

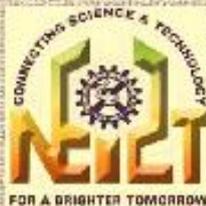
# TECHNO ECONOMIC FEASIBILITY REPORT

## ANUGRAHA – A METALLIC HAND LOOM FOR WEAVING COIR GEO- TEXTILES

*Submitted to*

**COIR BOARD**

Ministry of MSME  
Govt. of India



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### SUMMARY

In the North East Region, landslides due to soil erosion in hilly states like Meghalaya, Mizoram, Manipur, Sikkim, Arunachal Pradesh, Nagaland and river side soil erosion in the state of Assam are common & perennial problem. One of the most effective and yet natural soil erosion prevention techniques is the use of Coir Geotextiles fabrics (Woven Geotextiles). It is strong, durable, water proof and is one of the few natural fibers that is salt water resistant. Therefore, in North East India there is a high demand and potentiality of coir geotextile production industry.

The Anugraha Loom under North East Indian conditions is very much technically feasible and economically viable as has been worked out in the feasibility report. However, it is also found that big industries with higher capacity of production with multiple Anugraha Loom will not be feasible because of limitation of raw materials as compared to South Indian States. The Anugraha loom will be economically feasible in the major coconut producing districts in Assam, which are – **Barpeta, Nagaon, Sonitpur, Golaghat, Kamrup & Nalbari**. In Tripura 2 numbers of Anugraha Loom will be feasible at the state headquarter at **Agartala. & Udaipur**.

#### **Plant Capacity :**

The production basis for a single ANUGRAHA LOOM would be as follows :

Working hour per day	: 8 hours
Production capacity	: 80 sp.m. per day
Working Days in a year	: 300 days
Capacity utilization	: 75%, 80%, 85% during first, second & third year & 90% from fourth year onwards.
Annual Production	: 24000 sq.m.

#### **The major highlight of the feasibility report :**

1. The Capital requirement	: Rs.3.41 lakh
2. Promoter contribution	: Rs.0.682 lakh
3. Annual Sales (Turnover)	: Rs.11.52 lakh
4. Annual Operating expenses (fixed + variable)	: Rs.8.29 lakh
5. Annual Gross profit (pre-tax)	: Rs.3.23 lakh
6. Annual Gross profit Ratio	: 28.00%
7. Break Even Point	: 26.45%
8. Rate of return on investment	: 27.55%
9. Number of person employed	: 3 persons per day

# TECHNO ECONOMIC FEASIBILITY REPORT

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# TECHNO ECONOMIC FEASIBILITY REPORT

## ANUGRAHA – A METALLIC HAND LOOM FOR WEAVING COIR GEO-TEXTILES

### 11. INTRODUCTION

#### 11.1 General

The coconut palm indeed is a traditional plantation crop grown in India over the past 3000 years with longest mythological and historical record. In spite of the great antiquity attached to coconut crop in the country, organized efforts to develop the crop were made only about a century back and actual systematic efforts for development of coconut palm as a commercial crop begun in 1940s.

Coir is a unique natural fibre with diverse applications of great economic importance extracted from husks of Coconut. India is the largest coir producer in the world accounting for more than 80 per cent of the total world production of coir fibre. The coir sector in India is very diverse and involves households, co-operatives, NGOs, manufacturers and exporters.

The husk yields fibres, which is converted into coir and coir products viz., coil carpets, coir geo-textile, coir composite, coir safety belts, coir boards, coir asbestos and coir pith. Coir pith a secondary by product obtained during defibering process is used as soil conditioner and mending all types of soils. The spongy nature of pith helps in disintegration of clay soil and allows free drainage. Its sponginess helps to retain water and oxygen and also prevents loss of vital nutrients from soil.

Coir fibres measure up to 35 cm in length with a diameter of 12-25 microns. A coconut harvest occurs once in 45 days. From 1000 coconuts it would be possible to extract 10 kgs of coir. Among vegetable fibres, coir has one of the highest concentrations of lignin, making it stronger but less flexible than cotton and unsuitable for dyeing. The tensile strength of coir is low compared to abaca, but it has good resistance to microbial action and salt water damage and needs no chemical treatment.

There are two types of coir - the more commonly used brown fibre, which is obtained from mature coconuts, and finer white fibre, which is extracted from immature green coconuts after soaking for up to 10 months. Mature coir fibres contain more lignin, a complex woody chemical, and less cellulose than fibres such as flax or cotton.

Indian coir industry is an important cottage industry contributing significantly to the economy of the major coconut growing States and Union Territories, i.e., Kerala, Tamil Nadu, Andhra Pradesh, Karnataka, Maharashtra, Goa, Orissa, Assam, Andaman & Nicobar, Lakshadweep, Pondicherry, etc. Coconut husk is the basic raw material for

coir products. Around 50 per cent of the available coir husk is used to produce coir products. Hence, there is scope for growth of coir industry.

There is a huge potential for using coconut husk to set up coir units to produce coir fibre, yarn and other value-added products including coir mattresses. Production of coir *bhoovastra* and coir pith in the North Eastern region could also help in the speedy development of the rural sector. It will be a great achievement for these States if they succeeded in capturing at least 5 per cent each of the Rs. 1,300-crore domestic market for rubberised coir mattresses.

The coir industry employs more than 6.4 lakh persons of whom majorities are from rural areas belonging to the economically weaker sections of society. Nearly 80% of the coir workers in the fibre extraction and spinning sectors are women approximately of which 3.60 lakhs people belong to Kerala alone. About 80% of them are women. The women are mostly engaged in fibre extraction and spinning. The industry concentrated in Kerala but spread over in other States like Tamilnadu, Karnataka, Orissa, Andhra Pradesh etc. The development of industry is mainly concentrated in the area of coconut cultivation and availability of coconut husk.

### **11.2 Brief of the technologies**

Central Coir Research Institute, Kalavoor the research center of Coir Board has successfully developed a metallic handloom namely “ANUGRAHA” for weaving all kinds of geo textiles. It is a specially designed light weight loom for weaving Coir Geo Textiles, very easy to operate and offers comfortable weaving of geo textiles especially for ladies. It is made up of steel material. Weaving method is similar to normal handloom, but the warp release and take up of woven matting are automatically done in this loom. The operation of wooden coir handlooms requires exertion of a large force and therefore can be operated mainly by males having sound physique. Anugraha loom has been so designed that it can weave a coir fabric with a close to 6 mm to a fabric having mesh size of 25 mm. A layman can operate and produce standard quality products without any drudgery. As there is no power required to operate this loom, it can be installed in the remote village where women can easily operate it as it has a simple pedal for treading. The treading and beating is very is in Anugraha loom. The treading is operated by a 3 mm wire rope (motor cycle cable) and beating simplified providing a bush bearing. The loom can be converted in to wider width or a multi shaft loom to make it more versatile to produce intricate designs on coir.

Anugraha is light weight, easy to shift from one place to another as it needs no foundation. It needs less maintenance and occupies less space. It is easy to operate compared to wooden handloom. Anugraha loom is a big success in the coir industry and there is a tremendous scope for generation of woman employment. It is a boon to the industry and hence named “Anugraha” by CCRI which means blessing especially to the rural poor woman folk. Anugraha loom is the best machine for

producing coir geotextiles. Fabrication of wooden handloom requires one cubic meter of valuable wood. A tree of height 15 m and diameter 0.5 m can produce 2.25 cubic meters of planks. Therefore, two wooden handlooms necessitate cutting of a tree. The metallic Anugraha handloom could save trees, which are very essential for maintenance of ecology.

The treadle lever in Anugraha loom is raised by a cable system. The Anugraha loom is designed with a cover to protect the women during weaving. Women get expertise to operate Anugraha Loom in four hours training. Panama matting, Ribbed matting, rod mat, rod inland mat and carpet mat can also be manufactured using Anugraha loom with minor arrangements.

The technology has been already transferred to 23 parties for manufacturing the Anugraha loom. The Anugraha loom for purchase will be available with the following :

- 1) Ashok Steel Industries, Cherthala
- 2) Clamp Tools, Kalamasserry
- 3) Coirwell Engineering Works, Pollachi
- 4) Cones India Engineering Works, Pollachi
- 5) Dollar Industrial Machines, Thanjavur
- 6) G.S. Industries, Thiruvananthapuram
- 7) Kurichi Engineering, Thanjavur
- 8) Mas Engineering Works, Thiruvananthapuram
- 9) Plants (India) Agro Machinery Pvt. Ltd, Kalamasserry
- 10) Sagar Nylon products (India) Pvt. Ltd., Thiruvananthapuram
- 11) St. Joseph Engineering Works, Cherthala
- 12) Sakthi Engineering Works, Pollachi
- 13) Sakthivel & Co., Muhamma
- 14) Shajan Engineering Enterprises, Alappuzha
- 15) Steelex Chemicals, Thiruvananthapuram
- 16) Steel Track Engineering products, Cherthala
- 17) Monarck Engineers, Kochi
- 18) Metal Forms, Palakkad
- 19) Sri Saranya industries, Coibatore
- 20) Charankattu Coir Manufacturing Co.(P) Ltd., Cherthala
- 21) Brothers Coir Mills, Alappuzha
- 22) Peekay Tree Crops Foundation, Kochi
- 23) Centre for Development of Coir Technology, Thiruvananthapuram

### **11.3 About the North Eastern Region**

North Eastern region of India comprising the eight states of Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura is endowed with vast natural resources and has enormous potential of development. The economic structure of north-east India is similar to the general economic structure of India as a whole. But because of its topography as well as social and political conditions it has a relatively backward economy.

The climatic condition in the region varies from temperate to sub-tropical and tropical. The agro-climatic conditions of the region, varied soil types and abundant rainfall are favourable for cultivation of horticultural crops especially plantation crops. Coconut is one of the most popular crop grown for a long time especially in Assam state and in recent times in others N.E. states. The area and production which were 11,000 hectares and 60 million nuts, respectively, during 1985–86, have now increased to 40,000 hectares and about 178 million nuts, in the North Eastern Region. The cultivation which was confined to Assam, Tripura and to some extent in Manipur, has now spread to states like Nagaland, Mizoram, Arunachal Pradesh and Meghalaya due to efforts made by Coconut Development Board.

The state of Assam is having 20710 ha area under Coconut & with a total production of 1756.13 lakhs of nuts every year. In the State, farmers of Nagaon, Nalbari, Kamrup (R), Morigaon districts and the Bajali sub-division in Barpeta district are the major producers of coconut. Farmers in some areas of Lakhimpur and Dhemaji districts also produce the crop. Lion's share of the coconut produced in the State is consumed by its own people, while a portion is exported to the neighbouring states of Manipur, Mizoram, Meghalaya and West Bengal. Some portions are also exported to Bihar and Jharkhand.

Taking advantage of the sufficient number of coconut production, there is great scope to set up Coir based industries in the states of Assam & Tripura in this North East Region of India. The prospect of the coir industry is very high as Assam produces a total of 176 million coconuts every year. The state produces 8 thousand 480 nuts per hectare per year against the national average of 8 thousand 303. According to experts, 80 tonnes of fiber could be extracted from 1 million coconuts. Hence, Assam can produce 17 thousand 561 metric tonnes of fiber per year. Traditional items like durable ropes and twines, brooms, door mats along with technology based products including Geo-textile for erosion control and ornaments are being produced, using coir.

In the North East Region, landslides due to soil erosion in hilly states like Meghalaya, Mizoram, Manipur, Sikkim, Arunachal Pradesh, Nagaland and river side soil erosion in the state of Assam are common & perennial problem. One of the most effective and yet natural soil erosion prevention techniques is the use of Coir Geotextiles fabrics (Woven Geotextiles). Used extensively to prevent environmental degradation geotextiles have no synthetic material but is instead made out of an organic fiber, coir, which is extracted from the husk of a coconut. It is strong, durable, water proof and is one of the few natural fibers that is salt water resistant. The coir fiber is spun or woven into mesh generating products such as coir netting, coir matting, geotextiles, geo blankets, coir beds, coir pots, coir discs and so on with an "ANUGRAHA LOOM". These products in NE States could be used widely for many purposes such as stream and river bank protection, slope stabilization in railways cuttings and embankments, Sediment control, reinforcement of rural unpaved roads, railways and storage areas, filtration in road drains, waste protections and greening forestry re-vegetation, UV protection for under earth crops, roof top greening and landscaping, protection from

wind erosion, Soil erosion control and wetland environment, concrete column curing and as a sound barrier and mine site reclamation. Therefore in North East India there is a high demand and potentiality of coir geotextile industry.

#### **11.4 Aim of the feasibility study**

The development of coir industry has all along been in areas where there is a concentration of coconut trees and availability of coconut husk. Historically, the coir industry started and flourished in Kerala which has a long coast line, lakes, lagoons and backwaters providing natural conditions required for retting. However, with the expansion of coconut cultivation, coir industry has picked up in the States of Tamil Nadu, Karnataka, Andhra Pradesh, Orissa, West Bengal, Assam, Tripura, Pondicherry and the Union Territories of Lakshadweep and Andaman & Nicobar Islands through the efforts of Coir Board. The coir fibre industry is particularly located in Southern states of India, mainly the coastal region of Kerala State, produces 60% of the total world supply of white coir fibre. There is scope for development of coir industry in the coconut growing North Eastern States of India. Hence, the present study was undertaken to find out the feasibility of establishing Coir Industries in North Eastern States of India with respect to availability of raw materials (coconut husks), operational cost etc.

The main aims of the techno-economic feasibility study for a developed technology are –

- Technical evaluation of the know-how/technology developed by an R&D institution.
- To broadly specify the plant and machinery and other facilities required.
- Assessment of demand of the product to be produced.
- The likely investment required.
- Financial analysis of the proposed technology/venture to broadly determine whether the project is economically viable.
- Commercial analysis of the project to evolve sound marketing plan and organizational structure for the proposed venture.
- To make projected financial analysis for submission to the financial institutions and bank seeking long term and short term borrowings respectively.

## **12. DEMAND, PRODUCTION AND SUPPLY**

### **12.1 Demand of the product**

North Eastern Hill (NEH) region of India comprises of 08 states namely Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim. The area is dominated by three land forms associated viz., (1) The Greater Himalayas (2) strong dissected high lands (3) low lying riverine plains. The Annual rainfall of the region varies from 2,000 to 10,000 mm. The topography and climate of the region is conducive to accelerate soil erosion, which has been recognized as a serious threat to environment. The hill of Arunachal Pradesh, which occupies a major portion in the Himalayan Mountains is relatively a younger formation and geologically, a very

complex range. There is a usual phenomenon of erosion and land degradation by the action of water in this region.

Use of geo-textiles in NE region at present is negligible. However, there is a huge scope of using coir geotextile for preventing soil erosion, landslides, construction of hilly roads etc. There is lack of proper awareness about the use of coir geotextile in this part of India & if efforts made to aware the general people, concerned govt. departments in this part of the country, the demand of coir geotextiles will increase tremendously.

## **12.2 Production & Supply**

Assam produces 1756.13 lakh of coconut per year. It is estimated that 80 tones of fiber could be extracted from 1 million coconuts. Hence, Assam can produce 14 thousand 80 metric tones of coir fiber per year.

However, at present there is no Anugraha loom or no commercial coir geotextile producing unit in the North Eastern states. Hence, considering the enormous scope of using coir geotextile in various ways in this part of the country, a few industries with Anugraha loom for producing coir geotextile should be established.

## **13. PLANT LOCATION AND INFRASTRUCTURAL FACILITIES**

### **13.1 Plant Location**

For the selection of a suitable location for setting up of Anugraha Loom for production of Coir Geotextiles, following prerequisites are to be considered.

- (i) Availability of infrastructural facilities *viz.* raw materials and transport.
- (ii) Locally available raw materials (Coir fibre/coir yarn) utilization.
- (iii) Communication and transport facilities.
- (iv) Availability of necessary technical personnel, skilled & unskilled manpower.

The source of coir fibre is the Coconut plant. It is observed from the survey, collection of data from various sources that Coconut is mostly grown in Assam (20710 ha) and Tripura (5900 ha) amongst the North Eastern States of India. Therefore, any entrepreneur wish to set up Coir Industry should be in Assam or in Tripura.

Assam & Tripura together produces 1890.55 lakhs of nuts per year. The Major coconut producing districts in Assam are – **Barpeta, Nagaon, Sonitpur, Golaghat, Kamrup & Nalbari**. The Anugraha loom plant for producing coir geotextile to be established in these district of Assam along with the fibre extraction machine. In Tripura the recommended area for Anugraha loom plant is **Agartala**, where coir fibres & yarns from all four districts can be collected for making coir geotextiles.

Keeping in mind the above factors **it is recommended that in Assam at least 10 unit of Anugraha Loom and in Tripura at least 2 Anugraha Loom unit could be established.**

### **13.2 Infrastructural Facilities**

Infrastructural facilities required for installation of Anugraha Loom are a building of 6m × 4m and one Anugraha Loom. The land requirement for construction of building/loom house is suggested to have his/her own and attached with residential house. As the Anugraha loom occupies less space, the 6m × 4m house will be sufficient enough for the installation of loom and storing raw materials & coir yarn & finished product.

### **13.3 Plant Layout**

There will not be any specific plant for setting up of Anugraha Loom. It is to be purchased from Coir Board authorized dealer. The loom is to be installed in the proposed loom house (6m × 4m) attached to residential house of the entrepreneur.

## **14. MANUFACTURING PROCESS**

### **4.1. General :**

The technology of Anugraha Loom is very simple and very easy to operate with higher output of superior quality, lesser cost, suitable for women can be manufactured by basic level fabrication units, even take up by mechanical means and warping mechanism for single machine. The finished product *i.e.* geo-textiles have a looser weave and are used outside for erosion control (pre-vegetative protection).

### **4.2. Manufacturing Process :**

The main process steps are :

- (a) Purchase/Fabrication and setting up of Anugraha Loom
- (b) Collection and storage of coir yarn
- (c) Weaving of coir geotextiles in Anugraha Loom
- (d) Marketing of finished product

Anugraha Loom Technology has already been transferred to 23 parties and they are the authorized manufacturer of the Anugraha Loom. Therefore, no manufacturing processes have been involved & interested entrepreneurs have to purchase the Loom & get trained for operation.

### **4.3. Quality Control Analysis :**

The coir geotextile is an excellent medium for bio-engineering applications in many parts of the world in the form of meshes, netting, needle felt and pads, erosion control blankets, geo rolls, vegetation fascines, geo cushions, geo beds and anti-weed blankets. The quality of production depends on the application of the product.

### **4.4. Pollution and abatement :**

The proposed plant for production of Coir Geotextile does not produce harmful effluents. Therefore, no environmental pollution will arise from the proposed industry.

## 15. ORGANIZATION AND MANAGEMENT

### 15.1 Functional areas envisaged

The operation and management of Anugraha Loom is very easy and a simple organizational structure is recommended the following functional areas :

- (i) Production (Weaving)
- (ii) Administration, sales/purchase and accounts &
- (iii) Quality Control.

### 5.2 Functional responsibilities

The recommended that only three persons are needed to execute the above functional areas with following responsibilities :

- (i) **Production** : A person may be directly involved in the activities related to the operation (weaver) using Anugraha Loom. A labour will also be required to collect & continuous supply of raw materials (coir yarn), cleaning of loom, packing of finished product etc.
- (ii) **Administration, Sales/Purchase and accounts** : Another third person (may be the owner also) will responsible for purchase of coir yarn, marketing of coir geotextiles, calculating operational cost, fixing of prices for sales & purchase and maintaining accounts. Formulation of a workable & profitable program for purchase of raw materials & sales of coir geotextiles will look after by the proposed Supervisor.
- (iii) **Quality Control** : Both the weaver & supervisor have to be well trained before starting the operation and should know about the operational functions of the loom with varied quality of raw materials for maintaining the quality of geotextiles.

## 16. PROJECT PHASING AND ACTIVITY SCHEDULE

### 16.1 Project phasing

A poorly designed traditional planning and control methods fail to cope up with the changing realities of modern business. Now the management have started using more effective planning and control techniques when a complex set of activities are involved. However, as the operation & function of Anugraha Loom is very simple no such critical planning is required.

A time span of 15 weeks time is envisaged to complete the project implementation i.e. training, purchase of Anugraha Loom, market survey & collection of raw materials.

### 16.2 Activity Schedule

The detail scheduling of each activity and effective project control systems are essential to completion of the project according to the project implementation schedule. The activity schedule for producing geotextiles through Anugraha looms involves the following primary activities:

- (i) Purchase & Installation of Anugraha Loom

- (ii) Engagement of Manpower like Supervisor, weaver & labour
- (iii) Training
- (iv) Purchase/collection of raw materials
- (v) Weaving/production of Coir geotextiles
- (vi) Storing & marketing of product

## 17. CAPITAL REQUIREMENT AND COSTS

### 17.1 Fixed capital

For the purpose of techno-economic study fixed costs are taken as those which are required before the commencement of commercial production. This includes fixed assets towards land and buildings, plant & machinery, miscellaneous fixed assets, know-how and engineering/training fees, capitalized and pre-operative expenses etc. The fixed investment for purchase & operation of Anugraha Loom is estimated as Rs.3.41 lakh. To cover the expenditure during project implementation period of 15 weeks, the establishment salaries, travelling expenses, postage and telephones, printing & stationeries expenses are considered under the pre-operative head. In this case, the Pre-operative cost is calculated as Rs.0.10 lakh & Margin Money for Working Capital is estimated at 0.58 lakh (**Table-IV**). The detail cost break of individual components is presented in **Table I & Figure I**.

### 17.2 Working capital

Working Capital provided for the inventory of new materials & utilities, salaries and wages, stock of finished goods, bills receivable & other items. Considerable care is exercised in estimating the working capital since it is a non-depreciable capital on which a return must be earned. The details of working capital (Cost of production) have been calculated as Rs.8.30 lakh and shown in **Table-II, Table- III & Figure-II**.

### 17.3 Scheme of finance

The proposed project *i.e.* Anugraha is to be managed by private entrepreneurs, requirement of funds are proposed to be drawn through a bankable project, capital subsidy from Coir Board, Govt. of India under suitable scheme. **Table-V** presents the Bank Loan along with loan repayment schedule for five years.

## 18. OPERATING REQUIREMENT AND COSTS

This is deals with the operating costs viz. fixed and variable costs after commencement of production. The breakdown of the production cost is given in **Table II**.

### 18.1 Variable costs

The variable costs which are directly related to the quantum of production, include raw materials, utilities, packing costs, maintenance cost etc. The total variable cost is presented in **Table-II**.

## 18.2 Fixed costs

The salary and wages of all the personnel to be employed is calculated as Rs.2.25 lakh per year and shown in **Table-III**.

## 19. FINANCIAL ANALYSIS

The primary objective of the financial analysis is to determine the suggested program and policies that form the very basis of the proposed venture would yield a reasonable return on investment. The assessment is presented in the following format.

- (i) Fixation of price of Coir Geotextiles
- (ii) Profitability Analysis
- (iii) Cash Flow Analysis
- (iv) Balance sheet presentation
- (v) Appraisal of the proposed venture

### 19.1 Fixation of product price

Demand of coir geotextile is well established in the country. From the available information the current price of coir geotextile in NE states is varies from Rs.48-55/- per square meter. However, for the purpose of feasibility study and financial analysis of the proposed project the minimum price of Rs.48/- per square meter has been considered.

### 19.2 Profitability analysis

From the recommended selling price and generated cost data the profitability has been worked out. While estimating profitability, sales and administrative expenses, financial expenses *i.e.* interest payable to financial institutions and banks have been duly considered. Considering the geographical locations & Socio-economic conditions in NE states, it is calculated that only 75% of the capacity of Anugraha loom is utilized in first year, 80% in second year, 85% in third year and 90% from fourth year onwards. The details of profitability analysis are presented in **Table-VI**. In short it can be seen that the proposed Anugraha Loom of an entrepreneur can generate the Gross Operating Profit and Net Profits for ten production years as per the following table:

Years	Gross Operating Profit (Rs. in lakh)	Net Profit (Rs. in lakh)
I Year	2.129	2.119
II Year	2.129	2.119
III Year	2.129	2.119
IV Year	2.129	2.119
V Year	2.129	2.119
VI Year	2.129	2.119
VII Year	2.129	2.119
VIII Year	2.129	2.119
IX Year	2.129	2.119
X Year	2.129	2.119

### 19.3 Cash flow analysis

The data presented in **Table VII** is very critical for the purpose of financial analysis. The data highlight the quantum of cash flow from the proposed Anugraha Loom for the ten productive years. This would in turn bring the debt paying power of the proposed entrepreneur. For the purpose of financial analysis, the repayment of loan (Rs.2.728 lakh), commences from the first year of production. It is expected to be cleared by the end of fifth year in 5 equal installments with interest. **Table-V** shows repayment schedule of loans and the interest payable to the financial institution at the rate of 12%. It is observed from the Cash Flow Analysis that an amount of Rs.25.413 lakh cash also has been accumulated for any expansion or diversification of business utilizing coir fibre during a period of ten years after clearing all the loans by fifth year.

### 19.4 Balance Sheet

The projected balance sheet for the ten productive years showing the assets and liabilities of the proposed venture (Anugraha Loom) has been shown in **Table-VIII**.

### 19.5 Appraisal

Setting up of industries in NE states owing to its varied socio-cultural differences, geographical unevenness & other socio-economic condition is sometimes become complex. To overcome such risks it is very much essential to judge a project by various means after working out a detail techno-economic feasibility report. Most of the projects are financed from multiple sources, internal funds, loans, grants etc. The loan and associated interest and other charges will be repaid principally from the operating cash flow which the capital project is expected subsequently to generate. Thus the risk are shared by both the parties *i.e.* lender & financial institution. There are some reliable means of judging a project and they are duly considered here.

### 19.6 Break Even Point :

The Break Even Point analysis is primarily intended to indicate the proposed plant operating level at which accounting sales covers the accounting costs and the unit run at no loss basis. Any increase in production from break event level will definitely yield profit whereas it will run at loss if the production level is below the break even. The secondary objective is to examine the relationship between profit and quantum of production. **Table-IX** represented the detail Break Even Point Analysis and **Figure-III** represented the BEP graphically. In this particular Anugraha loom in NE States, the break even point occurs at **26.45%** production level.

## 20. CONCLUSION AND RECOMMENDATION

India accounts for more than two-thirds of the world production of coir and coir products. It is an important cottage industry contributing significantly to the economy of the major coconut growing States and Union Territories, *i.e.*, Kerala, Tamilnadu,

Andhra Pradesh, Karnataka, Maharashtra, Goa, Orissa, Assam, Andaman & Nicobar, Lakshadweep, Pondicherry, etc.

However, despite the huge potential to grow up this industry in NE region, especially in Assam, due to lack of awareness, scattered nature of coconut plantations, the growth of the coir industry is negligible or very poor. The state of Assam is having 20710 ha area under Coconut & with a total production of 1756.13 lakhs of nuts every year. Assam can produce 17 thousand 561 metric tonnes of fiber per year. Due to lack of infrastructure facility, lack of awareness & poor economic condition the full utilization of the coconut husk has not been achieved.

The Anugraha Loom under North East Indian conditions is very much technically feasible and economically viable as has been worked out in the feasibility report. However, it is also found that big industries with higher capacity of production with multiple Anugraha Loom will not be feasible because of limitation of raw materials as compared to South Indian States. The Anugraha loom will be economically feasible in the major coconut producing districts in Assam, which are – **Barpeta, Nagaon, Sonitpur, Golaghat, Kamrup & Nalbari**. In Tripura 2 numbers of Anugraha Loom will be feasible at the state headquarter at **Agartala & Udaipur**.

Therefore, it is recommended that interested entrepreneurs may come forward to take up the technology (Anugraha loom) for self employment and socio-economic development of this region. Cooperation is also required from different sectors to provide necessary facilities *i.e.* financial, technical etc. to help the interested entrepreneurs for speedy & successful implementation of the project.

# TECHNO ECONOMIC FEASIBILITY STUDY

## Title of the Project : ANUGRAHA LOOM-A METALLIC HAND LOOM FOR WEAVING COIR GEO-TEXTILES

**Basis of calculation :**

Number of Working Days = 300 days  
Debt Equity Ratio = 4 : 1

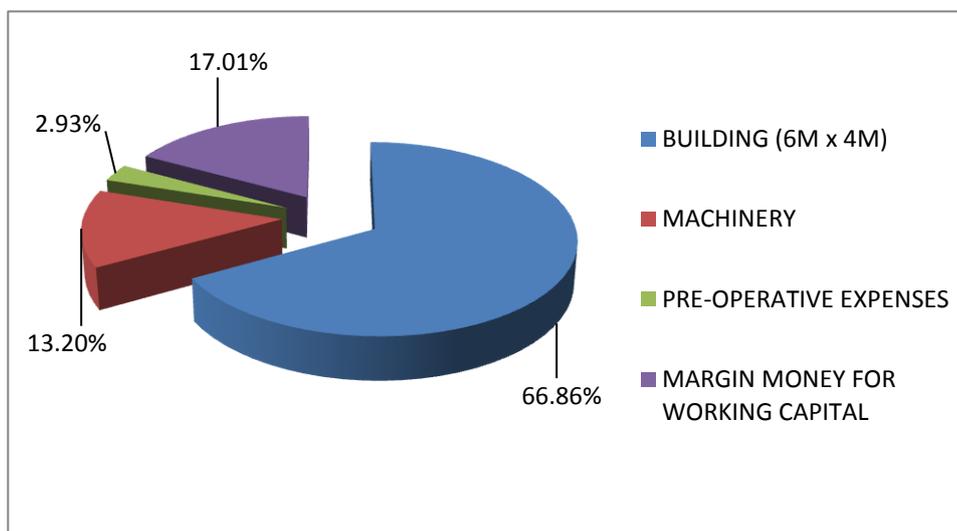
**Plant Capacity**

Raw Material (Coir Yarn) processing = 45 Kg per day  
Product (Geo-textile) = 80 Sq.M per day

**TABLE- I**

**PROJECT CAPITAL COST**

SI. NO.	PARTICULARS	CAPACITY	UNIT	QTY	COST(Rs)
A	<b>BUILDING (6M x 4M)</b>	24	Sq.M	1	228000.00
B	<b>MACHINERY</b>				45000.00
1	Machinery 1 metre Anugraha loom	600	Kg	1	
2	Transportation Cost of the Machine				
C	<b>PRE-OPERATIVE EXPENSES</b>				10000.00
D	<b>MARGIN MONEY FOR WORKING CAPITAL</b>				58000.00
<b>GRAND TOTAL</b>					<b>341000.00</b>



**Figure-I : Diagrammatic Representation of Project Capital Cost**

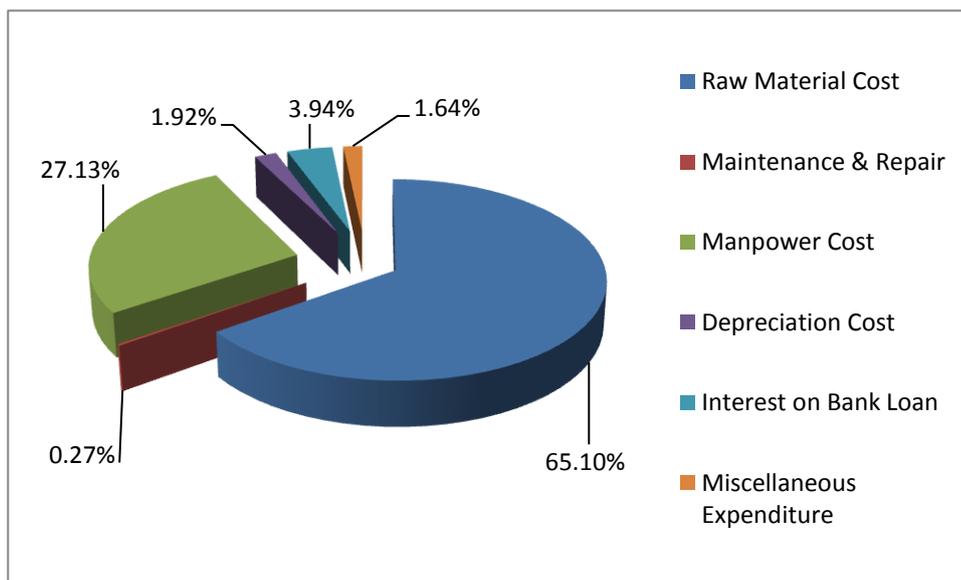
**TABLE - II**

**COST OF PRODUCTION**

Sl. No.	Item	Requirement per Day		Price (Rs)		Amount per Annum		
1	Raw Material Cost							
	Coir Yarn	45.0	Kg	40.00	per Kg	Rs.	540000.00	
	Raw Material Cost					Rs.	540000.00	
2	Maintenance & Repair	5%	of Machinery			Rs.	2250.00	
3	Manpower Cost						Rs.	225000.00
4	Depreciation		10%	of Machinery			Rs.	4500.00
			5%	of Building			Rs.	11400.00
	Depreciation Cost					Rs.	15900.00	
5	Interest on Bank Loan	12%	of Bank Loan			Rs.	32700.00	
6	Miscellaneous Expenditure	4%	of Machinery			Rs.	13640.00	
<b>TOTAL COST OF PRODUCTION</b>						<b>Rs.</b>	<b>829490.00</b>	

**SALES REALIZATION**

Sl. No.	Item	Quantity		Selling Price (Rs)		Amount per Annum	
1	Coir Geo-textile	80	sq.M	48.00	per sq.M	Rs.	1152000.00
<b>TOTAL SALES REALIZATION</b>						<b>Rs.</b>	<b>1152000.00</b>



**Figure-II : Diagrammatic Representation of Working Capital**

**TABLE - III****COST OF MANPOWER**

Sl. No.	Type	Quantity	Wage/ Monthly Salary in Rs.	No. of Days or month		Amount in Rupees
1	Supervisor	1	5000.00	12	Months	60000.00
2	Weaver	1	300.00	300	Days	90000.00
3	Labour	1	250.00	300	Days	75000.00
<b>TOTAL YEARLY COST</b>						<b>225000.00</b>

**TABLE - IV****MARGIN MONEY FOR WORKING CAPITAL**

Sl. No.	Particulars	No. of Months		Amount in Rupees
1	Raw Materials	1	Month	45000.00
2	Maintenance & Repair	1	Month	187.50
3	Manpower	1	Month	5000.00
4	Depreciation	1	Month	1325.00
5	Interest on fixed capital	2	Month	5450.00
6	Miscellaneous	1	Month	1136.67
<b>TOTAL</b>				<b>58099.00</b>
<b>SAY</b>				<b>58000.00</b>

**TABLE - V**

**BANK LOAN**

<b>Year</b>	<b>Loan Amount at the Beginning of the Year</b>	<b>Loan Repayment at the End of the Year</b>	<b>Outstanding Balance at the end of the Year</b>	<b>Interest (12%)</b>
1st	272800.00	54560.00	218240.00	32700.00
2nd	218240.00	54560.00	163680.00	26200.00
3rd	163680.00	54560.00	109120.00	19600.00
4th	109120.00	54560.00	54560.00	13100.00
5th	54560.00	54560.00	0.00	6500.00

**TABLE - VI****PROFITABILITY ANALYSIS**

(Rs. Lakhs)

Description	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year
<b>CAPACITY UTILIZATION</b>	75%	80%	85%	90%	90%	90%	90%	90%	90%	90%
Total Turnover	8.640	9.216	9.792	10.368	10.368	10.368	10.368	10.368	10.368	10.368
Less: cost of production	6.511	6.868	7.225	7.581	7.581	7.581	7.581	7.581	7.581	7.581
<b>Gross Operating Profit</b>	<b>2.129</b>	<b>2.348</b>	<b>2.567</b>	<b>2.787</b>						
Less: pre-operative expenses written off	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
<b>Net Profit</b>	<b>2.119</b>	<b>2.338</b>	<b>2.557</b>	<b>2.777</b>						
Add back :-										
- depreciation	0.159	0.159	0.159	0.159	0.159	0.159	0.159	0.159	0.159	0.159
- expenses written off	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
<b>TOTAL CASH ACCRUALS</b>	<b>2.288</b>	<b>2.507</b>	<b>2.726</b>	<b>2.946</b>						

**TABLE - VII**

**CASH FLOW STATEMENT**

(Rs. Lakhs)

Description	Procurement Stage	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year
<b>CAPACITY UTILIZATION</b>		75%	80%	85%	90%	90%	90%	90%	90%	90%	90%
<b>A. Source of Fund</b>											
Owner's Equity	0.682										
Gross Operating Profit		2.129	2.348	2.567	2.787	2.787	2.787	2.787	2.787	2.787	2.787
Bank Interest		0.327	0.262	0.196	0.131	0.065					
Profit after Depreciation but before Interest		2.456	2.610	2.763	2.918	2.852	2.787	2.787	2.787	2.787	2.787
Depreciation		0.159	0.159	0.159	0.159	0.159	0.159	0.159	0.159	0.159	0.159
Bank Loan	2.728										
<b>Total of A</b>	<b>3.410</b>	<b>2.615</b>	<b>2.769</b>	<b>2.922</b>	<b>3.077</b>	<b>3.011</b>	<b>2.946</b>	<b>2.946</b>	<b>2.946</b>	<b>2.946</b>	<b>2.946</b>
<b>B. Application of Fund</b>											
Project Expenditure	3.410										
Repayment of Bank Loan		0.546	0.546	0.546	0.546	0.546					
Interest on Bank Loan			0.327	0.262	0.196	0.131	0.065				
<b>Total of B</b>	<b>3.410</b>	<b>0.546</b>	<b>0.873</b>	<b>0.808</b>	<b>0.742</b>	<b>0.677</b>	<b>0.065</b>				
Opening Balance of Cash			2.069	3.966	6.081	8.416	10.750	13.630	16.576	19.521	22.467
Surplus/Deficit during the year		2.069	1.897	2.115	2.335	2.334	2.881	2.946	2.946	2.946	2.946
<b>Cumulative surplus</b>		<b>2.069</b>	<b>3.966</b>	<b>6.081</b>	<b>8.416</b>	<b>10.750</b>	<b>13.630</b>	<b>16.576</b>	<b>19.521</b>	<b>22.467</b>	<b>25.413</b>

**TABLE - VIII****PROJECTED BALANCE SHEET**

(Rs. Lakhs)

Description	Pre-operative Stage	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year
<b>LIABILITIES</b>											
Equity Capital	0.682	0.682	0.682	0.682	0.682	0.682	0.682	0.682	0.682	0.682	0.682
Reserve or Surplus		2.129	4.477	7.044	9.831	12.618	15.404	18.191	20.977	23.764	26.551
Bank Loan	2.728	2.182	1.637	1.091	0.546						
Interest Payable		0.327	0.262	0.196	0.131	0.065					
<b>Total</b>	<b>3.410</b>	<b>5.320</b>	<b>7.058</b>	<b>9.014</b>	<b>11.190</b>	<b>13.365</b>	<b>16.086</b>	<b>18.873</b>	<b>21.659</b>	<b>24.446</b>	<b>27.233</b>
<b>ASSETS</b>											
Fixed Assets	2.730	2.571	2.412	2.253	2.094	1.935	1.776	1.617	1.458	1.299	1.140
Current Assets	0.680	0.680	0.680	0.680	0.680	0.680	0.680	0.680	0.680	0.680	0.680
Cash or Bank Balance		2.069	3.966	6.081	8.416	10.750	13.630	16.576	19.521	22.467	25.413
<b>Total</b>	<b>3.410</b>	<b>5.320</b>	<b>7.058</b>	<b>9.014</b>	<b>11.190</b>	<b>13.365</b>	<b>16.086</b>	<b>18.873</b>	<b>21.659</b>	<b>24.446</b>	<b>27.233</b>

## TABLE - IX

### BREAK-EVEN ANALYSIS

Sl. No.	Particulars	Amount in Rupees
<b>A</b>	<b>FIXED COST</b>	
1	Manpower Cost	60000.00
2	Interest on Bank Loan	32700.00
3	Depreciation	15900.00
4	Maintenance & Repair	562.50
5	Miscellaneous Expenditure	6820.00
	<b>TOTAL OF (A)</b>	<b>115982.50</b>
<b>B</b>	<b>VARIABLE COST</b>	
1	Raw Material Cost	540000.00
2	Manpower Cost	165000.00
3	Maintenance & Repair	1687.50
4	Miscellaneous Expenditure	6820.00
	<b>TOTAL OF (B)</b>	<b>713507.50</b>
<b>C</b>	<b>TOTAL COST (A + B)</b>	829490.00
<b>D</b>	<b>SALES REALIZATION (TURNOVER)</b>	1152000.00
<b>E</b>	<b>GROSS PROFIT</b>	322510.00
<b>F</b>	<b>BREAK - EVEN POINT</b>	<b>26.45%</b>

### BREAK-EVEN ANALYSIS

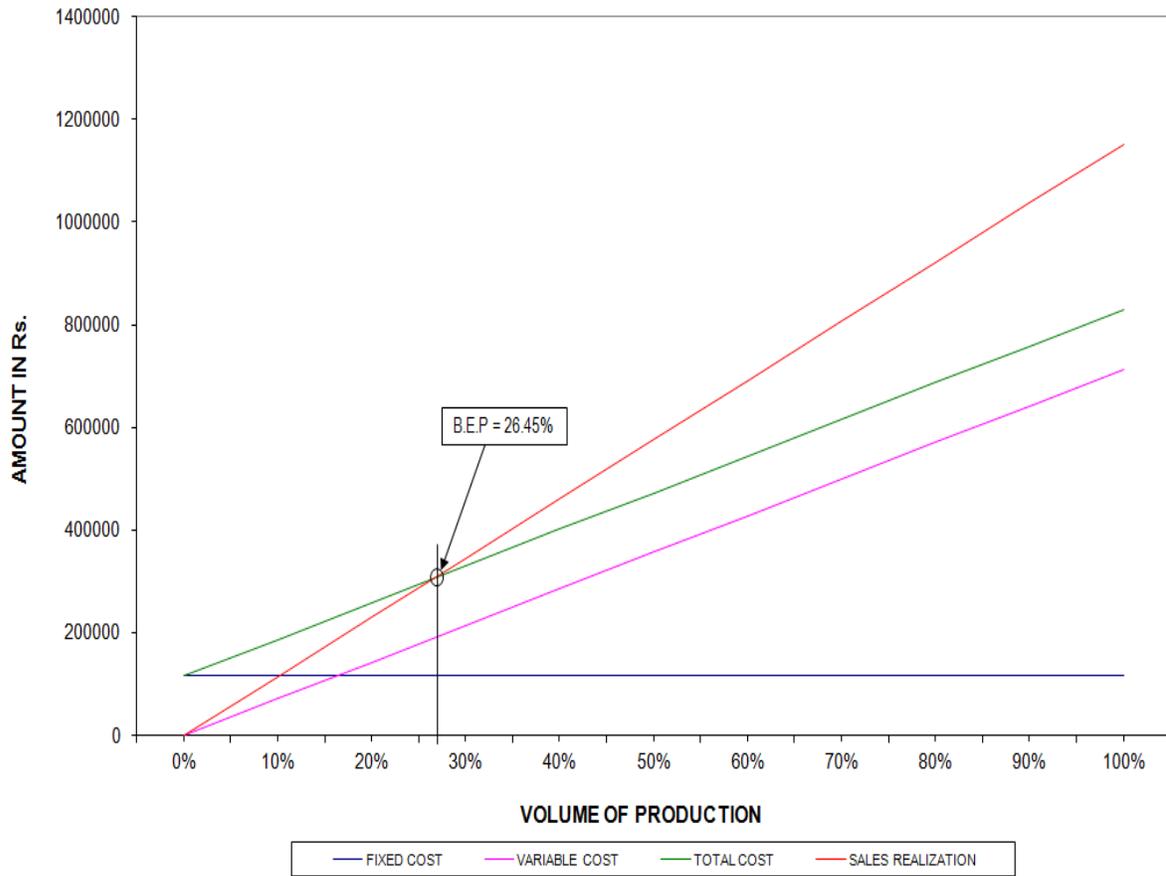


Figure-III : Graphical representation of Break Even Point Analysis