TECHNO ECONOMIC FEASIBILITY REPORT

C-POM – COIR PITH ORGANIC MANURE

Submitted to

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SUMMARY

With the sizable acreage under naturally organic/default organic cultivation, Assam has tremendous potential to grow crops organically and emerge as a main supplier of organic products in the world's organic market. Along with the growth of organic Agriculture in the region, the demand of organic inputs like organic manure has also been increased tremendously. The organic manure C-POM a bio-converted product from coir pith could be an excellent substitute for various peat products since it also has added advantages of water holding capacity and ability to last long in the soil.

Assam produces 1756.13 lakh of coconut per year. Seventy per cent of the coconut husks are the pith. Coir pith is normally the waste materials produced during the time of extraction of fibre. This coir pith after bioconversion has excellent properties for use as a growth medium for all types of plants. It is calculated that, in Assam itself, at least 8 lakh tones of Coir pith manure (C-POM) can be produced with the available raw materials. As the requirement of organic manure is very high in North Eastern Part of the country, there is a huge scope of commercial production of C-POM and meet the present day requirement.

Plant Capacity :

The production basis for a C-POM Production Unit would be as follows :

Working hour per day	: 8 hours
Production capacity	: 1.5 tone 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	: 450 tones

The major highlight of the feasibility report :

1.	The Capital requirement	: Rs.8.78 lakh
2.	Promoter contribution	: Rs.1.756 lakh
3.	Annual Sales (Turnover)	: Rs.27.00 lakh
4.	Annual Operating expenses (fixed + variable)	: Rs.16.86 lakh
5.	Annual Gross profit (pre-tax)	: Rs.10.14 lakh
6.	Annual Gross profit Ratio	: 37.55%
7.	Break Even Point	: 10.37%
8.	Rate of return on investment	: 39.54%
9.	Number of person employed	: 3 persons per day

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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 is the material released during extraction of fibre from coconut husk. This accumulates in large dumps outside the fibre extraction units, which process the husk for extraction of industrially valuable long fibres. The high lignin and cellulose content in the pith makes it non-biodegradable. When burnt, it smolders; emitting large quantity of smoke for several days causing air pollution. The Central Coir Research Institute, Alappuzha has developed a technology for the bioconversion of coir pith into organic manure which has applications both in the agriculture and horticulture fields.

The product obtained after bioconversion has excellent properties for use as a growth medium for all types of plants. The coir pith is available in huge quantities in our country, which needs to be processed into a form suitable for agricultural and horticultural use especially for the floriculture production and landscaping. The coir pith could be an excellent substitute for various peat products since it also has water holding capacity and ability to last long in the soil.

11.2 Brief of the technologies

The Central Coir Research Institute, Alappuzha has developed a technology for the bioconversion of coir pith into organic manure which has applications both in the agriculture and horticulture fields.

Coir Pith, one of the largest agro-wastes is a by-product of coconut husk processing industries. Coir pith constitutes 70% of the husk and is a fluffy material thrown out in

the process of separation of fibre from the coconut husk. Accumulation of coir pith forms coir pith hillocks which are common in the neighbourhood of fibre extraction units. The problematic waste (Coir pith) is a potential wealth and can be converted into valuable organic manure by microbial degradation. The technology has been developed by Coir Board for composting coir pith and converting it into rich natural organic manure. PITHPLUS, a mushroom spawn speeds up the composting process of coir pith and leads to 42% reduction in volume of coir pith. The mushroom belongs to the fungal group *Basidiomycetes* capable to detoxifying phenolics and producing bio polymersing enzymes. Cellulosic compounds present in coir pith support the initial growth of this fungus and act as co-substances for lignin degradation. The degradation of coir pith by PITHPLUS is marked by the increased evaluation of carbon dioxide.

Coir pith organic manure has been found to be superior to other organic manure which has been hitherto used for horticultural purposes.

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. On the other hand, along with the production of coir fibre, considerable amount of coir pith will also be available as by-product, which can be converted to value added product like C-POM. The North East Region of India is considered to be the naturally organic region as due to minimum or negligible use of chemical fertilizer & pesticides. Therefore, use of C-POM for production of Agricultural & horticultural crops enhance the productivity. Moreover, most of the Tea gardens in Assam converting their traditional garden to organic garden, which will necessitates large quantity of organic manure. Commercial production and availability of C-POM will be the solution for alternate use of chemical fertilizer.

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

With organic products gaining popularity worldwide in the wake of humanity's devastating experiences with chemical farming, Assam & other states in NE region are readying itself for the next phase of the green revolution "organic farming". The land of monsoons and evergreen forests is rediscovering its ancient farming practices along with many nations which are committed to socially responsible, ecologically friendly and economically self-sustainable development. Though Assam and the North East are mostly organic by default – according to government figures, of the net cultivated area of 4.3 million hectares, around 30.92 lakh hectares have never seen the use of chemical or inorganic fertilizers – conscious organic farming has suddenly picked up across Assam, especially among those cultivating ginger, turmeric, oranges, black pepper and pineapples. That Assam is "naturally organic by default" can be gauged from the extremely low consumption of fertilizer in the region. While the Indian average is currently around 106 kg of chemical fertilizer, Assam has been using 56 kg of chemical fertilizer per hectare on an average, out of which 60% is consumed by the tea gardens. With the sizable acreage under naturally organic/default organic cultivation, Assam has tremendous potential to grow crops organically and emerge as a main supplier of organic products in the world's organic market. Along with the growth of organic Agriculture in the region, the demand of organic inputs like organic manure has also been increased tremendously. The organic manure C-POM a bio-converted product from coir pith could be an excellent substitute for various peat products since it also has added advantages of water holding capacity and ability to last long in the soil.

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 tons of coir fiber per year. 70% of the coconut husks are the pith. Coir pith is normally the waste materials produced during the time of extraction of fibre. This coir pith after bioconversion has excellent properties for use as a growth medium for all types of plants. It is calculated that, in Assam itself, at least 8 lakh tones of Coir pith manure (C-POM) can be produced with the available raw materials. As the requirement of organic manure is very high in this part of country, there is a huge scope of commercial production of C-POM and meet the present day requirement.

13. PLANT LOCATION AND INFRASTRUCTURAL FACILITIES

13.1 Plant Location

For the selection of a suitable location for setting up of C-POM production unit, following prerequisites are to be considered.

(i) Availability of infrastructural facilities *viz.* raw materials and transport.

(ii) Locally available raw materials (coir pith) utilization.

(iii) Communication and transport facilities.

(iv) Availability of necessary technical personnel, skilled & unskilled manpower.

The location of the C-POM producing units can be selected in any parts of Assam & Tripura.

13.2 Infrastructural Facilities

Infrastructural facilities required for Commercial C-POM producing units are a land of 3000 sq.m., a small office cum store building of size 3m × 5m, a few garden tools like Rotary Shifter, sprinkler, weighing balance, rubber tubes and a refrigerator for storing PITHPLUS. Initially, it is suggested that the entrepreneur will purchase the PITHPLUS from genuine supplier or from CCRI. However, after established, the entrepreneur can also take the PITHPLUS technology and produce by himself for his use and can also sale to needy entrepreneur.

13.3 Plant Layout

There will not be any specific plant for setting up of C-POM production unit. The process know-how should be taken from Coir Board. An area of 3000 sq. m. with a small (3m × 5m) office cum store room is required. An area of 5m × 3m is to be selected for composting/bio-conversion of coir pith with PITHPLUS for 100kg capacity. For 1500 kg capacity 15 nos. of such unit will be required.

14. MANUFACTURING PROCESS

4.1. General :

Coir pith when inoculated with a proprietary bio-formulation, such as PITHPLUS, and enriched with urea shows a definite reduction in lignin and cellulose contents with an increase in total nitrogen and other nutrient elements after a period of 30 days. PITHPLUS is derived from *Pleurotus sajor caju*, which is a fast growing, edible oyster mushroom, originally found in India and grows naturally on a succulent plant (*Euphorbia royleans*) in the foothills of Himalayas.

4.2. Manufacturing Process :

The first layer of 100kg coir pith is covered with a layer of PITHPLUS. The layer of PITHPLUS provides the necessary cellular organisms to biodegrade the coir pith. The layer of PITHPLUS is covered by an additional layer of 100kg coir pith, followed by a layer of urea. Urea provides the necessary media to proliferate the growth of cellular organisms that cause the composting of coir pith. The urea layer is finally topped off by a layer of pith and PITHPLUS, respectively. The final assembly is a six-layered arrangement, which is continued until the height of the heap reaches a maximum of 1 meter. The PITHPLUS compost the coir pith in open air in about 30 days until pith becomes black in color, indicating the composting of the coir pith moving toward completion.

Method of bed composting

- Spread uniformly 100 kg coir pith is an area 5M x 3M
- Apply one packet of Pithplus (400gm) uniformly over it.
- Cover with 100kg coir pith and apply 1kg urea uniformly over it.
- Spread 100kg coir pith again
- Repeat the sandwiching process
- Moisten the heap by sprinkling 25 buckets (approx) of water daily.
- Allow the heap to decompose for 30 days

- 1 Ton Coir pith + 2kg pithplus +5kg Urea ----------> C-POM (200% Moisture, 30 days)

The organic manure thus obtained is richer in nitrogen, phosphorus and potassium. The method described above, although effective in composting coir pith, suffers from two limitations. First, it takes over a month for composting when the heaps are larger in dimensions. Second, the height of the coir pith heap that this process can compost has to be less than 1 meter, which results in a large area of land usage for compositing, for a given heap of coir pith. Both of these limitations originate because of the absence of proper aeration system in the heap of the coir pith. The process described above relies on natural aeration, which can be limiting, especially when multilayered heap structures are designed. The lack of proper flow of air also result in longer composting times.

The correct moisture is crucial. When there is too little, the biological reactions slow down and when there is too much, the space between the particles becomes clogged with water, preventing the movement of air through the heap. As a rough guide, the material should be as damp as a squeezed out sponge. In tropical conditions, the materials will dry out more quickly than in temperature climates except, of course, in the season. To ensure the moisture content at all times, the mixture should be wetted initially and again when necessary during the composting process.

Air must be supplied to all parts of the heap so that oxygen can get to the microorganisms and flush out the CO2 produced. When the heap beings the composting process the material becomes slightly acidic, as the simple organic acids are the first to break down. It then turns slightly alkaline as proteins are attacked and ammonia released. But, if the materials are carefully mixed and moisture content and aeration regulated, it won't be necessary to change the acidity of pH during composting.

Heat develops very soon as the more materials break down in the compositing process. This is normally enough to raise the central core of the heap to a temperature of 60^{o}C. To reduce heat losses as much as possible, the heap should be covered with coconut palm leaves thatching mounted at an angle at least 15cm above the top of heap or can also be spread on top of it and draped over the sides to

prevent heat loss and drying out. This type of cover insulates while allowing air to pass through. This enables the high temperature zone to move out toward the edges of the heap. It will provide some form of overhead protection against heavy rain or drying sun. It should be easy to remove to allow work on the heap when necessary.

4.3. Quality Control Analysis :

C-POM is coir pith organic manure which is prepared by bioconversion of coir pith using PITHPLUS a lignlytic mushroom spawn. This leads to increasing its nutrient status making & most suitable for agriculture/horticulture.

Nutrient status of composted coir pith is as below :

Nitrogen	: 1.26%
Phosphorous	: 0.06%
Potassium	: 1.20%
P^H	: 6.4-6.9
Electrical conductivity	: > 0.25 millimhos/cm
Organic Carbon	: 24.4%
C:N Ratio	: 19:1
Lignin	: 4.8%
Cellulose	: 10.20%
Calcium	: 0.50%
Magnesium	: 0.48%
Iron (ppm)	: 0.09
Manganese (ppm)	: 25.0
Zinc (ppm)	: 15.80
Copper (ppm)	: 6.20
Cation exchange Capacity	: 40-90 mwq/100g of sample

4.4. Pollution and abatement :

The proposed C-POM production unit does not produce harmful effluents. Therefore, no environmental pollution will arise from the proposed venture.

15. ORGANIZATION AND MANAGEMENT

15.1 Functional areas envisaged

The operation and management of C-POM production unit is very easy and a simple organizational structure is recommended the following functional areas :

(i) Production
(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 :** Two person may be directly involved in the activities related to the operation for production of C-POM. A labour will also be required to collect & continuous supply of raw materials (coir pith), packing of finished product etc.

(ii) **Administration, Sales/Purchase and accounts** : The owner/entrepreneur (Supervisor) will responsible for purchase of coir pith, pithplus, urea, marketing of C-POM, 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 C-POM, Coir Pith Organic Manure will look after by the proposed Supervisor.

(iii) **Quality Control** : The supervisor (entrepreneur) have to be well trained before starting the production of Coir pith organic manure (C-POM) with varied quality of raw materials for maintaining the quality of finished product.

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 production of Coir Pith Organic Manure (C-POM) 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 machineries/tools, 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 Coir Pith Organic Manure involves the following primary activities:

(i) Selection of suitable land

(ii) Purchase & Installation of machineries/tools

(iii) Engagement of Manpower like Supervisor & labour

(iv) Training

(v) Purchase/collection of raw materials

(vi) Production of Coir Pith Organic Manure (C-POM)

(vii) Packing, 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 Coir Pith Organic Manure (C-POM) is estimated as Rs.8.78 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.0.05 lakh & Margin Money for Working Capital is estimated at Rs.1.48 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.16.861 lakh and shown in **Table-II, Table-III & Figure-II.**

17.3 Scheme of finance

The proposed project *i.e.* production of Coir Pith Organic Manure (C-POM) 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 Mats/Matting
(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 Pith Organic Manure is well established in the country & specifically in this north eastern region. From the available information the current price of coir pith organic manure in NE states is varies from Rs.6-10/- per kg. However, for the purpose of feasibility study and financial analysis of the proposed project the minimum price of Rs.6/- per kg 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 C-POM production unit 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 Coir Pith Organic Manure (C-POM) Production Unit 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	7.311	7.306
II Year	7.877	7.872
III Year	8.442	8.437
IV Year	9.008	9.003
V Year	9.008	9.003
VI Year	9.008	9.003
VII Year	9.008	9.003
VIII Year	9.008	9.003
IX Year	9.008	9.003
X Year	9.008	9.003

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 Coir Pith Organic Manure (C-POM) Production Unit 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.7.024 lakh), commences from the first year of production. It is expected to be cleared by the end of fifth year in 5 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.81.238 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. The entrepreneur may also take up the Pithplus production unit from 6th year onwards.

19.4 Balance Sheet

The projected balance sheet for the ten productive years showing the assets and liabilities of the proposed venture (Coir Pith Organic Manure (C-POM) Production Unit) 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. However, for Coir Pith Organic Manure (C-POM) Production Unit, there will not be any problems seems to be associated as the technology is rural based and related to agriculture.

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 Coir Pith Organic Manure (C-POM) Production Unit in NE States, the break even point occurs at **10.37%** production level.

20. CONCLUSION AND RECOMMENDATION

Assam is embracing organic farming in a big way with the help of the central government. However, the alternate source of chemical fertilizer should also be made available to the farmers/growers to replace with Organic Manure. Tea gardens are the major consumers of chemical fertilizer and with growing awareness & demand, now-a-days, production of organic tea is also getting momentum.

A great cup of Assam tea starts in the soil, where the seeds of the tea plant *Camellia Sinesis assamica* take root and start to grow. As they mature, the plants will continue to draw up nutrients from the surrounding environment, and eventually their leaves will be picked and processed to create the bold flavor that has made Assam tea the world's most popular beverage. But with the growth of industrial farming, a lot more

than just nutrients and water has been making its way into the tea we drink, which is why organic tea cultivation has become the go-to source for clean, flavourful tea leaves.

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.

Therefore, it is recommended that interested entrepreneurs may come forward to take up the Coir Pith Organic Manure (C-POM) production unit 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 : **C-POM - A COIR PITH ORGANIC MANURE**

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

Plant Capacity
Product (Organic Manure) = 1500 Kg per day

TABLE- I

PROJECT CAPITAL COST

Sl. NO.	PARTICULARS	CAPACITY	UNIT	QTY	COST(Rs)
A	**LAND (3000 sq.M)**				500000.00
B	**BUILDING (3M x 5M)**	15	cu.M	1	135000.00
C	**MACHINERY**				90000.00
	Rotary shifter, Weighing balance, Refrigerator, Motor 2 HP, sprinkler pipe etc.				
D	**PRE-OPERATIVE EXPENSES**				5000.00
E	**MARGIN MONEY FOR WORKING CAPITAL**				148000.00
				GRAND TOTAL	**878000.00**

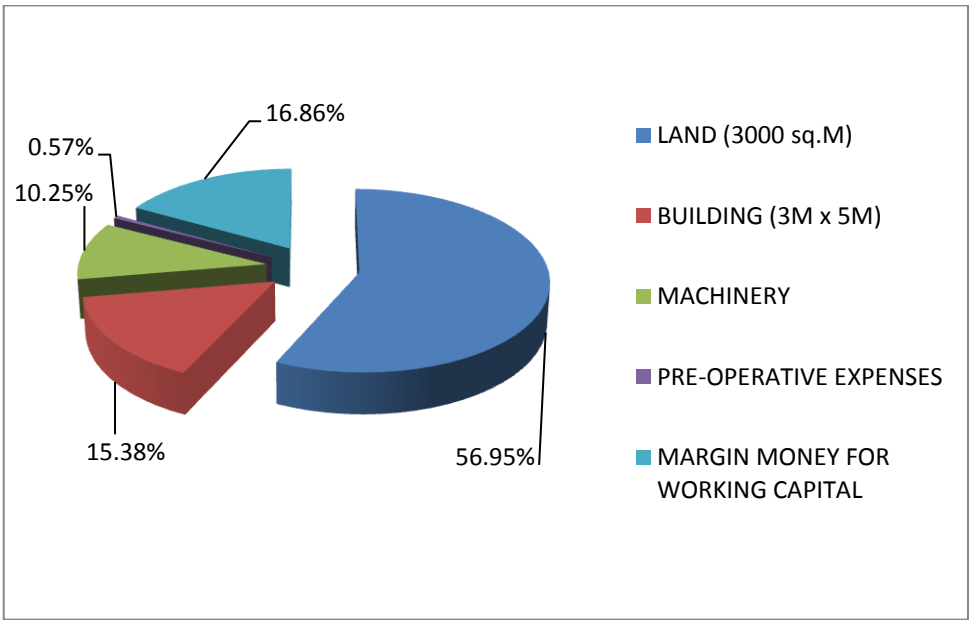

Figure-I : Diagrammatic Representation of Project Capital Cost

TABLE - II

COST OF PRODUCTION

Sl. No.	Item	Requirement		Price (Rs)		Amount per Annum	
1	Raw Material Cost						
	Coir pith	37500.0	Kg per month				
	pithplus	50.0	Kg per month				
	urea	125.0	Kg per month				
	Raw Material Cost					Rs.	1224000.00
2	Manpower Cost	3 labour/day		250.00/day		Rs.	225000.00
3	Utility						
	Power Charges			2000.00	per month	Rs.	24000.00
	Water	1250	Litre per day	10.00	per KL		3750.00
	Utility Cost						27750.00
4	Maintenance & Repair	5%	of Machinery			Rs.	4500.00
5	Depreciation	10%	of Machinery			Rs.	9000.00
		5%	of Building			Rs.	6750.00
	Depreciation Cost					Rs.	15750.00
6	Interest on Bank Loan	12%	of Bank Loan			Rs.	84300.00
7	Miscellaneous Expenditure	2%	of Raw material Cost			Rs.	24480.00
8	Marketing Cost	5%	of (1 to 7)			Rs.	80289.00
				TOTAL COST OF PRODUCTION		Rs.	**1686069.00**

SALES REALIZATION

Sl. No.	Item	Quantity		Selling Price (Rs)		Amount per Annum	
1	ORGANIC MANURE	1500	Kg per day	6.00	per Kg	Rs.	2700000.00
				TOTAL SALES REALIZATION		Rs.	**2700000.00**

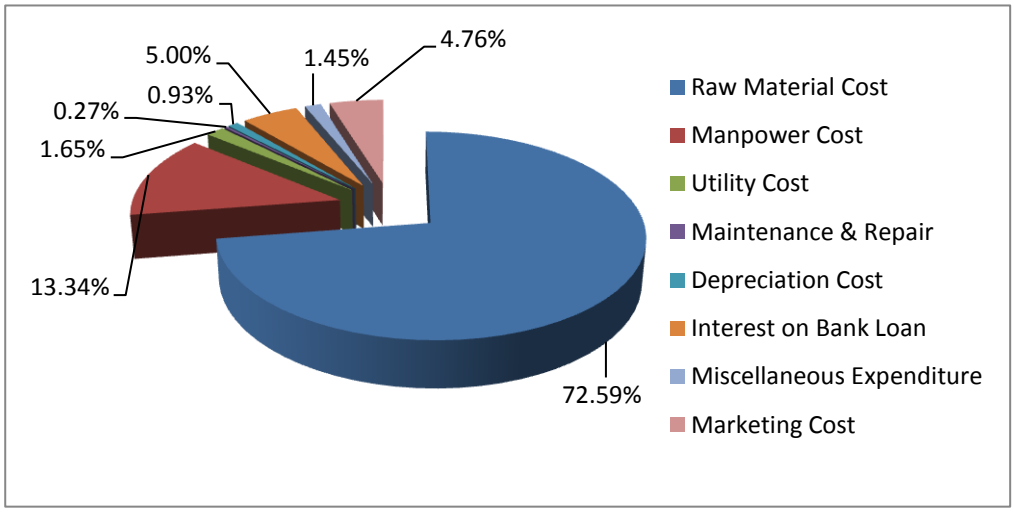

Figure-II : Diagrammatic Representation of Working Capital

TABLE - III

COST OF MANPOWER

Sl. No.	Type	Quantity	Wage/ Monthly Salary in Rs.	No. of Days or month		Amount in Rupees
1	Labour	3	250.00	300	Days	225000.00
				TOTAL YEARLY COST		225000.00

TABLE - IV

MARGIN MONEY FOR WORKING CAPITAL

Sl. No.	Particulars	No. of Months		Amount in Rupees
1	Raw Materials	1	Month	102000.00
2	Manpower Cost	1	Month	18750.00
3	Utility	1	Month	2312.50
4	Maintenance & Repair	1	Month	375.00
5	Depreciation Cost	1	Month	1312.50
6	Interest on Bank Loan	2	Month	14050.00
7	Miscellaneous Expenditure	1	Month	2040.00
8	Marketing Cost	1	Month	6690.75
			TOTAL	**147531.00**
			SAY	**148000.00**

TABLE - V

BANK LOAN

Year	Loan Amount at the Beginning of the Year	Loan Repayment at the End of the Year	Outstanding Balance at the end of the Year	Interest (12%)
1st	702400.00	140480.00	561920.00	84300.00
2nd	561920.00	140480.00	421440.00	67400.00
3rd	421440.00	140480.00	280960.00	50600.00
4th	280960.00	140480.00	140480.00	33700.00
5th	140480.00	140480.00	0.00	16900.00

TABLE - VI

PROFITABITY ANALYSIS

(Rs. Lakhs)

Description	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year
CAPACITY UTILIZATION	75%	80%	85%	90%	90%	90%	90%	90%	90%	90%
Total Turnover	20.250	21.600	22.950	24.300	24.300	24.300	24.300	24.300	24.300	24.300
Less: cost of production	12.939	13.723	14.508	15.292	15.292	15.292	15.292	15.292	15.292	15.292
Gross Operating Profit	**7.311**	**7.877**	**8.442**	**9.008**	**9.008**	**9.008**	**9.008**	**9.008**	**9.008**	**9.008**
Less: pre-operative expenses written off	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Net Profit	**7.306**	**7.872**	**8.437**	**9.003**	**9.003**	**9.003**	**9.003**	**9.003**	**9.003**	**9.003**
Add back :-										
- depreciation	0.158	0.158	0.158	0.158	0.158	0.158	0.158	0.158	0.158	0.158
- expenses written off	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
TOTAL CASH ACCRUALS	**7.469**	**8.034**	**8.600**	**9.166**	**9.166**	**9.166**	**9.166**	**9.166**	**9.166**	**9.166**

TABLE - VII

CASH FLOW STATEMENT

(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
CAPACITY UTILIZATION		75%	80%	85%	90%	90%	90%	90%	90%	90%	90%
A. Source of Fund											
Owner's Equity	1.756										
Gross Operating Profit		7.311	7.877	8.442	9.008	9.008	9.008	9.008	9.008	9.008	9.008
Bank Interest		0.843	0.674	0.506	0.337	0.169					
Profit after Depreciation but before Interest		8.154	8.551	8.948	9.345	9.177	9.008	9.008	9.008	9.008	9.008
Depreciation		0.158	0.158	0.158	0.158	0.158	0.158	0.158	0.158	0.158	0.158
Bank Loan	7.024										
Total of A	**8.780**	**8.312**	**8.708**	**9.106**	**9.503**	**9.335**	**9.166**	**9.166**	**9.166**	**9.166**	**9.166**
B. Application of Fund											
Project Expenditure	8.780										
Repayment of Bank Loan		1.405	1.405	1.405	1.405	1.405					
Interest on Bank Loan			0.843	0.674	0.506	0.337	0.169				
Total of B	**8.780**	**1.405**	**2.248**	**2.079**	**1.911**	**1.742**	**0.169**				
Opening Balance of Cash			6.907	13.367	20.395	27.986	35.579	44.576	53.741	62.907	72.072
Surplus/Deficit during the year		6.907	6.461	7.027	7.592	7.593	8.997	9.166	9.166	9.166	9.166
Cumulative surplus		**6.907**	**13.367**	**20.395**	**27.986**	**35.579**	**44.576**	**53.741**	**62.907**	**72.072**	**81.238**

TABLE - VIII

PROJECTED BALANCE SHEET

(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
LIABILITIES											
Equity Capital	1.756	1.756	1.756	1.756	1.756	1.756	1.756	1.756	1.756	1.756	1.756
Reserve or Surplus		7.311	15.188	23.630	32.639	41.647	50.655	59.663	68.671	77.679	86.687
Bank Loan	7.024	5.619	4.214	2.810	1.405						
Interest Payable		0.843	0.674	0.506	0.337	0.169					
TOTAL	**8.780**	**15.529**	**21.832**	**28.702**	**36.136**	**43.572**	**52.411**	**61.419**	**70.427**	**79.435**	**88.443**
ASSETS											
Fixed Assets	7.250	7.093	6.935	6.778	6.620	6.463	6.305	6.148	5.990	5.833	5.675
Current Assets	1.530	1.530	1.530	1.530	1.530	1.530	1.530	1.530	1.530	1.530	1.530
Cash or Bank Balance		6.907	13.367	20.395	27.986	35.579	44.576	53.741	62.907	72.072	81.238
TOTAL	**8.780**	**15.529**	**21.832**	**28.702**	**36.136**	**43.572**	**52.411**	**61.419**	**70.427**	**79.435**	**88.443**

TABLE - IX

BREAK-EVEN ANALYSIS

Sl. No.	Particulars	Amount in Rupees
A	**FIXED COST**	
1	Interest on Bank Loan	84300.00
2	Utility	2775.00
3	Depreciation	15750.00
4	Maintenance & Repair	2250.00
5	Miscellaneous Expenditure	12240.00
	TOTAL OF (A)	**117315.00**
B	**VARIABLE COST**	
1	Raw Material Cost	1224000.00
2	Manpower Cost	225000.00
3	Utility	24975.00
4	Maintenance & Repair	2250.00
5	Miscellaneous Expenditure	12240.00
6	Marketing Cost	80289.00
	TOTAL OF (B)	**1568754.00**
C	**TOTAL COST (A + B)**	1686069.00
D	**SALES REALIZATION (TURNOVER)**	2700000.00
E	**GROSS PROFIT**	1013931.00
F	**BREAK - EVEN POINT**	**10.37%**

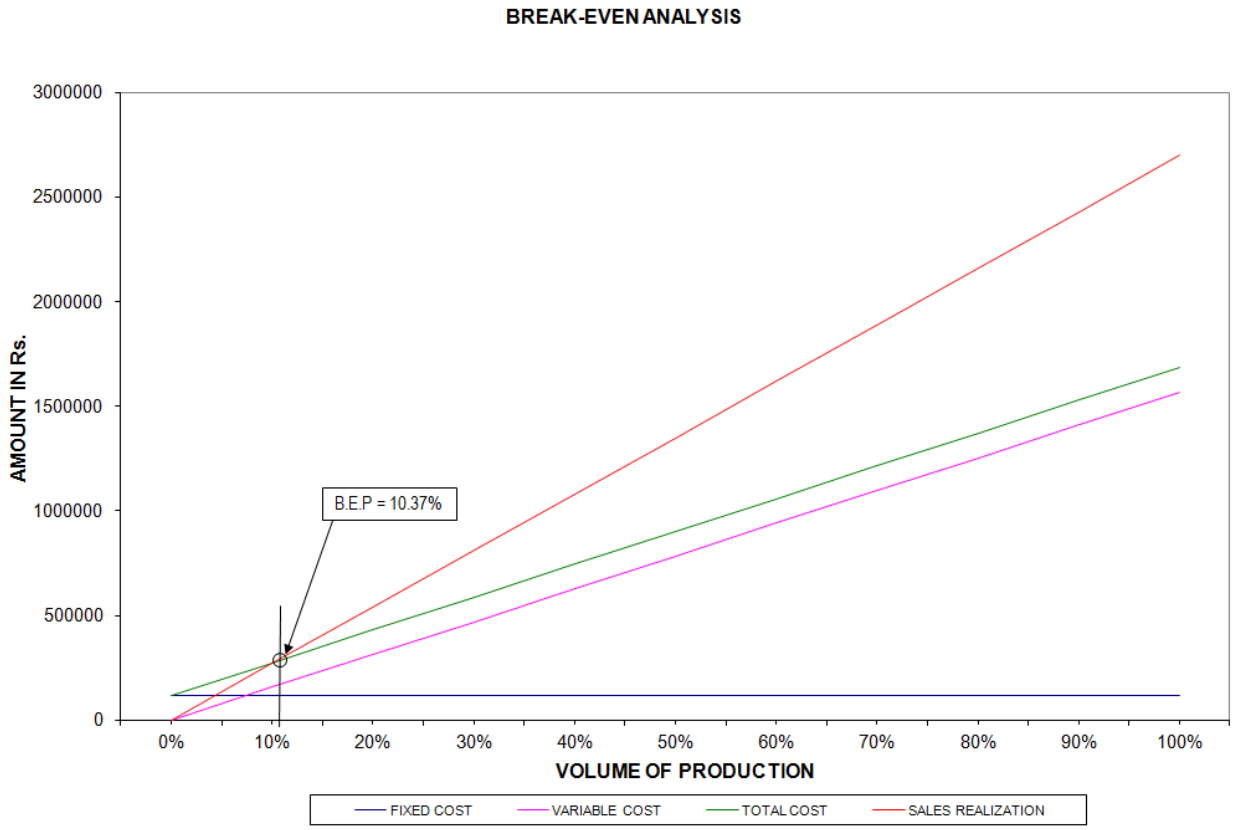

Figure-III : Graphical representation of Break Even Point Analysis