

**56. MOSQUITO NET, FISHING NET  
AND SPORTS NET**

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## **I. SUMMARY**

This profile envisages the establishment of a plant for the production of Mosquito - net & related products with a capacity of 31,500 pieces per annum.

The present demand for the proposed product is estimated at 1.5 million per annum. The demand is expected to reach at 2.4 million by the year 2010.

The plant will create employment opportunities for 21 persons.

The total investment requirement is estimated at Birr 2 million, out of which Birr 0.8 million is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 20 % and a net present value (NPV) of Birr 1.3 million, discounted at 8.5 %.

## **II. PRODUCT DESCRIPTION AND APPLICATION**

A net is a meshed arrangement of threads, cords or ropes that have been twisted, knotted, or woven together at regular intervals. Its applications are many and the most important ones include as protective articles in the prevention of mosquito bites, in sports and in fishing.

A mosquito net, as the name implies, is a net or screen used for keeping out mosquitoes. It is usually suspended from a frame so as to surround a bed.

Other nets envisaged in this project profile are those used in sports. Sport nets are essential components of almost all games like volley ball, foot ball, table tennis, basket ball and the like.

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

### **A. MARKET STUDY**

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

Nets are used against biting insects, mosquito nets, in particular, are used to provide physical barrier to hanging mosquitoes which are life threatening parasites transmitting malaria. Malaria in the world today is the cause for at least one million deaths annually and the cause of 300 millions acute illness particularly in the tropical and subs tropical regions of the world. Generally, 40 per cent of the world's population is at risk of malaria, a diseases killing an African child every 30 seconds.

According to the WHO, one of the greatest challenges facing Africa in the fight against malaria is drug resistance. Resistance to chloroquin, the cheapest and most widely used anti-malaria, is common through Africa.

As a result, many countries have to change their treatment policies. Because, science still has no solution and the prospect of finding solution to the problem in the near future is doubtful.

Nevertheless, effective low cost strategies are available for its treatment, prevention and control, and the roll back malaria global partnership is vigorously promoting them in Africa.

Mosquito nets treated with insecticide reduce malaria transmission and child deaths. Moreover, insecticide treated nets (ITNs) reduced deaths in young children by an average of 10%.

One of the targets set at the Abuja Summit in April, 2000 by African States was to have 60% of populations at risk sleeping under ITNs by 2005. This will require 32 million mosquito nets and a similar number of insecticides pre-treatments each year. The Ethiopian population at risk of malaria, according to the 1999 WHO estimate, was 23.9%. Applying this ratio to the estimated population of 70 million, 16,730,000 people will be at epidemic risk of malaria. Thus to have 60% of them sleep under ITNs in 2005, about 5 million ITN's should be available for an average of two persons per bed. The supply of mosquito nets is almost entirely met through import. The 1999-2003 mosquito net import is presented in Table 3.1.

On average 21,851 kg mosquito nets have been imported for the last five years. At an average of, 200 gm per net this amounts to 109,255 pieces. The average price before the mark-up (landed cost) of retailers is Birr 79. Obviously, this is more expensive type of mosquito nets as compared to the current price of Birr 40 per net. Hence considering the poverty level in Ethiopia, which is the major barrier to mosquito net ownership and the availability of cheaper mosquito nets, the current effective demand for mosquito nets is estimated at 30% of the endemic risk population described above, which amounts to one and half million pieces.

**Table 3.1**  
**IMPORTED MOSQUITO NETS (KG)**

<b>Year</b>	<b>Mosquito Nets</b>	<b>Value</b>	<b>Landed unit cost (Birr)</b>
1999	30,433	1,586,821	52
2000	9,478	372,303	39
2001	17,251	1,349,158	78
2002	11,194	2,120,533	189
2003	40,899	1,460,139	36
2004	50	3,607	72
<b>Average</b>	<b>18,218</b>	<b>1,148,760</b>	<b>78</b>
<b>Average excluding 2004</b>	<b>21,851</b>	<b>1,377,791</b>	<b>79</b>

Even though the project under study considers conventional mosquito nets, there is also scope to increase the use of ITNs by providing insecticide treatment for any untreated nets already in houses. Based on the comparative coverage with untreated and treated nets, this could double the percentage of households with ITNs. Besides using the most recent fiber technology, factory pre-treated nets that require no further treatment during their expected life time or long lasting insecticide nets (LLINs) are regarded as a major break through in malaria prevention.

## 2. Projected Demand

Since malaria is one of the major public health challenges undermining development, demand for mosquito nets is related with the prevention and control majors taken by the government.

Along with the development efforts which will rise the purchasing power of the people, the controlling and prevention of malaria is expected to grow a slightly higher rate of the average GDP growth rate. The last five years average growth rate of GDP was 8.5%. Thus, demand for mosquito nets is projected at 10% annual growth rate. Projected demand for mosquito nets is presented in Table 3.2.

**Table 3.2.**  
**PROJECTED DEMAND FOR MOSQUITO NETS (PIECES)**

Year	Projected Demand
2006	1,650,000
2007	1,815,000
2008	1,996,500
2009	2,196,150
2010	2,415,765
2011	2,657,342
2012	2,923,076
2013	3,215,383
2014	3,536,922
2015	3,890,614

## 3. Pricing and Distribution.

The major problem of mosquito nets availability is the inadequate system of distribution. The envisaged project will have its own distribution stores at selected malaria affected areas. Continuous and robust communication with the Ministry of Health, NGO's, Regional Health Bureaus and administrative bodies will be essential for the distribution of mosquito nets. The price of mosquito nets at Addis Ababa is Birr 40. The current price of the recent fiber technologies, LLINs are about USD 5 or about Birr 45 per net.

The recommended price for the envisaged project after reducing 45% mark-up of retailers is Birr 27.50. For sports net and fishing net an average price of Birr 110 and Birr 350 is adopted, respectively.

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

### **1. Plant Capacity**

Based on the out comes of the market study, the annual production capacity of the envisaged plant for the assorted net products is shown in Table 3.3. The plant will be set into single shift operation of 8 hours a day, and for 300 days a year.

**Table 3.3**  
**ANNUAL PRODUCTION CAPACITY OF NET PRODUCTS**

<b>Sr. No.</b>	<b>Products</b>	<b>Annual Production Capacity (pcs)</b>	<b>Remark</b>
1	Mosquito net	30,000	A single size white mosquito net, 74" x 33", having an average weight of about 0.5 kg
2	Sports net	1,000	The average weight of a sports net is taken to be 2 kgs
3	Fishing net	500	The average weight of a fishing net is taken to be 10 kgs

### **2. Production Programme**

In view of the out comes of demand projections and in order to allow sufficient time for manufacturing skill development, a gradual build-up of capacity is recommended. Hence, production will commence at 60% of installed capacity and reach at full- throttle capacity from the fourth year and onwards. Table 3.4 shows production build-up programme.

**Table 3.4**  
**PRODUCTION PROGRAMME**

<b>Year</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4-10</b>
Capacity utilization [%]	60	70	85	100
<b>Production [Pcs]</b>				
1. Mosquito net	18,000	21,000	25,500	30,000
2. Fishing net	300	350	425	500
3. Sports net	600	700	850	1,000

#### IV. RAW MATERIALS AND INPUTS

##### A. RAW MATERIALS

The major raw materials needed to manufacture mosquito, sports and fishing nets are nylon threads and cords. Table 4.1 depicts annual requirements at full production capacity.

**Table 4.1**  
**RAW MATERIAL REQUIREMENT AND COST**

Sr. No.	Description	Qty (kg)	Unit Price	Cost, ('000 Birr)		
				LC	FC	TC
1	Nylon thread	21800	20	153	283	436.00
2	Nylon cord	5600	25	50	90	140.00
	<b>Total</b>	-	-	<b>203</b>	<b>373</b>	<b>576.00</b>

##### B. AUXILIARY MATERIALS

Auxiliary materials required for the production of the assorted net products include sewing threads and fabric for edges. It is estimated that annual expenditure on these materials will be Birr 20,000 at full production capacity.

##### C. UTILITIES

Electricity and water are the utilities required for the plant. Electricity is required mainly for operating production equipment and for general lighting and supply to socket outlets. Water is required for human consumption, washing and for general purpose. Annual requirement of these inputs at full production capacity is shown in Table 4.2 below.

**Table 4.2**  
**UTILITIES REQUIREMENT AND COST**

Sr. No.	Description	Unit of Measure	Qty.	Unit Price (Birr)	Total Cost ['000 Birr]
1	Electricity	kWh	3600	0.474	1.7064
2	Water	m <sup>3</sup>	1000	1.50	1.500
	<b>Grand Total</b>				<b>3.2064</b>

## V. TECHNOLOGY AND ENGINEERING

### A. TECHNOLOGY

#### 1. Production Process

The production of nets is a simple process and requires minimum involvement of machinery, thread of cotton or nylon, depending on the type of net being made, is twisted on hand-operated twisting machine, and knitted by hand. Net warp and rope are then sewed at proper place with sewing machine. Size of the net is chosen according to the purpose for which it is required.

#### 2. Source of Technology

The technology required for Mosquito net & related products plant can be acquired from Indian Companies.

Address of technology supplier is given below.

K.L. Sharma and Sons (Regd)  
356/1, Bharat Nagar  
Near, Darpan studio  
Ludhiana, Punjab, India  
Fax: 91-161-442840  
E-mail: Seiko@Satyam.Net.in

### B. ENGINEERING

#### 1. Machinery and Equipment

The manufacturing of net products requires simple, conventional machines like twisting, knitting and sewing machines. Table 5.1 below shows the machinery required for the plant that produce assorted net products. The investment cost for the machinery is estimated at Birr 0.8 million, of which Birr 0.67 million is required in foreign currency, and the balance is in local currency.

**Table 5.1**  
**MACHINERY REQUIREMENT FOR NET PRODUCTS PLANT AND COST**

Sr. No.	Description	Qty.	Cost, ['000 Birr]		
			LC	FC	TC
1	Knitting machine (raschel)	3	50	250	300
2	Yarn twisting machine	3	50	250	300
3	Sewing machine	3	30	120	150
4	Hand tools (various)	set	-	50	50
	<b>Grand Total</b>		<b>130</b>	<b>670</b>	<b>800</b>



## 2. Land, Building and Civil Works

Total land requirement for the plant is estimated to be 1000 m<sup>2</sup> per year of this the built-up area accounts for about 500 m<sup>2</sup>.

The land lease cost in the region is taken to be Birr 2 per m<sup>2</sup>. It means that the plant site area for the period of 70 years of land holding will be leased by Birr 140,000. Taking the unit cost of building construction to be Birr 1500, the total building cost will be Birr 750,000. Therefore, the investment cost for land leasing, building and civil works assuming that the total land lease cost will be paid in advance is estimated to be Birr 890,000.

## 3. Proposed Location

The plant can be established in Assosa town where infrastructure is better found. Distribution of the net products into other areas of the region can be handled from Assosa.

## VI. MANPOWER AND TRAINING REQUIREMENT

### A. MANPOWER REQUIREMENT

Total skilled and unskilled labour force requirement is estimated at 21 persons. Table 6.1 below details out manpower requirement and associated labour cost including fringe benefits.

**Table 6.1**  
**MANPOWER REQUIREMENT AND ANNUAL LABOUR COST**

Sr. No.	Description	Req. No.	Salary [ Birr]	
			Monthly	Annual
1	General manager	1	1600	19,200
2	Accountant	1	600	7,200
3	Secretary	1	500	6,000
4	Technician	2	600	14,400
5	Skilled (production) workers	6	600	43,200
6	Unskilled labour	3	200	7,200
7	Storekeeper	1	400	4,800
8	General services	3	200	7,200
9	Guard	2	200	4,800
10	Production & technical head	1	1000	12,000
	<b>Sub-total</b>	<b>21</b>	-	<b>31,500</b>
	Employee benefit (25% BS)		-	157,500
	<b>Grand Total</b>		-	<b>189,000</b>

## **B. TRAINING REQUIREMENT**

Not much training is required as the manufacturing of net products is relatively simple process. However, on-site training scheme is proposed for the production workers on the use of twisting and raschel knitting machines. This would better be implemented during plant commissioning period for two weeks. A total of Birr 10,000 can be budgeted to implement on-site training programme.

## **VII. FINANCIAL ANALYSIS**

The financial analysis of the Mosquito-net & Related Products 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	7.5 %
Discounted cashflow	8.5 %
Repair and maintenance	3 % of the total plant and machinery
Accounts receivable	30 days
Raw material, local	30 days
Raw materials, 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 initial investment cost of the project including working capital is estimated at 2 million of which 38.2 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**

<b>Sr. No.</b>	<b>Cost Items</b>	<b>Total ('000 BIRR)</b>
1	Land lease value	140
2.	Building and Civil Work	750
3.	Plant Machinery and Equipment	800
4.	Office Furniture and Equipment	35
5.	Vehicle	-
6.	Pre-production Expenditure*	122.6
7	Working Capital	149.8
	<b>Total Investment cost</b>	<b>1,997.4</b>
	<b>Foreign share</b>	<b>38.2%</b>

## B. PRODUCTION COST

The annual production cost at full operation capacity of the plant is estimated at Birr 1 million (see Table 7.2). The material and utility cost accounts for 61.4 per cent, while depreciation financial costs and take 20.6 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	596	61.1
Utilities	3.2	0.3
Maintenance and repair	10.0	1.0
Labour direct	64.8	6.6
Factory overheads	3.5	0.4
Administration Cost	97.3	10.0
<b>Total Operating Costs</b>	<b>774.8</b>	<b>79.4</b>
Depreciation	131.0	13.4
Cost of Finance	70.1	7.2
<b>Total Production Cost</b>	<b>975.9</b>	<b>100</b>

\* N.B Pre-production expenditure includes interest during construction (Birr107.6 thousand), training (Birr10 thousand), and ( Birr 5 thousand) costs of registration, licensing and formation of the company including legal fees, commissioning expenses, etc.

## C. FINANCIAL EVALUATION

### 1. Profitability

According to the projected income statement, the project will start generating profit in the 1<sup>st</sup> 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 lifetime 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 4 ) is estimated by using income statement projection.

$$BE = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable cost}} = 35.8 \%$$

### 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 5 years.

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

Based on the cash flow statement, the calculated IRR of the project is 20% and the net present value at 8.5% discount rate is Birr 1.3 million.

## D. ECONOMIC BENEFITS

The project can create employment for 21 persons. In addition to supply of the domestic needs, the project will generate Birr 0.1 million per annum in terms of tax revenue when it starts to operate at full capacity. 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.