2002 – 2011 which is 170 million indicates the local production capacity of PP woven bag. Accordingly, the projected demand and demand supply gap for PP woven bag estimated on the basis of the above assumption and using the estimated present demand as a base is presented in Table 3.5.

Table 3.5

PROJECTED DEMAND FOR PP WOVEN BAG AND DEMAND SUPPLY GAP

Year	Projected Demand		Existing capacity		Demand supply gap	
	Pieces	Tons	Pieces	Ton	Pieces	Ton
2013	209,494,850	18,436	172,047,682	15,140	37,447,168	3,296
2014	232,539,283	20,463	172,047,682	15,140	60,491,601	5,323
2015	258,118,604	22,714	172,047,682	15,140	86,070,922	7,574
2016	286,511,651	25,213	172,047,682	15,140	114,463,969	10,073
2017	318,027,933	27,986	172,047,682	15,140	145,980,251	12,846
2018	353,011,005	31,065	172,047,682	15,140	180,963,323	15,925
2019	391,842,216	34,482	172,047,682	15,140	219,794,534	19,342
2020	434,944,859	38,275	172,047,682	15,140	262,897,177	23,135
2021	482,788,794	42,485	172,047,682	15,140	310,741,112	27,345
2022	535,895,561	47,159	172,047,682	15,140	363,847,879	32,019
2023	594,844,073	52,346	172,047,682	15,140	422,796,391	37,206
2024	660,276,921	58,104	172,047,682	15,140	488,229,239	42,964
2025	732,907,382	64,496	172,047,682	15,140	560,859,700	49,356

3. Pricing and Distribution

The current factory gate price of woven PP bag which is also recommended to be adopted by the envisaged plant is shown in Table 3.6.

Table 3.6
FACTORY GATE PRICE OF WOVEN PP BAG (PCS)

Sr. No.	Size (cm)	Weight (gm)	Capacity (kg)	Price (Birr)
1	52 - 85	60	25	3.00
2	61 - 100	90	50	4.00
3	61 - 110	100	50	5.50
4	72 -120	110	100	7.50

The products of the envisaged factory can be distributed through the existing wholesale channel or by establishing own distribution centers at strategic locations.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

The production capacity of the plant is 12,000,000 bags per year. The envisaged plant will operate in two shifts sixteen hours per day for three hundred days within a year considering 13 holidays and 52 Sunday per year and assuming that maintenance activities will be performed during off hours and Sundays.

2. Production Program

The plant will operate at different capacity after the implementation until all production factors start to function properly and also till the operators develop skills and experience for operation and troubleshooting. The annual production program is as shown in Table 3.7.

Table 3.7**PRODUCTION PROGRAM**

Description	Production Year		
	1	2	3
Capacity utilization rate	75	85	100
Production (pieces)	9,000,000	10,200,000	12,000,000

IV. MATERIALS AND INPUTS**A. RAW MATERIALS**

The main and direct major raw material required for production of poly propylene woven bag are polypropylene resin, also ink and solvent are auxiliary materials for printing purpose. All the raw materials have to be imported. Annual requirement and related cost of the raw materials at full capacity operation is shown in Table 4.1.

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

Sr. No.	Description	Annual Consumption	Unit Cost (Birr /Ton)	Total Cost (`000 Birr)		
				LC	FC	Total
1	Poly propylene (resin)	2,520 Ton	25,600		64,512.00	64,512.00
2	Ink	12 Ton	44,000		528.00	528.00
3	Solvent	24 Ton	30,400		729.60	729.60
4	Sewing yarn	48 Ton	20,000	20.00		20.00
Total FOB					65,769.60	65,789.60
5	CIF (15%)			9,865.44		9,865.44
Total Annual Raw Material Cost				9,885.44	65,769.60	75,655.04

B. UTILITES

The main utilities of the envisaged plant are electricity and water. Annual cost of utilities is Birr 321,140. Annual consumption and related cost at full capacity operation is shown in Table 4.2.

Table 4.2

ANNUAL UTILITY REQUIREMENT

Sr. No.	Description	Annual Consumption	UOM	Unit Cost (Birr)	Total Cost (`000 Birr)
1	Electricity	210,000	kWh	0.58	121
2	Water	20,000	m ³	10.00	200
Total Annual Cost					321

V. TECHNOLOGY AND ENGINNERING

A. TECHNOLOGY

1. Production Process

The production process of polypro bag involves three main production operations namely yarn making, weaving and bag making is described below:

Yarn making

Polyethylene resin is charged in to hopper of extruder and heated to pass through the die to form film and the film is cooled ,cut in to a fixed width ,then delivered continuously in to stretching equipment .The hot plate of the stretching equipment will heat the slit tape film which is then stretched by high seed rolls and results a stretched yarn which will be annealed and wound on a bobbin to be delivered to weaving process

Weaving

This process is carried out by a circular loom system for weaving the stretched yarn in tabular state .The yarn is drawn out from the creel stand is set on the loom in a circular shape and used

as a warp .The pick is set on four shuttles which are inside the loom and when the loom is operated the shuttle rotates in a circular shape which results the pick to move through the warp in a circular shape to effect weaving

Bag making

This is the last stage of the production process where the woven yarn is printed, cut to length and converted to bag using cutters, printers and sewing machine in the process

2. Environmental Effect

The envisaged plant is a manufacturing plant with no chemical or any hazardous waste to the surrounding environment and process scrapes and wastes will be sold to surrounding market for different application so that there will not be additional investment for environmental protection

B. ENGINNERING

1. Machinery and Equipment

Total cost of machinery and equipment is estimated at Birr 14.48 million out of which Birr 12.154 million is required in foreign currency. For details see Table 5.1.

Table 5.1**LIST OF MACHINERY AND EQUIPMENTS AND COST**

Sr.No.	Description	Qty.	Unit Cost (Birr)	Total Cost ("000) Birr		
				LC	FC	Total (Birr)
1	Yarn extrusion and stretching machine	8.00	630,000.00		5,040.00	5,040.00
2	Take up winder	8.00	189,000.00		1,512.00	1,512.00
3	Circular loom	25.00	180,000.00		4,500.00	4,500.00
4	Printing machine	2.00	144,000.00		288.00	288.00
5	Cutting machine	2.00	126,000.00		252.00	252.00
6	Sewing machine	2.00	18,000.00		36.00	36.00
7	packing machine	1.00	180,000.00		180.00	180.00
8	Teasing machine	2.00	54,000.00		108.00	108.00
9	Forklift machine	1.00	500.00	500.00		500.00
10	Spare parts (2%)				238.32	
Total Fob Price				500.00	12,154.32	12,654.32
11	CIF (15%)			1,823.15		1,823.15
Grand Total Machinery Cost				2,323.15	12,154.32	14,477.47

2. Land, Building and Civil Works

The total estimated area of land requirement for the plant is 3,000 m² out of which the factory build up area is 1500 m². At the rate of Birr 5,000 per m² the total cost of building and civil work is estimated at Birr 7.5 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 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 Completion 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 798,000 of which 10% or Birr 79,800 will be paid in advance. The remaining Birr 718,200 will be paid in equal installments with in 28 years i.e. Birr 25,650 annually

VI. HUMANRESOURCE AND TRAINING REQUIREMENTS

A. HUMANRESOURCE REQUIREMENT

A total of 57 workers are required by the plant. Annual cost of labor is Birr 1,221,120. The total direct and indirect labor requirement with corresponding labor cost is shown in Table 6.1.

Table 6.1
HUMANRESOURCE REQUIREMENT& LABOR COST

Sr. No.	Description	Required No.	Monthly Salary	Annual salary (`000 Birr)
1	Plant manager	1	8,000.00	96.0
2	Secretary	1	2,500.00	30.0
3	operators-Yarn making	8	1,400.00	134.4
4	operators- weaving	25	1,400.00	420.0
5	operators- cutting and printing	4	1,200.00	57.6
6	bag sewing operators	4	800.00	38.4
7	Packing and inspection	4	600.00	28.8
8	forklift driver	1	1,400.00	16.8
9	Administration and finance	1	4,500.00	54.0
10	Accountant	1	3,000.00	36.0
11	Clerk	1	800.00	9.6
12	Cashier	1	1,800.00	21.6
13	Mechanic	1	2,200.00	26.4
14	Electricians	1	2,200.00	26.4
15	Guards	3	600.00	21.6
Total		57	32,400.00	1,017.6
16	Employment benefits and allowances 20%		6,480.00	203.5
Total Annual Labor cost				1,221.1

B. TRAINING REQUIREMENT

Since the complication of the production technology is very low ,on -job training can be arranged by hiring both for the maintenance workers and operators before machinery commissioning and make them involved both at installation and commissioning stage of the plant with a total estimated on job training cost of Birr 150,000

VII. FINANCIAL ANALYSIS

The financial analysis of the woven bags 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	3 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 46.34 million (see Table 7.1). From the total investment cost, the highest share (Birr 23.21 million or 50.08%) is accounted by fixed investment cost followed by initial working capital (19.02 million

or 41.06%) and pre operation cost (Birr 4.10 million or 8.63%). From the total investment cost, Birr 12.15 million or 26.23% 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	79.80		79.80	0.17
1.2	Building and civil work	7,500.00		7,500.00	16.19
1.3	Machinery and equipment	2,323.15	12,154.32	14,477.47	31.24
1.4	Vehicles	900.00		900.00	1.94
1.5	Office furniture and equipment	250.00		250.00	0.54
	Sub total	11,052.95	12,154.32	23,207.27	50.08
2	Pre operating cost *				
2.1	Pre operating cost	1,073.87		1,073.87	2.32
2.2	Interest during construction	3,031.34		3,031.34	6.54
	Sub total	4,105.21		4,105.21	8.86
3	Working capital **	19,023.71		19,023.71	41.06
	Grand Total	34,181.87	12,154.32	46,336.19	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 25.50 million. However, only the initial working capital of Birr 19.02 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 85.23 million (see Table 7.2). The cost of raw material account for 88.76% of the production cost. The other major components of the production cost are depreciation, financial cost, labor, and utility which account for 4.24%, 3.80%, 1.19% and 0.38%, respectively. The remaining 1.63% is the share of

marketing and distribution, 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 (000 Birr)	%
Raw Material and Inputs	75,655.00	89.10
Utilities	321.00	0.38
Maintenance and repair	434.00	0.51
Labour direct	1,018.00	1.20
Labour overheads	204.00	0.24
Administration Costs	250.00	0.29
Land lease cost	-	-
Cost of marketing and distribution	500.00	0.59
Total Operating Costs	78,382.00	92.31
Depreciation	3,615.27	4.26
Cost of Finance	2,917.66	3.44
Total Production Cost	84,914.93	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 3.85 million to Birr 7.89 million during the life of the project. Moreover, at the end of the project life the accumulated net cash

flow amounts to Birr 70.39 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.

$$\text{Break- Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 37,800,000$$

$$\text{Break -Even Capacity utilization} = \frac{\text{Break -even Sales Value}}{\text{Sales revenue}} \times 100 = 33.96 \%$$

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 7 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 17.79% 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 21.48 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 57 persons. The project will generate Birr 19.07 million in terms of tax revenue. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports. The project will also create backward linkage with plastic manufacturing sub sector and forward linkage with the packaging and logistics sub sector and also generates other income for the Government.

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	56,741	64,307	75,655	75,655	75,655	75,655	75,655	75,655	75,655	75,655
Utilities	241	273	321	321	321	321	321	321	321	321
Maintenance and repair	326	369	434	434	434	434	434	434	434	434
Labour direct	764	865	1,018	1,018	1,018	1,018	1,018	1,018	1,018	1,018
Labour overheads	153	173	204	204	204	204	204	204	204	204
Administration Costs	188	213	250	250	250	250	250	250	250	250
Land lease cost	0	0	0	0	26	26	26	26	26	26
Cost of marketing and distribution	500	500	500	500	500	500	500	500	500	500
Total Operating Costs	58,912	66,700	78,382	78,382	78,408	78,408	78,408	78,408	78,408	78,408
Depreciation	3,615	3,615	3,615	3,615	3,615	325	325	325	325	325
Cost of Finance	0	3,334	2,918	2,501	2,084	1,667	1,250	834	417	0
Total Production Cost	62,527	73,649	84,915	84,498	84,107	80,400	79,983	79,566	79,149	78,733

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	67,500	76,500	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000
Less variable costs	58,412	66,200	77,882	77,882	77,882	77,882	77,882	77,882	77,882	77,882
VARIABLE MARGIN	9,089	10,300	12,118	12,118	12,118	12,118	12,118	12,118	12,118	12,118
in % of sales revenue	13.46	13.46	13.46	13.46	13.46	13.46	13.46	13.46	13.46	13.46
Less fixed costs	4,115	4,115	4,115	4,115	4,141	851	851	851	851	851
OPERATIONAL MARGIN	4,973	6,185	8,003	8,003	7,977	11,267	11,267	11,267	11,267	11,267
in % of sales revenue	7.37	8.09	8.89	8.89	8.86	12.52	12.52	12.52	12.52	12.52
Financial costs		3,334	2,918	2,501	2,084	1,667	1,250	834	417	0
GROSS PROFIT	4,973	2,851	5,085	5,502	5,893	9,600	10,017	10,434	10,851	11,267
in % of sales revenue	7.37	3.73	5.65	6.11	6.55	10.67	11.13	11.59	12.06	12.52
Income (corporate) tax	0	0	0	1,651	1,768	2,880	3,005	3,130	3,255	3,380
NET PROFIT	4,973	2,851	5,085	3,851	4,125	6,720	7,012	7,304	7,595	7,887
in % of sales revenue	7.37	3.73	5.65	4.28	4.58	7.47	7.79	8.12	8.44	8.76

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	24,281	89,646	76,512	90,018	90,000	90,000	90,000	90,000	90,000	90,000	90,000	32,965
Inflow funds	24,281	22,146	12	18	0	0	0	0	0	0	0	0
Inflow operation	0	67,500	76,500	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	0
Other income	0	0	0	0	0	0	0	0	0	0	0	32,965
TOTAL CASH OUTFLOW	24,281	81,057	76,745	89,282	86,702	86,430	87,123	86,831	86,539	86,248	81,788	0
Increase in fixed assets	24,281	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	19,114	2,543	3,815	0	2	0	0	0	0	0	0
Operating costs	0	58,412	66,200	77,882	77,882	77,908	77,908	77,908	77,908	77,908	77,908	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income tax	0	0	0	0	1,651	1,768	2,880	3,005	3,130	3,255	3,380	0
Financial costs	0	3,031	3,334	2,918	2,501	2,084	1,667	1,250	834	417	0	0
Loan repayment	0	0	4,168	4,168	4,168	4,168	4,168	4,168	4,168	4,168	0	0
SURPLUS (DEFICIT)	0	8,588	233	736	3,298	3,570	2,877	3,169	3,461	3,752	8,212	32,965
CUMULATIVE CASH BALANCE	0	8,588	8,355	9,091	12,390	15,959	18,836	22,005	25,466	29,218	37,430	70,395

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	67,500	76,500	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	32,965
Inflow operation	0	67,500	76,500	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	0
Other income	0	0	0	0	0	0	0	0	0	0	0	32,965
TOTAL CASH OUTFLOW	43,305	61,442	70,496	78,382	80,035	80,176	81,288	81,413	81,538	81,663	81,788	0
Increase in fixed assets	24,281	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	19,024	2,531	3,796	0	2	0	0	0	0	0	0	0
Operating costs	0	58,412	66,200	77,882	77,882	77,908	77,908	77,908	77,908	77,908	77,908	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income (corporate) tax		0	0	0	1,651	1,768	2,880	3,005	3,130	3,255	3,380	0
NET CASH FLOW	-43,305	6,058	6,004	11,618	9,965	9,824	8,712	8,587	8,462	8,337	8,212	32,965
CUMULATIVE NET CASH FLOW	-43,305	37,247	-31,243	19,625	-9,660	164	8,876	17,464	25,926	34,263	42,475	75,440
Net present value	-43,305	5,507	4,962	8,729	6,806	6,100	4,918	4,407	3,948	3,536	3,166	12,709
Cumulative net present value	-43,305	37,798	-32,836	24,107	-17,301	11,201	-6,283	-1,876	2,071	5,607	8,773	21,483

NET PRESENT VALUE 21,483
INTERNAL RATE OF RETURN 17.79%
NORMAL PAYBACK 7 years