51. PROFILE ON COTTON YARN

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I. SUMMARY

This profile envisages the establishment of a plant for the production of 1,500 tonnes of cotton yarn per annum.

The present demand for proposed product is estimated at 6,945 tonnes and it is projected to reach at 20,504 tonnes by the year 2020.

The plant will create employment opportunities for 100 persons.

The total investment requirement is estimated at Birr 34.24 million, out of which Birr 20.5 million is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 14% and a net present value (NPV) of Birr 7.41 million, discounted at 10.5%.

II. PRODUCT DESCRIPTION AND APPLICATION

Cotton yarn is a continuous strand often of two or more plies that is composed of carded or combed fibers of cotton twisted together, or filaments or blends of same. It is used for warp and weft in weaving and for knitting or other interlacing that form cloth.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The demand for cotton yarn in Ethiopia is currently met through domestic production though the country was importing some amount in the past to fill the demand gap. The local producers are two spinning plants: Adei Ababa Yarn Factory and Edget Yarn and

Sewing Thread Factory; and integrated textile mills: such as Akaki, Awassa, Kombolcha, Almeda and DireDawa textile factories.

Adei Ababa Yarn Factory which was established in 1961 in Addis Ababa has installed capacity of 4,967 tonnes/ year, while Edget Yarn and Sewing Thread factory has an installed capacity of 1,450 tonnes/year. The integrated mills produce yarn mainly for the consumption of their own weaving department to produce fabrics, while the spinning factories produce exclusively for the handloom sector and other consumers of industrial yarn.

In addition to the above, cotton yarn is spun at household level; and according to a textile sector study conducted by IPS (1996), annual production of home-spun yarn is estimated at 200 tonnes. Traditional weavers (the handloom sector) use industrially produced yarn for warp and home-spun yarn for weft to produce traditional garments (*buluko*, *gabi* etc).

The domestic production data of industrially produced cotton yarn is sown in Table 3.1.

Table 3.1

LOCAL PRODUCTION OF INDUSTRIAL COTTON YARN (TONNES)

Year	Domestic Production of Cotton Yarn
1993	4,910
1994	535
1995	4,934
1996	4,440
1997	3,133
1998	2,657
1999	3,408
2000	3,977
2001	5,726
2002	5,736

Source: *CSA, Survey of the Manufacturing and Electricity Industries, Annual issue.*

Table 3.1 clearly depicts that local production of industrial yarn has reached to 5,736 tonnes in 2002. When the estimated production of home-spun yarn is added to this, the

figure comes to about 5,900 tonnes per annum. During the period 1993-2002 cotton yarn production had exhibited an average annual growth of 5%. Assuming that this growth trend had continued the present (2004) demand for cotton yarn would be in the order of 6,945 tonnes per annum.

2. Projected Demand

As revealed by the data set in Table 3.1, cotton yarn consumption had exhibited an average annual growth of 5% during the period 1993-2002. However, according to textile sector survey conducted in 1996 by Chemonics International (INC) the textile sector of Ethiopia operates at only 50% of their capacity; the major constraints being competition from legally and illegally imported fabrics and closings. There are, however, favourable prospects for the sector stemming from opening of the markets of the United States and European Union countries to Ethiopian textile products. The Ethiopian government has also taken various supportive initiatives, including credit on easy terms to boost the foreign exchange earning capacity of the sector. Accordingly it can be assumed that the growth in demand for cotton yarn will be higher than the growth registered in the past. Therefore, the future demand for cotton yarn is projected by taking the estimated present demand as a base and applying an annual average growth rate of 10%. (see Table 3.2).

Table 3.2

PROJECTED DEMAND FOR COTTON YARN

Year	Projected Demand (Tonnes)	Existing Capacity	Demand Cap
2005	7,431	5,900	1,531
2006	7,952	5,900	2,052
2007	8,508	5,900	2,609
2008	9,104	5,900	3,204
2009	9,741	5,900	3,842
20010	10,424	5,900	4,524
2011	11,153	5,900	5,253
2012	11,934	5,900	6,034
2013	12,769	5,900	6,869
2014	13,663	5,900	7,763
2015	14,619	5,900	8,720
2016	15,643	5,900	9,743
2017	16,738	5,900	10,838
2018	17,909	5,900	12,010
2019	19,163	5,900	13,264
2020	20,504	5,900	14,605

3. Pricing and Distribution

The current factory-gate price of cotton yarn is:

Type	Price (Birr /kg)
21 count	17.6
10 count	15.6
40 count (bleached)	25.4

For the purpose of financial analysis, the average price of (Birr 19.5 kg) is adopted. Currently, distribution of yarn is undertaken by long established wholesalers, most of them located in Merkato area of Addis Ababa. The envisaged plant can also adopt the existing distribution system.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

On the basis of demand projection made for the product and in consideration of high capital costs associated with high volume of production, a plant with a capacity of 1,500 tonnes of cotton yarn per annum is envisaged in this project profile.

For an average yarn count of 25, (i.e. for counts 10, 21 and 40 demanded in the market), the number of spindles matching this annual output is estimated at 20,000.

Production capacity is based on a schedule of 300 working days per annum and 3 shifts of eight hours each per day.

2. Production Programme

The envisaged production programme is given in Table 3.3 below. The schedule is worked out in consideration of the time required for gradual build-up in labour productivity and fine-tuning of machinery. Production starts at 75% of plant capacity in the first year of operation and reaches full-gear in the 3rd year of operation and thenafter.

Table 3.4
PRODUCTION PROGRAMME

Year	1	2	3-10
Capacity Utilization [%]	75	85	100
Production [tonnes]	1125	1275	1500

IV. MATERIALS AND INPUTS

A. MATERIALS

The major raw material needed for the manufacture of cotton yarn is ginned cotton and dye staff. All of these raw materials could be obtained from local suppliers; additionally, there is a very high potential to grow cotton in the region.

Different packaging materials are also needed in the production of cotton yarn; namely; paper cones, plastic sheets and cartons. Studies indicate that the combined cost of these materials is roughly about 3% of the cost of cotton used. Raw material requirement and the corresponding cost for the envisaged capacity of 1,500 tonnes of cotton yarn per annum is shown in Table 4.1.

Table 4.1

ANNUAL MATERIALS REQUIREMENTS AND COSTS

Sr. No.	Description	Unit of Measure	Qty	Unit Price (Birr)	Cost ('000 Birr)
1	Ginned cotton	Tonnes	1,612.5	1,0000	16,125.00
2	Dye staff	Tonnes	10	275	2,498.84
3	Packaging @3% cost of cotton	-	-		483.75
	Grand Total				**19,107.59**

B. UTILITIES

Electricity and water are the two major utilities required by the plant. Total cost of major utility items at full operation capacity of the plant is Birr 3,127,275. Details are shown in Table 4.2 below.

Table 4.2

ANNUAL UTILITIES REQUIREMENT AND COST

Sr. No.	Description	Unit of Measure	Qty	Unit price (Birr)	Cost ('000 Birr)
1.	Electricity	kWh	5,625,000	0.335	1,884.375
2.	Water	m^3	357,000	1.50	535.500
3.	Lubricant oil	liter	39,300	18.00	707.400
	Grand Total				**3,127.275**

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

Textile mills purchase cotton and receive the bales from gin yards or cotton warehouses. These mills start with raw bales of cotton and process them in stages until they produce yarn (fibers twisted into threads used in weaving or knitting) or cloth (fabric or material constructed from weaving or knitting).

The first stage in yarn making is done in the opening room. Here, bales are opened and laid in a line on the floor, side by side, near a cotton-opening machine. This machine travels along the line of opened bales, pulling fibers to be sent to a mixing machine and then on to the carding system.

Carding is the process of pulling the fibers into parallel alignment to form a thin web. High-speed electronic equipment with wire-toothed rollers performs this task. The web of fibers is eventually condensed into a continuous, untwisted, rope-like strand called a sliver.

These slivers then continue to a combing machine. Here, the fibers shorter than half-inch and impurities are removed from the cotton. This process makes the sliver smoother so more uniform yarns can be produced. The drawing or pulling of this sliver is next.

The sliver is drawn out to a thinner strand and given a slight twist to improve strength, and then wound on bobbins (spools wound with the thread-like product for storage). Having completed this process, it is now called roving. The roving bobbins are now ready for the spinning process.

Spinning and dyeing or bleaching is the last process in yarn manufacturing. Modern mills draw and twist the roving into yarn and place it on bobbins. They do this quite efficiently. With the use of automatic winding, the yarn bobbins are transferred to larger bobbins called cheese cones**.** These cheese cones can be stored until they are needed in the weaving process.

Cotton yarn making does not have any major adverse impacts on the environment.

2. Source Of Technology

The manufacturing technology and machinery for cotton spinning and yarn making operation can be obtained from suppliers in Europe and Asia.

The Tianjin Machinery Import and Export Corporation of China, for instance, is one renowned supplier. Its address is:

Tianjin Machinery Import and Export Corporation,
18 Zhangde Road, Heping District,
Tianjin, China;
Tel.: 86-22-23313095;
Fax: 86-22-23306082;
Web site: www.tmg.com.cn.

B. ENGINEERING

1. Machinery And Equipment

The list of machinery and equipment required for the production of cotton yarn are given in Table 5.1. On this basis, total cost of machinery and equipment is estimated at Birr 20.5 million, out of which Birr 13.5 million is required in foreign currency.

Table 5.1

LIST OF MACHINERY AND EQUIPMENT

Sr. No.	Description	Qty. No.
1	Blending and opening machine	1
2	Carding machine	1
3	Drawing machine	1
4	Combing machine	1
5	Roving machine	1
6	Spinning machine, 20, 000 spindle	1 Set
7	Winding machine	1
8	Packing machine	1
9	Auxiliary machines	Set
10	Dyeing/Bleaching cabinets	1
11	Laboratory equipment	Set

2. Land, Building And Civil Works

Total land requirement of the project is estimated at 5000m^2, out of which 3000m^2 is a built-up area. Cost of building construction, at a unit cost of Birr 1,500 per m^2, is estimated at Birr 4.5 million. Total land lease cost, for a period of 70 years and a unit cost of Birr 2 per m^2, is estimated at Birr 700,000. The total investment cost for land,

building and civil works, assuming that the total and lease cost will be paid in advance is estimated at Birr 5.2 million.

3. Proposed Location

The resource potential study of the Benishangul Gumuz Regional State indicates that cotton is one of the crops that could be cultivated in irrigable areas of the region, which include Afa, Dabus, Checorsa, Afafir, Tiliku sherkole, Yabus, Shilla and Fafa. Moreover, cotton could be cultivated through rain fed agriculture in Belojiganfy woreda.

In view of this, the Assosa zone (most preferably Assosa town itself) and Belojiganfoy are believed to be the most optimal locations for a cotton yarn factory as the above-mentioned areas have relatively better infrastructure.

VI. MANPOWER AND TRAINING REQUIREMENTS

A. MANPOWER REQUIREMENT

A spinning mill is a very labour intensive factory. Table 6.1 shows the list of manpower required and the estimated annual labour cost. Total manpower requirement, including skilled and unskilled labour, is estimated at 100 persons. Correspondingly, total annual labour cost, including fringe benefits, is estimated at Birr 821,250.

Table 6.1

MANPOWER REQUIREMENT AND LABOUR COST

Sr. No.	Description	No. Required	Monthly Salary [Birr]	Annual Salary [Birr]
1	General Manager	1	2,750	33,000
2	Secretary	1	800	9,600
3	Head, Administration & Finance	1	2,100	25,200
4	Secretary	1	600	7,200
5	Personnel & General Service Head	1	600	7,200
6	Archive	1	400	4,800
7	Personnel Clerk	1	300	3,600
8	General Service Clerk	1	300	3,600
9	Driver	1	300	3,600
10	Messenger	2	400	4,800
11	Guard	5	1,000	12,000
12	Cleaners (Office)	2	400	4,800
13	Finance Section Head	1	1,800	21,600
14	Senior Accountant	1	1,400	16,800
15	Accountant	1	750	9,000
16	Accounts Clerk	2	600	7,200
17	Cashier	1	350	4,200
18	Head, Commercial Department	1	2,100	25,200
19	Purchaser	1	350	4,200
20	Sales Person	2	700	8,400
21	Sales Clerk	1	300	3,600
22	Stores Clerk	2	600	7,200
23	Store Keeper	2	700	8,400
24	Production & Technical Manager	1	2,100	25,200
25	Production Head	1	1,800	21,600
26	Maintenance Head	1	900	10,800
27	Mechanical Maintenance Foreman	1	750	9,000
28	Electrical Maintenance Foreman	1	750	9,000
29	Electrician	1	450	5,400
30	Mechanic	2	900	10,800
31	Shift Leader	1	850	10,200
32	Mechanic Helper	5	300	3,600
33	Electrician Helper	2	600	7,200
34	Machinist	1	750	9,000
35	Machine Operators	50	25,000	300,000
	Sub-Total	**100**	**54,750**	657,000
	Worker's Benefit = 25% Of Basic Salary	**-**	13,687.5	164,250
	Grand Total	**100**	**68,437.50**	**821,250**

B. TRAINING REQUIREMENT

The technology of cotton spinning is not new to Ethiopia as there are a number of textile factories in the country. On account of this, it is believed that some trained labour will be in the market. Hence, an on-site training programme is believed to be sufficient; this should be arranged for key production, maintenance and quality control personnel in consultation with the machinery and technology supplier. The training can be best carried out during commissioning and performance testing of the factory. Cost of an on-site training of this nature is estimated at Birr 400,000.

VII. FINANCIAL ANALYSIS

The financial analysis of cotton yarn project is based on the data provided in the previous chatpers and the following assumptions:-

Construction period	2 years
Source of finance	30% equity
	70% loan
Tax holidays	3 years
Bank interest	10.5%
Discounted cash flow	10.5%
Repair and maintenance	2 % of Plant machinery and equipment
Accounts receivable	30 days
Raw material (local)	60 days
Work in progress	2 days
Finished products	30 days
Cash at hand	5 days
Accounts payable	30 days

A. TOTAL INITIAL INVESTMENT COST

The total initial investment cost of the project including working capital is estimated at Birr 34.24 million, out of which about 39% will be required in foreign currency. Details are indicated in Table 7.1.

Table 7.1

INITIAL INVESTMENT COST ('000 BIRR)

Sr. No.	Cost Items	Foreign Currency	Local Currency	Total
1	Land	-	700.00	700.00
2	Building and Civil Work	-	4,500.00	4,500.00
3	Plant Machinery and Equipment	13,500.00	7,000.00	20,500.00
4	Office Furniture and Equipment	-	100.00	100.00
5	Vehicle	-	300.00	300.00
6	Pre-production Expenditure*	-	4,045.86	4,045.86
	Total Investment Cost	**13,500.00**	**17,195.86**	**30,695.86**
7	Working Capital	-	3,545.52	3,545.52
	Grand Total	**13,500.00**	**20,741.29**	**34,241.39**

* Pre-*production expenditure include interest during construction (Birr 3.05 million), training (Birr 400,000) and cost 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 of the plant is estimated at Birr 28.45 million (see Table 7.2). The material and utility cost accounts for 78 per cent while repair and maintenance take 1.4 per cent of the production cost.

Table 7.2

ANNUAL PRODUCTION COST

('000 BIRR)

Items	Year			
	3	**4**	**7**	**10**
Raw Material and Inputs	14,330.69	16,238.80	19,107.59	19,107.59
Labour Direct	295.65	335.01	394.20	394.20
Utilities	2,345.47	2,657.75	3,127.28	3,127.28
Maintenance and repair	300.00	339.94	400.00	400.00
Labour overheads	123.19	139.59	164.25	164.25
Administrative Cost	197.10	223.34	262.80	262.80
Total operating costs	**17,592.09**	**19,934.44**	**23,456.12**	**23,456.12**
Depreciation	4,525.00	4,525.00	4,525.00	235.00
Cost of Finance	2,346.84	1,877.47	469.37	-
Total Production Cost	**24,463.93**	**26,336.91**	**28,450.48**	**23,691.12**

C. FINANCIAL EVALUATION

1. Profitability

According to the projected income statement, the project will start generating profit in the third year of operation. Important ratios such as the percentage of net profit to total sales, net profit to equity (return on equity) and net profit plus interest to total investment (return on total investment) will show an increasing trend throughout the production life

of the project. The income statement and other profitability indicators show that the project is viable.

2. Break-even Analysis

The break-even point of the project is estimated by using income statement projection.

$$Be = \frac{\text{Fixed Cost}}{\text{Sales-Variable Cost}} = 69\%$$

3. Pay-Back Period

The investment cost and income statement projection are used to project the pay-back period. The project will fully recover the initial investment and working capital within 7 years time.

4. Internal Rate of Return and Net Present Value

Based on the cash flow statement, the calculated IRR of the project is 14% and the net present value at 10.5% discount rate is Birr 7.41 million.

D. ECONOMIC BENEFITS

The project can create employment opportunities for 100 persons. In addition to supply of the domestic needs, the project will generate Birr 17.03 million in terms of tax revenue. Moreover, the Regional Government can collect employment, income tax and sales tax revenue. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports.