# 120. PROFILE ON PRODUCTION OF ABSORBENT COTTON

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## I. SUMMARY

This profile envisages the establishment of a plant for the production of absorbent cotton with a capacity of 180 per annum.

The present demand for the proposed product is estimated at 79 tonnes per annum. The demand is expected to reach at 330 tonnes by the year 2022.

The plant will create employment opportunities for 48 persons.

The total investment requirement is estimated at about Birr 9.73 million, out of which Birr 6.94 million is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 26 % and a net present value (NPV) of Birr 8.37 million discounted at 8.5%.

## II. PRODUCT DESCRIPTION AND APPLICATION

Absorbent cotton is cleared de-oiled and bleached cotton packed in different sizes. Since absorbent cotton is a material which comes in direct contact with the human body, its quality is very important and should satisfy the required pharmaceutical parameters. Either virgin cotton or waste cotton can be used as raw material. Comber waste cotton is desirable in case of waste cotton. The fiber of absorbent cotton is very elastic. It consists of 98%-99.5% of cellulose which has a diameter of 16.30 and a length of 12-40 mm.

Absorbent cotton is mainly used for sanitary purposes and surgical operations as well as for ordinary daily use. It is also usually needed by women during their menstruation period that reoccurs at least once a month.

# III. MARKET STUDY AND PLANT CAPACITY

## A. MARKET STUDY

### 1. Past Supply and Present Demand

Absorbent cotton is widely used in hospitals, clincs, health centers and pharmacies for medical purposes. It is also used in barberries, beauty salons, business organizations and households for various purposes. The country's requirement for absorbent cotton is essentially met through import. However, data on imports of the product is not readily available since the external trade statistics of the customs authority does not show the product separately.

The requirement of health facilities for absorbent cotton is considered in estimating the demand for the product. According to a previous IPS study, the average monthly requirement of absorbent cotton for a hospital, a clinic and a health center is about 27kg, 3kg, and 1 kg, respectively. According to the Region's Five Year Action Plan for Development, Good Governance and Democracy (2006 – 2010), the type and number of health facilities in the Region by the end of 2005 was as follows:

- Hospitals…….16
- Clinics/health post……1316
- Health centers… 161

Based on the above stated requirement, the monthly and annual requirement of absorbent cotton for the different health facilities in the Region is given in Table 3.1.

**Table 3.1**

**MONTHLY AND ANNUAL REQUIREMENT OF ABSORBENT COTTON IN SNNPR, 2005**

| Type of Health Facility | No. of Health Facilities | Total Monthly Requirement (kg) | Total Annual Requirement (Kg) |
|---|---|---|---|
| Hospitals | 16 | 432 | 5184 |
| Clinics/health post | 1316 | 3948 | 47376 |
| Health Centers | 161 | 161 | 1932 |
| Total | 1493 | 4541 | 54492 |

As can be seen from Table 3.1, the annual absorbent cotton requirement of health facilities in the Region in 2005 was about 54492 kg. Assuming the regional market constitutes the viable market for the product and other users require about 20% of the requirement of health facilities, the demand for the product for 2005 is in the order of 65390 kg. The demand for absorbent cotton is directly related with the development and expansion of health facilities. Given the low rate of health coverage in the country, the Federal as well as Regional governments have given high attention and priority for the expansion of health facilities. In the SNNP Region, the average annual rate of growth of health facilities during the period 1994 – 2005 is computed to be 36.3%. However, for the purpose of estimating the demand for absorbent cotton, a conservative estimate of a 10% rate of growth is used. The present demand for the product (i.e. for 2007) in the Regional market is thus estimated at 79122 kg.

## 2. Projected Demand

As stated above, a rate of growth of 10% is applied in estimating the demand for absorbent cotton. The projected demand for the product is depicted in Table 3.2.

**Table 3.2**

**PROJECTED DEMAND FOR ABSORBENT COTTON AT REGIONAL LEVEL (TONNES)**

| Year | Projected Demand |
|---|---|
| 2007 | 79.12 |
| 2008 | 87.03 |
| 2009 | 95.74 |
| 2010 | 105.31 |
| 2011 | 115.84 |
| 2012 | 127.43 |
| 2013 | 140.17 |
| 2014 | 154.19 |
| 2015 | 169.61 |
| 2016 | 186.57 |
| 2017 | 205.22 |
| 2018 | 225.74 |
| 2019 | 248.32 |
| 2020 | 273.15 |
| 2021 | 300.47 |
| 2022 | 330.51 |

## 3. Pricing and Distribution

The retail price of absorbent cotton is about Birr 44 per a pack of 500 gram or Birr 88 per kg. Allowing margin for wholesalers and retailers, a price of Birr 37 per kg is recommended for the product of the envisaged plant.

The product can get its market outlet through the existing distributors of drug and medical supplies.

## B. PLANT CAPACITY AND PRODUCTION PROGRAMME

### 1. Plant Capacity

Based on the market study above, the suggested plant capacity is 180 tones per annum on a three shifts of 8 hours per day and 300 working days per annum basis.

### 2. Production Programme

Due to technical reasons such as skill upgrading of the operators and acquaintance with the machines such as a smooth running of the machinery parts, it is vital to have a gradual capacity buildup.

Hence, it is assumed that the plant will go into full capacity, utilization in three years time starting with 75% capacity in the first year, 85% during the second years and then to full capacity during the 3rd year and then after.

## IV. MATERIALS AND INPUTS

## A. MATERIALS

The principal raw material required is virgin cotton .The annual raw materials and various chemicals for bleaching which are necessary as subsidiary raw materials are presented below. (see Table 4.1).

**Table 4.1**

**ANNUAL REQUIREMENT FOR RAW AND AUXILIARY MATERIALS AND THEIR COSTS**

| No | Description | Qty Tone | Cost, 000 Birr | | |
|---|---|---|---|---|---|
| | | | F.C | L.C | Total |
| 1 | Raw ginned cotton | 225.25 | - | 1,576.75 | 1,576.75 |
| 2 | Soda ash | 14.4 | - | 83.15 | 83.15 |
| 3 | Caustic soda | 4.05 | - | 11.66 | 11.66 |
| 4 | Bleaching agent | 45.00 | 142.45 | 35.61 | 178.06 |
| 5 | Other chemicals | Lump sum | - | 13.45 | 13.45 |
| 6 | Wetting agent | " | | 196.34 | 196.34 |
| 7 | Packing and labeling Materials | " | | 23.30 | 23.30 |
| | **Total** | **-** | **142.45** | **1,940.26** | **2,082.71** |

**B. UTILITIES**

Utilities required are electricity, water and furnace oil for boiler. The annual quantities and cost of utilities are estimated as shown in Table 4.2.

**Table 4.2**

**ANNUAL UTILITY REQUIREMENT**

| No | Description | Qty | Cost, OOO Birr | | |
|---|---|---|---|---|---|
| | | | F.C | L.C | Total |
| 1 | Electric Power | 155,000 Kwh | - | 73.408 | 73.408 |
| 2 | Water | 75,000 $m^3$ | - | 750.00 | 750.00 |
| 3 | Furnace Oil | 37.5 $m^3$ | - | 202.875 | 202.875 |
| | **Total** | | | **1,026.283** | **1,026.283** |

# V. TECHNOLOGY AND ENGINEERING

## A. TECHNOLOGY

### 1. Production Process

The technology of manufacturing absorbent cotton involves opening cleaning and bleaching that can be performed automatically or manually in which the facilities are made as simple as to keep the production cost low. In view of simplicity of operation and maintenance the manual method is taken in this profile.

Cotton is fed to opener and cleaner to free it from extraneous matter and to get the fibers loosened. Next filling process is taken followed by bleaching them and hydro extracting process for which dewatering is done. Then opening and drying are carried out, in order to facilitate the subsequent carding process. The dried cotton is further loosened finally by the opening machine and tested and carded. Finally winding, cutting and packing is performed. Since the process uses hazardous chemicals like caustic soda and bleaching powder, a liquid waste treatment plant is necessary to control pollution of the environment.

### 2. Source of Technology

The above described technology is available from the following sources:

Small and Medium Industry Promotion Corporation
South Korea
http//:www.smipc.or.kr

## B. ENGINEERING

### 1. Machinery and Equipment

The list of machinery and equipment required for the envisaged plant is given in Table 5.1.

**Table 5.1**

**MACHINERY & EQUIPMENT & ESTIMATED COSTS**

| No | | Qty | Cost, ( OOO Birr) | | |
|---|---|---|---|---|---|
| | | | F.C | L.C | Total |
| 1 | A. Production Machinery & Equipment | | | | |
| | Opening & Cleaning Unit | 1 set | | | |
| | Filling Unit | 1 set | 4,685.37 | 1,171.343 | 75,856.713 |
| | Bleaching Unit | 1 set | | | |
| | Hydro-extracting Unit | 1 set | | | |
| | Opening/for wet cotton) | 1 set | | | |
| | Drying Unit | 1 set | | | |
| | Opening unit (for dried cotton) | 1 set | | | |
| | Reserving Unit | 1 set | | | |
| | Carding Unit | 1 set | | | |
| | Winding and Cutting | 1 set | | | |
| | Packing Machine | 1 set | | | |
| | **Sub – Total** | **-** | **4,856.713** | **1,171.343** | **6,028.056** |
| 2 | B. Auxiliary Machinery & Equipment | | | | |
| | Air conditioning equipment | 1 set | 66.47 | 16.62 | 83.09 |
| | Boiler (3 tonnes/hr, 10 kg $km^2$ | 2 set | 545.00 | 136.25 | 681.25 |
| | Water treatment facilities for fresh water (50 tonnes/day) softener | 1 set | 97.87 | 24.47 | 122.34 |
| | Testing equipment & Tools | Lump sum | 23.52 | 5.88 | 29.40 |
| | **Sub – Total** | | **732.86** | **183.22** | **916.08** |
| | **Grand Total** | **-** | **5,589.573** | **1,354.563** | **6,944.136** |

### 2. Land, Buildings & Civil Works

The production building will be made by hollow blocks, both sides of the walls will be plastered, reinforced concrete floor lined with chemical resistant tiles and RHS truss and EGGA sheet roof. Taking into consideration space for easy movement and possible future expansion, the total area of the project will be 1,500 square meters the lease value at a rate of Birr 1.20 per square meter and for 95 years will amount to Birr 171,000. Total built-up area will be 700 square meters. The total building and construction cost at a unit cost of Birr 1600 is estimated at about Birr 1,120,000.

### 3. Proposed Location

Based on resource potentials the proposed location for the plant is Amaro special woreda.

## VI MANPOWER AND TRAINING REQUIREMENT

## A. MANPOWER REQUIREMENT

Total manpower required is 48 persons. The detail of the manpower requirement and the estimated annual labor cost including employees' benefit is given in Table 6.1.

## Table 6.1

## MANPOWER REQUIREMENT AND ESTIMATED LABOUR COST

| No | Job Title | No. of Persons | Salary (Birr) | |
|---|---|---|---|---|
| | | | Monthly | Annual |
| 1 | General Manager | 1 | 2,000 | 24,000 |
| 2 | Secretary | 1 | 800 | 9,600 |
| 3 | Production & Technical Head | 1 | 1,700 | 20,400 |
| 4 | Commercial Head | 1 | 1,600 | 19,200 |
| 5 | Finance & Administration Head | 1 | 1,600 | 19,200 |
| 6 | Personnel | 1 | 800 | 9,600 |
| 7 | Accountant | 1 | 750 | 9,000 |
| 8 | Accounts Clerk | 1 | 400 | 4,800 |
| 9 | Cashier | 1 | 500 | 6,000 |
| 10 | Sales person | 1 | 500 | 6,000 |
| 11 | Purchaser | 1 | 500 | 6,000 |
| 12 | Store Keeper | 1 | 500 | 6,000 |
| 13 | Quality Controller | 1 | 800 | 9,600 |
| 14 | Shift Leader | 3 | 750x3 | 27,000 |
| 15 | Operator | 9 | 400x9 | 43,200 |
| 16 | Assistant Operation | 9 | 250x9 | 27,000 |
| 17 | Labourer | 3 | 150x3 | 5,400 |
| 18 | Mechanic | 3 | 700x3 | 25,200 |
| 19 | Electrician | 3 | 700x3 | 25,00 |
| 20 | Driver | 2 | 400x3 | 9,600 |
| 21 | Guard | 3 | 200x3 | 7,200 |
| | **Sub – Total** | **48** | | **309,600** |
| | Employee's Benefit 20% basic salary | | | 61,920 |
| | **Grand Total** | | | **371,520** |

## B. TRAINING REQUIREMENT

The supervisor, skilled workers and quality control worker need at least two weeks training on the technology, maintenance and quality control. For the rest, on-the-job training will be sufficient on the start up period by the specialists. Total training cost is estimated at about 75,000 Birr.

## VII. FINANCIAL ANALYSIS

The financial analysis of the absorbent cotton 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 | years |
| Bank interest | 8% |
| Discount cash flow | 8.5% |
| Accounts receivable | 30 days |
| Raw material local | 30 days |
| Raw material, import | 90 days |
| Work in progress | 5 days |
| Finished products | 30 days |
| Cash in hand | 5 days |
| Accounts payable | 30 days |

## A. TOTAL INITIAL INVESTMENT COST

The total investment cost of the project including working capital is estimated at Birr 9.73 million, of which 49 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**

| Sr. No. | Cost Items | Total Cost ('000 Birr) |
|---|---|---|
| 1 | Land lease value | 171.0 |
| 2 | Building and Civil Work | 1,120.0 |
| 3 | Plant Machinery and Equipment | 6,944.1 |
| 4 | Office Furniture and Equipment | 100.0 |
| 5 | Vehicle | 250.0 |
| 6 | Pre-production Expenditure* | 623.9 |
| 7 | Working Capital | 523.6 |
| | **Total Investment cost** | **9,732.6** |
| | Foreign Share | 49 |

** N.B Pre-production expenditure includes interest during construction ( Birr 473.87 thousand ) training (Birr 75 thousand ) and Birr 75 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 4.85 million (see Table 7.2). The material and utility cost accounts for 63.99 per cent, while repair and maintenance take 2.37 per cent of the production cost.

**Table 7.2**

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

| Items | Cost | % |
|---|---|---|
| Raw Material and Inputs | 2,082.71 | 42.87 |
| Utilities | 1026.28 | 21.12 |
| Maintenance and repair | 115 | 2.37 |
| Labour direct | 185.76 | 3.82 |
| Factory overheads | 61.92 | 1.27 |
| Administration Costs | 123.84 | 2.55 |
| Total Operating Costs | 3,595.51 | 74.01 |
| Depreciation | 848.96 | 17.47 |
| Cost of Finance | 413.89 | 8.52 |
| **Total Production Cost** | **4,858.36** | **100** |

## 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 profit to total sales, net profit to equity (Return on equity) and net profit plus interest on total investment (return on total investment) show an increasing trend during the life-time of the project.

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

## 2. Break-even Analysis

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.

$$BE = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable Cost}} = 28\ \%$$

## 3. Pay Back Period

The investment cost and income statement projection are used to project the pay-back period. The project's initial investment will be fully recovered within 4 years.

## 4. Internal Rate of Return and Net Present Value

Based on the cash flow statement, the calculated IRR of the project is 26 % and the net present value at 8.5% discount rate is Birr 8.37 million.

## D. ECONOMIC BENEFITS

The project can create employment for 48 persons. In addition to supply of the domestic needs, the project will generate Birr 4.1 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.