59. PROFILE ON COTTON GINNING

TABLE OF CONTENTS

I. SUMMARY

This profile envisages the establishment of a plant for the production of 15,000 tonnes of lint cotton per annum.

The current demand for the proposed product is estimated at 30,000 tonnes and it is projected to reach at 50,000 tonnes by the year 2019.

The plant will create employment opportunities for 34 persons.

The total investment requirement is estimated at Birr 7.77 million, out of which Birr 3 million is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 19% and a net present value (NPV) of Birr 4.26 million, discounted at 10.5%.

II. PRODUCT DESCRIPTION AND APPLICATION

Cotton is a natural fiber used as a raw material for cloth. Cotton is the principal raw material for the world's textile industry due to its strength, ease for spinning, absorbency, and capability for washing and dying. Fully refined and deodorized oil obtained from cotton seed is virtually used as salad and cooking oil and when dehydrated, for the production of margarine and shortening.

In the ginning operation the lint is separated from the cotton seed. The cotton obtained after compression in bales is transported to textile factories & the cotton seed is transported to the oil mills for further processing.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past supply and present Demand

The demand for lint cotton is derived from textile production. According to textile sector survey conducted in 1996 by Chemonics International (INC), the annual lint cotton consumption capacity of spinning plants in Ethiopia, when operating at full capacity, is 59,876 tonnes. Given the fact that the domestic textile sector is constrained by market and other problems, actual demand for lint cotton cannot be that much high. Currently, spinning plants operate at only 50% of their capacity; hence, present demand for lint cotton would be about 30,000 tonnes per annum.

Cotton is produced in Ethiopia by state farms, private commercial farms and peasant farms. Cotton produced on the state farms and private commercial farms is processed in ginneries and supplied to spinning mills for commercial textile manufacturing, while that much produced by peasant farmers is, for the larger part, used by the hand loom sector. The production of cotton by the state farms is undertaken by five enterprises; namely, Abobo, Middle Awash, North Omo and Tendho Agricultural Development Enterprises. The biggest producers are Middle Awash, followed by Tendaho, North Omo and Abobo. The annual production of lint cotton is shown in Table 3.1.

Table 3.1

PRODUCTION OF LINT COTTON IN ETHIOPIA

(1993-2002)

Year	Production (Tonnes)
1993	7,720
1994	7,270
1995	5,670
1996	5,324
1997	5,458
1998	6,324
1999	10,382
2000	12,356
2001	16,097
2002	20,845

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

The annual average production of lint cotton over the ten years period between 1993 and 2002 was 9,744 tonnes. However, production of lint cotton has exhibited significant growth since 1999, reaching a peak level of production (20,845 tonnes) in year 2002. Despite increase in production, the current supply is still lower than the current demand (about 30,000 tonnes).

2. Projected Demand

The future demand for lint cotton depends on the performance of the textile sector. Currently, the sector is beset by diverse problems, the major ones being stiff competition from legally and illegally imported fabrics and clothings.

There are, however, favourable 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 has also taken various supportive initiatives,

including credit on easy terms and availing land for factory premises, to boost the foreign exchange earning capacity of the sector.

Hence, when these factors are taken into account, it will be reasonable to assume that the capacity utilization in the textile sector will increase to about 80% in the coming five years, giving rise to a corresponding expansion in lint cotton demand. The future unsatisfied demand for lint cotton is projected on this assumption; and, as shown in Table 3. 2, it ranges from 12,600 tonnes by the year 2005 to 29,000 tonnes by the year 2019.

Table3. 2

PROJECTED DEMAND FOR LINT COTTON (TONNES)

(2004-2019)

Year	Projected Demand	Existing Production	Unsatisfied Demand
2004	30,000	21,000	9,000
2005	33,600	21,000	12,600
2006	37,600	21,000	16,600
2007	42,000	21,000	21,000
2008	48,000	21,000	27,000
2009	48,000	21,000	27,000
2010	48,000	21,000	27,000
2011	50,000	21,000	29,000
2012	50,000	21,000	29,000
2013	50,000	21,000	29,000
2014	50,000	21,000	29,000
2015	50,000	21,000	29,000
2016	50,000	21,000	29,000
2017	50,000	21,000	29,000
2018	50,000	21,000	29,000
2019	50,000	21,000	29,000

3. Pricing and Distribution

At present, most ginneries are integrated with cotton farms which provide ginning and baling service at a charge ranging between Birr 35-45 per quintal. It is recommended that the envisaged plant may charge Birr 40 per quintal.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

Based on the unsatisfied lint cotton demand obtained from the market study and the potential of cotton production in the region, the envisaged cotton ginnery will have annual capacity of producing 15,000 tonnes of lint cotton or equivalently treating 42,857 tonnes of raw cotton.

2. Production Programme

Considering skill development and market penetration, the plant is assumed to start production at 70% in the first year, 90% in the second year and full capacity in the third year and thereafter. The envisaged ginning plant will operate 250 days per year, in a single shift of eight hours a day.

IV. RAW MATERIALS AND INPUTS

A. MATERIALS

The main raw material required for the ginnery is raw cotton from cotton farms in the region. Auxiliary materials for the ginnery are ropes and hessian fabric for fastening the bales of lint cotton and jute bags for packing the cotton seed. All raw materials are locally available. Annual requirements and costs of raw materials are depicted on Table. 4.1.

Table 4.1

ANNUAL RAW MATERIAL REQUIREMENT AND COST

(AT FULL CAPACITY)

Sr. No.	Component	Consumption	Unit Cost	Total Cost ('000 Birr)
1.	Packing material for lint (150 kg)	lump sum	8.00	971.43
2.	Jute sack (75 kg)	345,000 pcs	7.50	2,587.5
	Grand Total			**3,558.93**

B. UTILITIES

Utilities required for cotton ginning plant include electricity and water. Electricity is supplied for production equipment to furnish motive power for machinery and lighting. The total consumption of electricity is estimated to be 160,000 kWh which costs about Birr 75,840. Annual water requirement is estimated at 5,000 m^3, which costs about Birr 7,500. Accordingly, the total annual cost of utilities is estimated to be Birr 83,540.

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Process Description

Raw cotton from the storage hall is manually transported to an intake separator where the cotton is screened to separate the cotton from foreign materials and then passed to a hot gas drier to dry damp or wet cotton.

Dried and cleaned cotton seed is fed to gin stands containing gin saws that can separate seed from the lint. Gin saws are steel disks approximately 0.037 inch thick and provide with about seven teeth per inch of periphery.

Ribs of tough, highly polished iron are used in cotton gins to form grids through which the saws may pass. Ginning ribs are spaced about 5/8 inch apart, so that the saws carrying the lint may pass while the seeds are excluded.

After the seed is separated from the lint, it is discharged into self cleaning belt and then into self cleaning blow pipe systems. The lint removed from the saws is carried by air past to the condenser. From the condenser, the cotton drops into the press box, over the bottom of which has been spread bale bagging. As the cotton collects in the box it is packed every minute or so by mechanical trampers. After enough amount has been accumulated to make 150 kg bale, heavy press is applied by hydraulic press. The bale is, then, fastened by jute rope. The seed produced is bagged in jute sacks and dispatched to oil mills. The project is environmentally friendly since it is solid process and doesn't have any waste.

2. Source of Technology

The machinery and equipment required by the plant can be obtained from the following company.

SRI DHANALAKSHMI C&R MILLS (P) LTD
GANAFAVARMM - 522619 VIA CHILAKALURIPET
GUNTUR DIST (A.P) S.INDIA
Tel. 0091-8647-54921
0091 - 8647 - 54330
Fax 0091 - 8647-54925, 54027
Email Spin@ pol.Net.in
Cell: 09848105480

B. ENGINEERING

1. Machinery and Equipment

Machinery and equipment required to produce 15,000 tonnes of lint cotton or process 42,857 tonnes of raw cotton are presented in Table 5.1. The total cost of machinery and equipment is estimated at Birr 3 million, out of which about Birr 2.4 million will be required in foreign currency.

Table 5.1

LIST OF MACHINERY AND EQUIPMENT REQUIREMENT FOR LINT COTTON GINNERY OF 15,000 TONNES CAPACITY

Sr. No.	Description	Quantity (No.)
1	Separator	2
2	Dryer	2
3	Cleaning machine	2
4	Master extractor	1
5	Distributor	1
6	Feeders	As required
7	Gin stands	"
8	Lint cleaners	2
9	Hot gas generator	1
10	Ribs, mating devices and doffing devices	As required
11	Seed handing equipment (self clearing belts and blow pipes)	"
12	Condenser	"
13	Presses	"

2. Land, Building and Civil Works

The envisaged plant requires a total land area of 3000 m^2, out of which 1500 m^2 is a built-up area. Considering average cost of construction of Birr 1500 for m^2, the total cost of buildings will be Birr 2,250,000. The average land lease value for rural areas in the region is Birr 1.2 per m^2, thus the expenditure of leasing 3000 m^2 of land for 70 years will be Birr 252,000. Therefore, the total cost of land, buildings and civil works assuming that the total land lease cost will be paid in advance will be Birr 2,502,000.

3. Proposed Location

A ginnery is conveniently located near the cotton farms to save transportation cost of bulky raw cotton. Moreover, considering the availability of infrastructure like electricity, transportation, etc. the plant is proposed to be located at Assosa zone.

VI. MANPOWER AND TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

Manpower requirement of the ginnery is 34 persons, of which 15 are direct production workers and 19 are administrative and supervisory staff. Details of manpower requirement and estimate of annual expenses for salaries is presented in Table 6.1.

Table 6.1

MANPOWER REQUIREMENT OF GINNERY AND ANNUAL LABOUR COST

Sr. No.	Description	Required No.	Monthly Salary	Annual Salary
1	Plant manager	1	2500	30,000
2	Secretary	1	750	9,000
3	Production and Tech. head	1	2000	24,000
4	Production supervisor	1	1300	15,600
5	Machine operators	5	500	30,000
6	Electrician	2	600	14,400
7	Mechanic	2	600	14,400
8	Accountant	1	800	9,600
9	Store keeper	1	500	6,000
10	Cashier	1	500	6,000
11	Clerks	3	400	14,400
12	Laborers	6	300	21,600
13	Guard	4	300	14,400
14	Messenger & cleaner	3	250	9,000
15	Driver	2	400	9,600
	Sub-Total	**34**		**228,000**
16	Employees benefit (25% of sub total)			57,000
	Grand Total	**34**		**285,000**

B. TRAINING REQUIREMENT

Training on operation of production equipment will be provided for operators and on maintenance of machinery for mechanics and electricians by machinery supplier at the site of the project during erection and commissioning. A total of Birr 50,000 is adequate to conduct the training programme.

VII. FINANCIAL ANALYSIS

The financial analysis of cotton ginning 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	5 % 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 7.775 million, out of which about 31% 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	-	252.00	252.00
2	Building and Civil Work	-	2,502.00	2,502.00
3	Plant Machinery and Equipment	2,400.00	600.00	3,000.00
4	Office Furniture and Equipment	-	75.00	75.00
5	Vehicle	-	200.00	200.00
6	Pre-production Expenditure*	-	1,109.00	1,109.00
	Total Investment Cost	**2,400.00**	**4,738.00**	**7,138.00**
7	Working Capital	-	636.65	636,65
	Grand Total	**2,400.00**	**5,374.65**	**7,775.65**

B. PRODUCTION COST

The annual production cost at full operation capacity of the plant is estimated at Birr 4.87 million (see Table 7.2). The material and utility cost accounts for 75 per cent while repair and maintenance take 2.05 per cent of the production cost.

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* *Pre-production expenditure include interest during construction (Birr 959,960), training (Birr 50,000) and cost of registration, licensing and formation of the company including legal fees, commissioning expenses, etc.*

Table 7.2

ANNUAL PRODUCTION COST

('000 BIRR)

Items	Year			
	3	**4**	**7**	**10**
Raw Material and Inputs	2,491.25	2,847.09	3,558.98	3,558.98
Labour Direct	95.76	109.44	136.80	136.80
Utilities	58.48	66.83	83.54	83.54
Maintenance and repair	70.00	80.00	100.00	100.00
Labour overheads	95.76	109.44	57.00	57.00
Administration cost	63.84	72.96	91.20	91.20
Total operating costs	**2,819.23**	**3,221.92**	**4,027.52**	**4,027.52**
Depreciation	506.20	506.20	506.20	436.20
Cost of Finance	554.54	499.09	332.72	166.36
Total Production Cost	**3,879.96**	**4,227.20**	**4,866.45**	**4,630.03**

C. FINANCIAL EVALUATION

1. Profitability

According to the projected income statement, the project will start generating profit in the first year of operation. Important ratios such as 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.

$$Be = \frac{\text{Fixed Cost}}{\text{Sales-Variable Cost}} = 26\ \%$$

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 6 years time.

4. Internal Rate of Return and Net Present Value

Based on the cash flow statement, the calculated IRR of the project is 19% and the net present value at 10.5% discount rate is Birr 4.26 million.

D. ECONOMIC BENEFITS

The project can create employment opportunities for 34 persons. In addition to supply of the domestic needs, the project will generate Birr 6.03 million in terms of tax revenue. Moreover, the Regional Government can collect employment, income tax and sales tax revenue.