

## **284 . PROFILE ON TIMBER PRODUCTION**

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## **I. SUMMARY**

This profile envisages the establishment of a farm and processing plant for the production of timber with a capacity of 50,000 m<sup>3</sup> per annum.

The present demand for the proposed product is estimated at 790,200 m<sup>3</sup> per annum. The demand is expected to reach at 1.1 million m<sup>3</sup> by the year 2017.

The plant will create employment opportunities for 85 persons.

The total investment requirement is estimated at Birr 3.16 million, out of which Birr 1.59 million is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 27 % and a net present value (NPV) of Birr 2.35 million, discounted at 8.5%.

## **II. PRODUCTION DESCRIPTION AND APPLICATION**

Timber production is the harvesting of logs of matured trees and preparing them for market. Appropriately produced timbers are used for the manufacturing of wood products such as household and office furniture, wooden ornaments, kitchen articles, etc., and the waste can be used as source of energy in households and industries. Logs of trees of different species can be used as raw materials.

### **III. MARKET STUDY AND PLANT CAPACITY**

#### **A. MARKET STUDY**

##### **1. Past supply and Present Demand**

Timber production is harvesting of matured trees' logs and preparing them for market. The product is used as industrial or construction wood. Accordingly, the demand for industrial and construction wood in SNNPRS is briefly assessed below.

##### **a) Industrial Wood**

The three principal types of primary industrial wood products are sawn wood, wood-based panels (including plywood, fiberboard and particleboard) and paper which are used in production of furniture, windows, doors, moldings, stairs, cabinets, and many other products. In Ethiopia industrial wood production (and consumption) per capita is one of the lowest in the world (EFAP, 1994).

Ethiopia's low level of consumption of sawn wood and other industrial wood products reflects the fact that the country's limited forest resource base has been and continues to be primarily exploited for fuel wood. The same is true for SNNPRS.

In SNNPRS, only sawn boards are produced. Products such as plywood, particle boards and the like are not produced in the Region at all. According to The Regional Forestry Action Plan of SNNPRS (RFAP) the volume harvested and the actual consumption do not much at all unless a proper measure is devised.

The current (2007) demand for industrial wood in SNNPRS is estimated at 69,730 m<sup>3</sup> by the regional RFAP.

## b) Construction Wood

Construction wood, including poles, posts and lumber, is used by State Enterprises, small urban and rural enterprises and households. Construction poles with a length between 4 and 12 m are used for roofing, house framing and pillars. Split poles with a length of about 3m are used for house walls. Fence posts with a length of 1 to 3 m are normally of lower quality than construction poles. Both poles and posts are small sized wood with a diameter between 3 and 10 cm.

The sources of construction wood in the SNNPRS are mainly natural forests, plantations, farm forestry, woodlands, community and private wood lots.

The RFAP of SNNPRS calculated the demand for construction wood in SNNPRS based on the following assumptions.

- New houses to be built due to population growth ( $3\text{m}^3$  per annum)
- Rebuilding of existing houses assuming houses have a 30 year life span: ( $3\text{m}^3$  per annum)
- Annual renovation of houses over, 10 years old: ( $0.05\text{m}^3$  per annum)
- 20% of the houses have wooden fences which consume  $2\text{m}^3$  per annum)  
Fences are replaced every ten years.
- Demand from all sources is expected to grow at 2.9 per annum

Based on the above assumptions the current (2007) demand for construction wood is estimated at 720,470 which are adopted for the purpose of this study.

Accordingly the total current demand for timber which is the total industrial and construction wood demand in SNNPRS is estimated at  $790,200\text{ m}^3$

## 2. Projected Demand

The demand for timber is going to increase with the expansion of the wood and wooden product industry and the construction sector. At present, the sub-sectors are growing at a faster rate owing to the expansion of schools, clinics, the bureaucracy apparatus and increase in population size.

In projecting the regional demand for timber, projection made by the RFAP of SNNPRS is adopted. Accordingly, the total demand for timber in the region increases from 810,730 m<sup>3</sup> in 2008 to 1.1 million m<sup>3</sup> in 2020. (See Table 3.1.)

**Table 3.1**  
**PROJECTED DEMAND FOR TIMBER IN SNNPRS ( m<sup>3</sup> )**

<b>Year</b>	<b>Industrial Wood</b>	<b>Construction Wood</b>	<b>Total</b>
2008	72,750	737,980	810,730
2009	75,430	755,950	831,380
2010	78,460	774,380	852,840
2011	81,610	793,280	874,890
2012	84,890	812,670	897,560
2013	88,300	832,560	920,860
2014	91,850	852,970	944,820
2015	95,550	873,900	969,450
2016	99,400	895,370	994,770
2017	103,410	917,400	1,020,810
2018	107,580	940,010	1,047,590
2019	111,930	963,210	1,075,140
2020	116,450	987,010	1,103,460

### **3. Pricing and Distribution**

The price of timber varies considerably with the type of tree species used. Allowing a profit margin for retailers and distribution costs, factory-gate price of Birr 150 per m<sup>3</sup> is recommended.

The products could be distributed to the end-users through existing distributing agents and retailers.

## **B. PLANT CAPACITY AND PRODUCTION PROGRAMME**

### **1. Plant Capacity**

Accordingly to market study shown above, the projected demand of timber for the year 2008 will be 810,730 m<sup>3</sup>. This figure will grow to 969,450 m<sup>3</sup> and 1,103,460 m<sup>3</sup> in 2015 and 2020, respectively. As timber is required for different economic sectors such as construction sector, industrial sector, house hold and office furniture sector, the demand of the product would substantially grow as these economic sectors grow in the country. On the other hand timber production will have to be carried out without affecting the environment by way of depleting the forest in the region. Thus, the most appropriate approach will be to start timber production at a small scale level and gradually raise capacity by future expansion. The envisaged plant understudy will therefore have annual production capacity of 50,000 m<sup>3</sup> of timber. The total land area required for full capacity production is estimated to be 200 hectares. This new farm area to be developed by the envisaged plant.

### **2. Farming and Production Programme**

At the initial stage, Pines tree shall be grown in the area of 200 hectares of land. Experience indicates that the first cutting shall be carried out after five years of growing. In some localities first cutting can stay from six to seven years. The longer pine trees stay in the farm, the longer will be their height, the thicker will be their stems, and the greater will be the volume of timber that can be harvested.

Production can be started at 60% of annual capacity, and gradually raise production to 75%, 90% and finally to 100% in the succeeding years. Production might be started on the third year of pine tree plantation. It is assumed that timber will be harvested when the plant reaches production at 75% of capacity.

#### **IV. MATERIALS AND INPUTS**

##### **A. RAW AND AUXILIARY MATERIALS**

Sources of raw material are assumed to be already existing forests in the region, particularly the Kaffa, Sheka and Benchmaji zones, and the area of 300 hectares of land to be covered by pinus tree in the coming five to six years. This project study assumes that there is high forest potential in the SNNPRS, and supply of raw material will not be a hindrance to the operation of the envisaged plant.

The major raw material required by the plant is seed, poly propylene sheets and other auxiliary materials. Table 4.1 below indicates annual requirement of raw and auxiliary materials.

**Table 4.1**  
**RAW AND AUXILIARY MATERIALS REQUIREMENT**

<b>Sr. No.</b>	<b>Description</b>	<b>Qty</b>	<b>Cost ('000 Birr)</b>
1	Seed (kg)	200	350
2	Fertilizer (quintal)	Reqd.	150.0
3	Auxiliary materials	Reqd.	75.0
	<b>Total</b>	<b>-</b>	<b>575</b>



## B. UTILITIES

Electricity, water, fuel and lubricant are utilities required for the timber production plant. Table 4.2 below shows estimates of annual requirement of utilities.

**Table 4.2**  
**ANNUAL REQUIREMENT OF UTILITIES**

Sr. No.	Description	Qty	Cost ('000 Birr)
1	Electricity (kWh)	20,000	9.48
2	Water (m <sup>3</sup> )	200	2.00
3	Fuel (litres)	6,000	32.94
4	Lubricant (Litre)	200	22.00
	<b>Total</b>	-	<b>66.42</b>

## V. TECHNOLOGY AND ENGINEERING

### A. TECHNOLOGY

#### 1. Production Process

In order to produce the required size and quality of timber for various economic sectors, it would be necessary to carry out a good timber management programme. This is the process of improving, protecting and managing forest lands for the production of timber. These include: tree planting; timber –stand improvement; protection of forests from fire and insects; felling or cutting down the timber; cutting it into lengths; and transporting it usually by truck to the point of end-use.

In a well-planned harvest, before the timber is felled, the forester – the person in charge of managing the forest – decides which trees will be cut and when. These decisions must be

made within the context of the forester's overall responsibility for maintaining the quality of the forest as an ongoing resource.

Loggers employed by the envisaged plant generally fell trees with gasoline – powered chain saws. When cutting and felling trees care has to be taken to avoid smashing and scarring trees that are to be left standing. Once the tree is down the logger removes its limbs to make easier to transport the stem.

After the trees are felled and trimmed, the logs are skidded to landings where they can be put on trucks and hauled to the mill or a place where the timber is required. Skidding involves raising one end of the log and dragging it across the ground. Animal skidding can be applied in case wheeled or tracked vehicles are not available. Cable skidders with vehicles can be used to pull logs behind them with steel ropes.

## **2. Source of Technology**

Yongkang Anluda Co., Ltd  
No. 23, Yinchua East Road  
Hardware Science and Technology  
Industrial zone,  
Yongkang City, Zhejiang  
Province, China, Yongkang,  
Zhejiang, China

## **B. ENGINEERING**

### **1. Plant Machinery and Equipment**

The list of machinery and equipment required for timber production is shown in Table 5.1 below.

**Table 5.1**  
**MACHINERY AND EQUIPMENT AND COST**

Sr. No.	Description	Qty	Cost ('000 Birr)		
			LC	FC	TC
1	Gasoline- powered chain saw	10	-	50	50
2	Truck-mounted crane	1	-	450	450
3	Hand tools	2 sets	-	10	10
4	Tractor (110-125 HP)	1	-	350	350
5	Vehicle	1	-	250	250
6	Trailor	4	-	160	160
7	Generator	1	-	60	60
8	Motor cycle	2	-	60	60
9	Workshop equipment	LS	-	50	50
	FOB price			1440	1440
	Freight, insurance, customs, book charges, etc.		150	-	
	<b>CIF landed cost</b>		<b>150</b>	<b>1440</b>	<b>1590</b>

## 2. Land, building and Civil Works

Timber production plant requires land for tree plantation, and an area for preparation of timber suitable for marketing. Moreover, land is required for building that would be used as offices for management, for laborers to serve for social activities. At the initial stage land area of 200 hectares will be required for planting pine and eucalyptus trees. The envisaged plant will, however, require more land for future expansion. Timber production is preceded by tree plantation and conserving the environment. This activity will have to be encourage by the regional government. One approach of encouragement is the provision of land free of lease value. The study therefore proposes that the regional government provide enough land area to investors that would be engaged in timber production. As indicated above a total area

of 400 m<sup>2</sup> will be required for building. At the rate of Birr 2000 per m<sup>2</sup>, the investment on building will be Birr 800,000.

### **3. Proposed Location**

Location of a plant is determined on the basis of proximity to raw materials, distance to potential market outlets, and the availability of infrastructure. Consideration is also given to fair distribution of projects among the woredas of SNNPRS. In view of these three zones namely Kaffa, Sheka and Benchamji were identified. The three woredas that are believed to be potential areas for timber production are Bonga Zuria, Andricha and Mizanteferi zuria. Of these woredas Andricha is selected to be an appropriate one. Therefore, it is proposed that the Timber production plant will be established in Gucha town.

## **VI. MANPOWER AND TRAINING REQUIREMENT**

### **A. MANPOWER REQUIREMENT**

Timber production plant requires wood technologist, workers to handle the chain saws and laborers. The details of manpower with wages are given in Table 6 .1 below.

**Table 6.1****MANPOWER REQUIREMENT AND SALARY OF EMPLOYEES(BIRR)**

<b>Sr. No.</b>	<b>Job Title</b>	<b>Req.No</b>	<b>Monthly Salary</b>	<b>Annual Salary</b>
	<b>A. Administration</b>			
1	Plant manager	1	2,000	24,000
2	Secretary	1	600	7,200
3	Sales man	1	800	9,600
4	Personnel	1	1,000	12,000
5	Guard	4	350	16,800
6	Store keeper	2	600	14,400
	<b>Sub total</b>	<b>10</b>	<b>-</b>	<b>84,000</b>
	<b>B. Production</b>			
1	Production head (wood technologist)	1	1500	18,000
2	Operators	10	600	72,000
3	Laborers	60	350	252,000
4	Production clerk	2	500	12,000
5	Mechanics	2	700	16,800
	<b>Sub total</b>	<b>75</b>		<b>370,800</b>
	Workers benefit (25% BS)	-		113,700
	<b>Total</b>	<b>85</b>		<b>568,500</b>

**B. TRAINING REQUIREMENT**

Timber production does not require specialized skill, except that experienced workers on wood working can handle the work.

## VII. FINANCIAL ANALYSIS

The financial analysis of the timber 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%
Discount cash flow	8.5%
Accounts receivable	30 days
Raw material local	30days
Work in progress	2 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 3.16 million, of which 51 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	-
2	Building and Civil Work	800.00
3	Plant Machinery and Equipment	1,590.00
4	Office Furniture and Equipment	75
5	Vehicle	200
6	Pre-production Expenditure*	368.87
7	Working Capital	131.22
	<b>Total Investment cost</b>	<b>3,165.1</b>
	Foreign Share	51

\* *N.B Pre-production expenditure includes interest during construction ( Birr 218.87 thousand ) and Birr 200 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 1.98 million (see Table 7.2). The material and utility cost accounts for 36.36 per cent, while repair and maintenance take 7.57 per cent of the production cost.

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

<b>Items</b>	<b>Cost</b>	<b>%</b>
Raw Material and Inputs	575.00	29.01
Utilities	66.42	3.35
Maintenance and repair	150	7.57
Labour direct	341.1	17.21
Factory overheads	142.13	7.17
Administration Costs	227.4	11.47
Total Operating Costs	1,502.05	75.77
Depreciation	276.5	13.95
Cost of Finance	203.72	10.28
<b>Total Production Cost</b>	<b>1,982.27</b>	<b>100</b>

**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.

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

## 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 27 % and the net present value at 8.5% discount rate is Birr 2.35 million.

## D. ECONOMIC BENEFITS

The project can create employment for 85 persons. In addition to supply of the domestic needs, the project will generate Birr 1.43 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.