

34. PROFILE ON SYNTHETIC YARN

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I. SUMMARY

This profile envisages the establishment of a plant for the production of synthetic yarn with a capacity of 42 tonnes per annum.

The major raw material required is synthetic fiber which has to be imported.

The present demand for the proposed product is estimated at 9,460 tonnes per annum. The demand is expected to reach at 24,536 tonnes by the year 2018.

The total investment requirement is estimated at Birr 8.97 million, out of which Birr 2.26 million is required for plant and machinery. The plant will create employment opportunities for 21 persons.

The project is financially viable with an internal rate of return (IRR) of 14.04 % and a net present value (NPV) of Birr 2.87 million at 8.5%.

The project creates forward linkage with the textile sector. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports.

II. PRODUCT DESCRIPTION & APPLICATION

Synthetic yarn is man made fiber made up of chemical products widely used to meet the ever increasing demand for textile products. The demand for the product is increasing in the world owing to their economic advantages and quality. Some of the important man-made fibers are acrylic, nylon, olefin, polyester, rayon etc.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

Currently, the demand for synthetic yarn in Ethiopia is virtually met through import. Some of the biggest textile mills in the country such as Awassa and Almeda Textile Factories import synthetic yarn for internal use i.e. as a raw material for fabric production. A seven years series of import data pertaining to synthetic yarn, excluding the synthetic fibers imported for internal use by some of the textile mills, is provided in Table 3.1.

Table 3.1
IMPORT OF SYNTHETIC YARN (TONS)

Year	Import
2000	3,963
2001	2,636
2002	6,377
2003	6,848
2004	6,509
2005	8,175
2006	6,130

Source: - Compiled from import data of Ethiopian Customs Authority.

Import of synthetic yarn consists of acrylic, polyester and nylon. The imported quantity of synthetic yarn was generally increasing during the past seven years. During the period 2000-2001 the annual average level of import was about 3,300 tons. The yearly average quantity imported between the periods 2002 to 2004 was around 6,578 tons. By the year 2005-2006 the yearly average imported quantity has increased to 7,153 tons. Over this

seven years period, import of synthetic yarn has grown at an average annual growth rate of about 15%. Taking the recent two years average, which is 7,153 tons, and applying the 15% historical growth rate current (2008) demand for synthetic yarn is estimated at 9,460 tons.

2. Projected Demand

The demand for synthetic yarn depends on the performance of the textile sector. In the past, the sector was beset by diverse problems, the major ones being stiff competition from legally and illegally imported fabrics and clothings.

There are, however, favorable prospects for the sector stemming from opening of the markets of the United States and the European Union countries to Ethiopian textile products. The Ethiopian Government is also taking various supportive initiatives including credit on easy terms and availing land for factory premises to boost the foreign exchange earning capacity of the sector.

One of the strategies of the Government to accelerate economic development and to improve the living standard of the people is the Industrial Development Strategy which is based on ADLI. The following are among the measures that are put forward through the Industrial Development Strategy.

- Creating conducive environment for industrial development and investment.
- Provide direct support and guidelines to strategic industries which include support to textile and garment industries.

The target set for the industrial sector during the period of the Plan for Accelerated and Sustained Development to End Poverty (PASDEP, 2004/05-2009/10) is to register an average annual growth rate of 11.5% and thereby to increase the sector's share in overall GDP from 13.6% in 2004/05 to 16.5% by the end of 2009/10. By the end of the PASDEP period it is expected that export earnings from textile and garment industries will reach US \$500 million. In this regard continuous investment support and expansion

activities will be carried out by the Government for more than 191 investors with investment worth US \$1.6 billion in textile and garment industry.

Hence, when these factors are taken into account, it won't be unreasonable to assume that the demand for synthetic yarn to grow by an average of 10% per annum. The demand projection worked based on this assumption is given in Table 3.1.

Table 3.2
PROJECTED DEMAND FOR SYNTHETIC YARN (TONS)

Year	Projected Demand
2009	10,406
2010	11,446
2011	12,591
2012	13,850
2013	15,235
2014	16,759
2015	18,435
2016	20,278
2017	22,306
2018	24,536

3. Pricing and Distribution

The latest (2007) average CIF price for synthetic yarn was Birr 48,963.24 per ton although prices for different specifications vary. Price suggested for the project's output is, therefore, to be based on the CIF prices of imports and the additional costs of customs duty, other relevant taxes, inland transport as well as other handling charges, which may be estimated at about 45% of the CIF price. Accordingly, a factory gate price of Birr 68,548.54 per ton is taken for sales revenue projection.

The product will have to reach the end users through the existing yarn distributing enterprises through out the country.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

Based on the technology recommended the proposed plant will have a production capacity of 42 tons per annum.

The plant will operate single shift, 8 hours a day and for 300 days a year.

2. Production Programme

Considering a period needed for production skill development and market penetration, the capacity utilization rates of 75% , 85% and 100% in the first, second, and third year respectively are selected. Table 3.3 shows the proposed production programme.

Table 3.3
PRODUCTION PROGRAMME

Year	1	2	3-15
Capacity utilization (%)	75	85	100
Production (tons)	31.50	35.70	42

IV. MATERIALS AND INPUTS

A. RAW MATERIALS

The major raw material is acrylic fibre, and its annual requirement is indicated in Table 4.1. The acrylic fiber is imported from India , China, Malaysia , South Korea and

Thailand and other inputs like packaging materials are also required which can be sourced from local packaging manufacturers.

Table 4.1
RAW MATERIALS REQUIREMENTS
(AT FULL CAPACITY)

Description	Unit	Qty	Cost ('000 Birr)		
			FC	LC	TC
Synthetic fibre	Ton	50	1095	405	1500
Packing materials	Ton	1.5	64	-	64
Total		-	1,159	405	1,564

B. UTILITIES

Electricity and water are utilities required for the envisaged plant. The total annual expenditure on utilities will be Birr 121,789. The details are shown in Table 4.2.

Table 4.2
ANNUAL UTILITIES REQUIREMENTS

S/No	Description	Qty	Unit rate	Cost (Birr)
1	Electricity (Kwh)	240,000	0.4736	113,664
2	Water (m ³)	2500	3.25	8125
	Total	-		121,789

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1 Production Process

The production process involves the following sub- processes.

- Opening, Blending and Cleaning
- Carding
- Drawing
- Roving
- Spinning
- Winding
- Twisting

Opening, blending and cleaning: -All staple fibers must pass through some form of opening, blending and cleaning to convert compressed bales of fiber into an open sheet for presentation to the carding machine.

Carding: - is the last major cleaning and opening operation in the normal process and converts the open flock into a condensed sliver reducing its weight per meter to 100th of the flock weight.

Drawing: - The draw frame draws several slivers from the card and attenuates them to the dimensions of one thus increasing the uniformity of the product.

Roving:- The objective of roving is to attenuate further and to even the sliver, give it some twist to the strength required at this stage, and wind onto a bobbin to fit a ring frame creel. This process is eliminated in open-end [rotor] spinning.

Spinning: - It is the final process in the transformation of fiber into yarn or thread.

Spinning twists fibers of finite length together to form a long, continuous length of thread or yarn. The yarn is finally wound in appropriate container like cone, cops, reel etc. by using winding machine according to the market demand.

The production of yarn starts from dyed fiber as a result no finishing operation is involved which uses many chemicals which requires treatment plant before disposal. So the envisaged plant has no any adverse impact on environment.

2. Source of Technology.

The equipment can be supplied from Europe, Far East or India. Contact can be made with the following suppliers:

i) Wujaang Wanshiy Silk Co.Ltd

Contact Person: Sherry

<http://www.wanshiyitex.com>

B. ENGINEERING

1. Machinery and Equipment

The list of machinery and equipment required for the production of synthetic yarn is indicated in Table 5.1. The total cost of machinery is estimated to be Birr 2.3 million, out of which Birr 1.92 million is required in foreign currency.

Table 5.1
MACHINERY AND EQUIPMENT REQUIREMENT FOR THE
PRODUCTION OF SYNTHETIC YARN AND COST

S/N	Description	Qty	Cost ('000 Birr)		
			FC	LC	TC
1	Ring frame-400 spindle	1	476	84	560
2	Twisting machine of 200 spindles German type with bottom and tap rollers and aluminum pulley	1	163.2	28.8	192
3	Intersection gill box 2Hx2 balls Japan type 48 fallers, high speed	1	108.8	19.2	128
4	Intersection gill box 2H x 4 balls Japan type 48 fallers, high speed	1	204	36	240
5	Intersection gill box 2Hx4 balls Japan type 48 fallers, high speed	1	204	36	240
6	Robbins machine 10H x 20 balls	1	81.6	14.4	96
7	Robbins machine 15Hx30 balls	1	115.6	20.4	136
8	Cheese winder 30 spindles CI drum	1	61.2	10.8	72
9	Two rolling machine 40 page cards	1	115.6	20.4	136
10	Carding machine	1	163.2	28.8	192
11	Hand building press 5 kg. capacity		34	6	40
12	Electrical fitting	Set	163.2	28.8	192
13	Temperature and humidity control	-	34	6	40
	Total		1924.4	339.6	2264

2. Land, Building and Civil Works

The envisaged plant requires a total land area of 1500 m², of which 1000m² would be built-up area comprising of 620m² for production hall, 300m² and 80m² for store and office respectively. Building construction cost at a rate of Birr 2500/m² is estimated to be Birr 2.5 million.

According to the Federal Legislation on the Lease Holding of Urban Land (Proclamation No 272/2002) 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.

The land lease price in the industrial zones varies from one place to the other. For example, a land was allocated with a lease price of Birr 284 /m² in Akakai-Kalti and Birr 341/ m² in Lebu and recently the city's Investment Agency has proposed a lease price of Birr 346 per m² for all industrial zones.

Accordingly, in order to estimate the land lease cost of the project profiles it is assumed that all manufacturing projects will be located in the industrial zones. Therefore, for this profile, which is a manufacturing project a land lease rate of Birr 346 per m² 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 5.2 shows incentives for lease payment.

Table 5.2

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 period of lease for industry is 60 years .

Accordingly, the total lease cost, for a period of 60 years with cost of Birr 346 per m², is estimated at Birr 31.14 million of which 10% or Birr 3,114,000 will be paid in advance. The remaining Birr 28.03 million will be paid in equal installments with in 28 years i.e. Birr 1,000,929 annually.

VI. MANPOWER AND GTRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

A total of 21 persons would be required for the envisaged plant. The annual cost would be Birr198,000. The details are given in Table 6.1.

Table 6.1
MANPOWER REQUIREMENT AND ESTIMATED LABOUR COST

Sr. No	Description	No. of persons	Salary(Birr)	
			Monthly	Annual
1	Plant Manager	1	4,000	48,000
2	Secretary	1	800	9,600
3	Production Supervisor	1	1,500	18,000
4	Operator	6	3,600	43,200
5	Labourer	3	1,050	12,600
6	Cleaner	1	350	4,200
7	Personnel	1	900	10,800
8	Accountant	1	1,000	12,000
10	Cashier	1	700	8,400
11	Technician	1	800	9,600
11	Sales Man	1	600	7,200
16	Driver	1	500	6,000
17	Guard	2	700	8,400
	Total	21	16,500	198,000

B. TRAINING REQUIREMENT

Training will be required for supervisor and production workers. It is recommended that machinery supplier will provide on-the-job training for two weeks. The cost of training is estimated at Birr 20,000; 75% of which would be in foreign currency.

VII. FINANCIAL ANALYSIS

The financial analysis of the synthetic yarn 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	8.5%
Discount cash flow	8.5%
Accounts receivable	30 days
Raw material local	30 days
Raw material import	90 days
Work in progress	1 days
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 8.97 million, of which 22 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 ('000 Birr)

Sr. No.	Cost Items	Local Cost	Foreign Cost	Total Cost
1	Land lease value	3,114.00	-	3,114.00
2	Building and Civil Work	2,500.00	-	2,500.00
3	Plant Machinery and Equipment	339.60	1,924.40	2,264.00
4	Office Furniture and Equipment	50.00	-	50.00
5	Vehicle	150.00	-	150.00
6	Pre-production Expenditure*	581.32	15.00	596.32
7	Working Capital	298.19	-	298.19
	Total Investment cost	7,033.11	1,939.40	8,972.51

* *N.B Pre-production expenditure includes interest during construction (Birr 446.32 thousand), training (Birr 20 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 2.65 million (see Table 7.2). The raw material cost accounts for 58.85 per cent of the production cost. The other major components of the production cost are financial cost, depreciation and utilities which account for 14.90 %, 8.05% and 4.58 % respectively. The remaining 13.61 % is the share of direct labour, repair and maintenance, labour overhead and other administration cost.

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

Items	Cost	%
Raw Material and Inputs	1,564.00	58.85
Utilities	121.79	4.58
Maintenance and repair	113.20	4.26
Labour direct	119.28	4.49
Labour overheads	49.70	1.87
Administration Costs	79.52	2.99
Land lease cost	-	-
Total Operating Costs	2,047.49	77.05
Depreciation	213.96	8.05
Cost of Finance	395.96	14.90
Total Production Cost	2,657.41	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 476.10 thousand to Birr 846.59 thousand during the life of the project. Moreover, at the end of the project life the accumulated cash flow amounts to Birr 10.03 million.

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

$$\text{BE} = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable Cost}} = 24 \%$$

4. Payback Period

The pay back period, also called pay – off period is defined as the period required to recover 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 14.04 % 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 8.5% discount rate is found to be Birr 2.87 million which is acceptable.

D. ECONOMIC BENEFITS

The project can create employment for 21 persons. In addition to supply of the domestic needs, the project will generate Birr 2.4 million in terms of tax revenue. The project creates forward linkage with the textile sector. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports.