INTERNSHIP REPORT ON : "TRENDS AND STATUS OF BAMBOO PLANTATION IN DIFFERENT REGIONS"

SUBMITTED BY-

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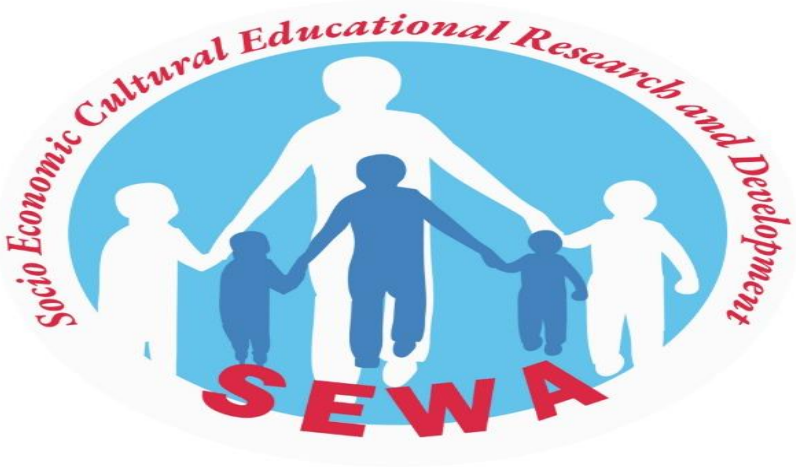

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

JORHAT ENGINEERING COLLEGE

JORHAT, ASSAM

AUGUST 2019

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

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CERTIFICATE

This is to certify that the work presented in the report entitled "**TRENDS AND STATUS OF BAMBOO PLANTATION IN DIFFERENT REGIONS**" is a bona fide work carried out by Ms. PARISHMITA DAS(180710007039) AND IS SUBMITTED AS A PART OF INTERNSHIP –I

DATE:

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

ACKNOWLEDGEMENT

THE SUCCESS AND FINAL OUTCOME OF THIS PROJECT REQUIRED A LOT AND OF GUIDANCE AND ASSISTANCE FROM MANY PEOPLE AND I AM EXTREMELY PRIVILEGED TO HAVE GOT THIS ALL ALONG THE COMPLETION OF MY INTERNSHIP .ALL THAT I HAVE DONE IS ONLY DUE TO THE SUPERVISION AND GUIDANCE AND I WOULD NOT FORGET TO THANK THEM.

I EXPRESS RESPECT AND THANK MR. BIBEK BORA-CHAIRMAN,SEWA; MR.GYANDIP BORUAH,VICE CHAIRMAN,SEWA AND MR. SATYAM NAYAK,EXECUTIVE MEMBER, FOR PROVIDING ME AN OPPORTUNITY TO DO THE INTERNSHIP ON “SEWA NGO” AND GIVING ME ALL SUPPORT AND GUIDANCE WHICH MADE ME COMPLETE THE PROJECT DULY.I AM EXTREMELY THANKFUL TO THEM FOR PROVIDING SUCH A NICE SUPPORT AND GUIDANCE ,ALTHOUGH THEY HAD BUSY SCHEDULE MANAGING THE CORPORATE AFFAIRS.

CONTENT

ABSTRACT

Bamboo is a evergreen perennial plant,which have had a lot of advantages since ages.the people use is for a large no. of reasons.It is easy to mainits presence in the northeast makes it look much more beautiful then ever.Now,a joint venture company named “assam bio-refinery” has made an approach to bring out some more use out of this greenery.

Numaligarh Refinery Limited has taken a giant step forward by establishing a joint venture, **Assam Bio-Refinery Pvt. Limited (ABRPL)** with equity participation of M/s Chempolis Oy of Finland and M/s Fortum 3 B.V. of Netherland to build and operate the first of its kind Bio Refinery in India which would generate renewable green fuel-bioethanol, other valuable chemicals and green powerfrom bamboo biomass.

The joint venture agreement was signed in New Delhi recently by MD NRL S K Barua; Mr. Sanjay Aggarwal, authorised representative of Fortum 3 B.V. and CEO Chempolis Oy, Finland Mr. Tomi Honkala in the presence of officials from all the partner companies including Director (Tech) NRL Mr. B. J. Phukan and Head (Legal) Fortum India Pvt.Ltd.

The joint venture company incorporated on 04th June 2018 has 3 partners with major equity holding of 50% by NRL , 28% by Fortum 3.B.V. Netherland and 22% by Chempolis Oy, Finland.

Government of India recently stepped up its support for production of bio-ethanol, most prominently by means of the new bio-ethanol policy for mandatory blending of Ethanol with gasoline upto 10%. The new bio-ethanol policy aims to spur investments for setting up projects with a total production capacity of 1 billion litres of fuel ethanol every year. The policy is also aimed at cutting down the country's significant energy import dependence as well as meet Nationally Determined Contributions (NDCs) committed to the Paris Agreement on Climate Change.

This project has a clear role in the fight against climate change. It can also have a big positive impact on local communities. It will provide employment

opportunities for thousands of people and in the long run it will help local communities to become self-sustainable and enhance their living standards.

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Bamboo is present abundantly in the northeastern states.Hence,this experiment has been carried out in orderto provide India energy security and promote green fuel.

Regarding this Project ,our internship has carried out this Internship to conduct survey in different regions of Jorhat on “Trends and status of bamboo plantation in different regions”.

During this we came to know that bamboo plantations are very easy to manage.

It can be just fenced for protection and provided manure at its base for

A hardwood forest isn't replaced for many decades, but **bamboo**, among the world's fastest-**growing plants**, can be harvested in one to five years, depending on the species. Because of its extensive root system, prevention of soil erosion is a valuable **bamboo** benefit in many soil-depleted areas.

During this internship our main focus was to understand if rural people are ready to practice bamboo plantation in association with “SEWA NGO” to aid this project of “ASSAM BIO-REFINERY”.We came across a large no. Of people who are excited to do this job.

Surveyors with Mr Satyam Nayak sir,executive member of SEWA.

Surveyors with Mr Bibek bora sir,chairman,SEWA and Mr Gyandeep Boruah sir,vice chairman,SEWA

CHAPTER1:INTRODUCTION

Biofuel is a liquid or gaseous fuel derived from biomass such as trees,agricultural wastes,crops,or grass.In simple terms it is a fuel from recently lifeless or living biological material.biofuels such as bioethanol (often made from corn in united states and sugarcane in brazil),biodiesel (vegetable oils and liquid animal fats),green diesel (derived from algae and other plant sources),etc ...are very much environment friendly than other sources of fuel.this report focuses on "**bioethanol**".It is produced from biomass by the hydrolysis and sugar fermentation processes.It can be used as a fuel,alone or mixed in varying amounts with gasoline.Its use has been extended mainly to replace the consumption of petroleum derivatives.but the question arises is this that "why bioethanol and why not something else?" .

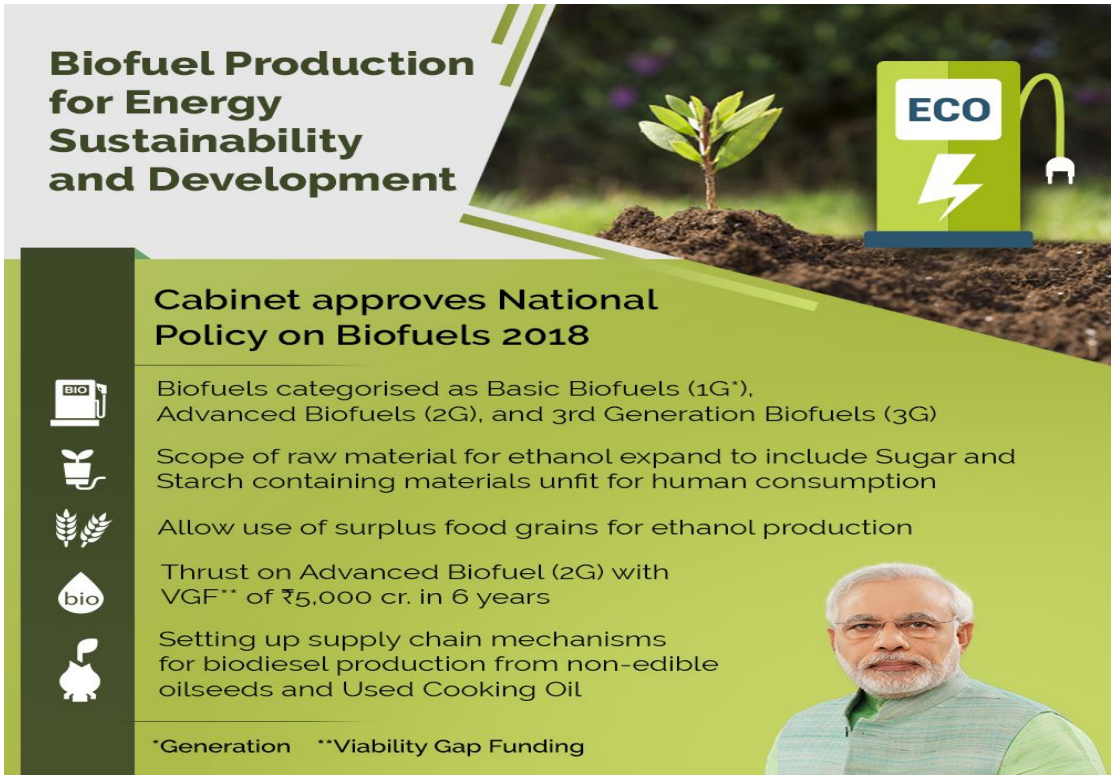
It's because:

- Exhaust gases of ethanol are much cleaner ,it burns more cleanly.
- The use of ethanol–blended fuels such as e85 (85% ethanol and 15 % gasoline) can reduce the net emissions of greenhouse gases by as much as 37.1% ,which is a significant amount.
- You can prepare bioethanol from any plant,it just has to contain sugar and starch.
- It is carbon neutral i.e. the carbon dioxide produced during this process is the same amount as the one the crops previously absorbed during photosynthesis.
- It reduces green house gas emission.
- It reduces the amount of high-octane additives.
- The fuel spills are more easily biodegraded or diluted to non toxic concentrations.

Hence, seeing the current alarming situation of the environment and noticing how biofuels can be so benificiary,the union cabinet ,chaired by the prime minister shri narendra modi has approved **national policy on biofuels-2018.**

(i)SALIENT FEATURES:

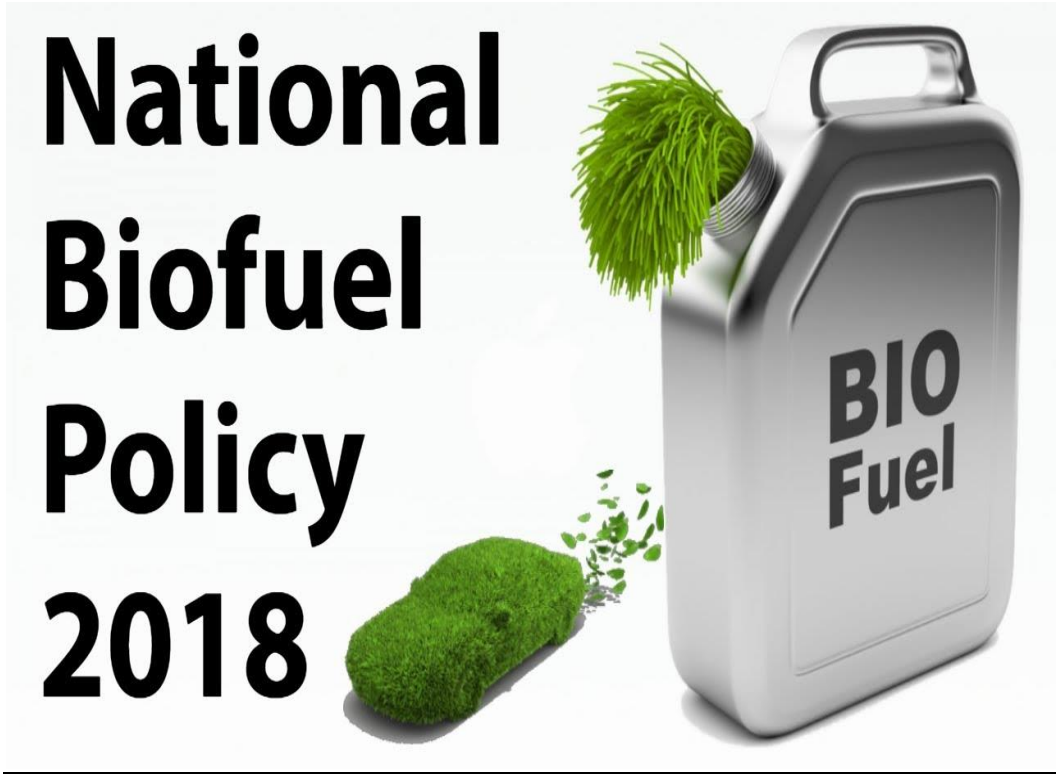
- The policy categorises biofuels as "basic biofuels" viz. first generation (1g) bioethanl & biodiesel and "advanced biofuels" - second generation (2g) ethanol, municipal solid waste (msw) to drop-in fuels, third generation(3g) biofuels, bio-cng etc... to enable extension of appropriate financial and fiscal incentives under each category.
- The policy expands scope ofraw materials for ethanol production by allowing use of sugarcane juice, sugar containing materials like sugar beet, sweet sorghum, starch containing materials like corn, cassava, damaged food grains like wheat, broken rice, rotten potatoes, unfit of human consumption for ethanol production.
- Farmers are at a risk of not getting appropriate price for their produce during the surplus production phase. taking this into account, the policy allows use of surplus food grains for production of ethanol for blending with petrol with the approval of national biofuel coordination committee.
- With a thrust on advanced biofuel, the policy indicates a viability gap funding scheme of 2g ethanol bio refineries of rs.5000 crore in 6 years in addition to additional tax incentives, higher purchase price as compared to 1g biofuels
- The policy encourages setting up of supply chain mechanism for biodiesel production from non-edible oilseeds, used cooking oil, short gestation crops.
- Roles and responsibilities of all the concerned ministries/departments with respect to biofuels has been captured in the policy document to synergise effort.



THE POLICY HAS A LOT OF BENEFITS .

(ii)BENIFFITS OF “NATIONAL POLICY ON BIOFUELS”

- **Cleaner environment:** Reducing crop burning and conversion of agricultural residues/wastes to biofuels there will be further reduction in green house gas emissions.
- **Health benefits:** Prolonged reuse of cooking oil especially for deep frying can have serious health hazards.used cooking oil is a potential feedstock for biodiesel and its use for making biodiesel will prevent diversion of used cooking oil in food industry.
- **Employment generation:** 2g refineries can contribute 1200 jobs in plant operations,village level entrepreneurs and supply chain managemet.
- **Additional income to farmers:**The agricultural waste which was earlier just burnt by the farmers,now can be converted by adopting 2 g technologies and this provides the farmers an addition scope of earning.

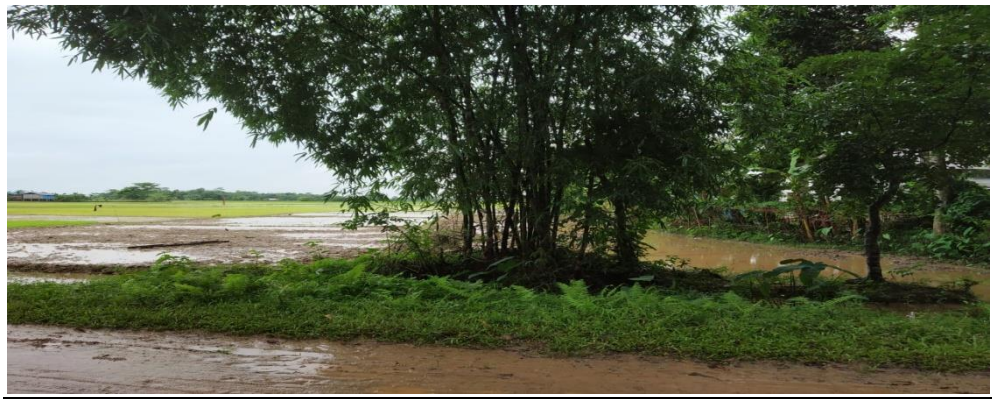


(iii)PROBLEMS THIS INTERNSHIP IS CONCERNED WITH:

- **Biofuel production causes hamper to food security:**Biofuel is a liquid or gaseous fuel prepared from biomass i.e either food crop or non-food crop.due to growing energy needs,rising oil costs,the pursuit of clean and renewable source of energy,the biofuel demand is increasing day by day.In turn the need for crops such as maize and sugarcane-to be used as feedstocks for biofuels has increased dramatically.hence,food is being damaged.
- **Land for agriculture is getting reduced:**As land is now engaged for growing feedstocks for biofuels,the land for agriculture is getting reduced.but,the with the increase in the demand of biofuel,the food demand is also increasing.
- **Indirect land use change:**This is a theory which explains how land owners in distant lands change their planting habits in ways that release sequestered carbon due to the very success of bioenergy causes.
- **Runaway feedstock cost:** Most biofuels shut down due to rising feedstock costs and they don’t have any immediate plans to reopen.

(iv)APPROACH TOWARDS SOLVING THIS PROBLEM:

- **Assam bio-refinery** A joint venture company incorporated on 4th june 2018 with equity participation of 50% by NRL,28% by m/s chempolis oy,finland.the technology for bio-refinery will be provided by m/s chempolis oy of finland.This is a pioneering effort which will use this new technology for conversion of ligno-cellulosic bio-mass to ethanol for the first time in the country in a commercial scale besides ethanol,the bio-refinery will also produce furfural,acetic acid and bio-coal.The plant shall have capacity to process 300 tmt of bamboo (bone dry) and shall produce 49 tmt of ethanol together with associated platform chemicals.
- **Bamboo** is grown in almost every household of assam.it's easily manageble,does'nt require any proper care.use of bamboo as a feedstock for bioethanol production will be very benificiary as now the abundant greenary will be put into some use.
- **The problem of destruction to food security will BE SOLVED:** AS NOW BAMBOO WILL BE USED IN PLACE OF MAIZE,SUGARCANE,SORGHUM,ETC..THE FOOD SECURITY WILL BE PROTECTED.
- **Land for agriculture will not be reduced:**Bamboo is prsent in almost every household.They use it for building their house,jopona i.e. fencing,bamboo articles or to sell it in the market.As bamboo is most often grown in people's own courtyard itself,no extra land needs to engaged for this purpose.
- **Extra source of income for people:** People in rural areas mostly have bamboo trees in their courtyard.by conversion of bamboo into bioethanol,People will be able to fetch some money.



CHAPTER2:LITERATURE SURVEY

The bamboos are evergreen perennial flowering plants in the subfamily bambusoideae of grass family poaceae. the word "bamboo" comes from the dutch or portuguese language ,which probably borrowed it from malay.

SCIENTIFIC CLASSIFICATION

KINGDOM: PLANTAE

CLADE: ANGIOSPERMS

CLADE: MONOCOTS

CLADE: COMMELINIDS

ORDER: POALES

FAMILY: POACEAE

CLADE: BOP CLADE

SUBFAMILY: BAMBUSOIDEAE

Assam is rich in sylvan resources and most of its forests are richly stocked with bamboo and cane of various species .bamboo is a raw material of great versatality and forms an integral part of lifestyle and economy of assam.

THE IMPORTANT SPECIES OF BAMBOO OF ECONOMIC VALUE ARE THE **BHALUKA BAMBOO (BAMBUSA BALCOOA), JATI BAMBOO (BAMBUSA TULDA), MULI (MELOCANNA BAMBUSOIDES),DALU(TEINOSTACHYUM DALLOA),KHANG (DENDROCALMUS LONGISPATNUS),KALIGODA(OXYTENANTHERA NIGROCILIATA)** AND **PECHA(DENDROCALAMUS HAMILTON-ii). (i)BHALUKA BAMBOO (BAMBUSA BALCOOA)**

(ii)JATI BAMBOO(BAMBUSA TULDA)

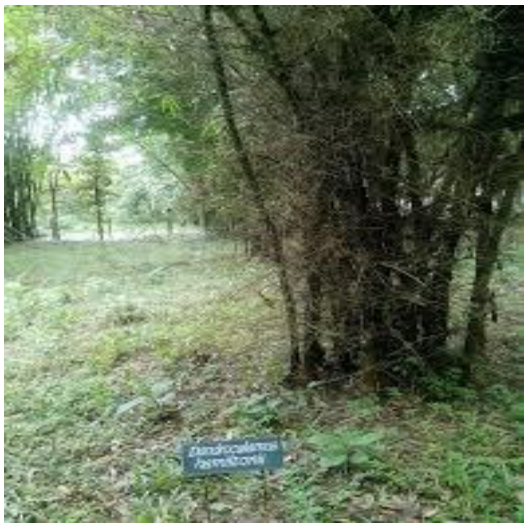
(iii)MULI(MELOCANNABAMBUSOIDES)

(iv) DALU (TEINOSTACHYUM DALLOA)

(v) KHANG (DENDROCALMUS LONGISPATNUS)

(vi)KALIGODA (OXYTENANTHERA NIGROCILIATA)

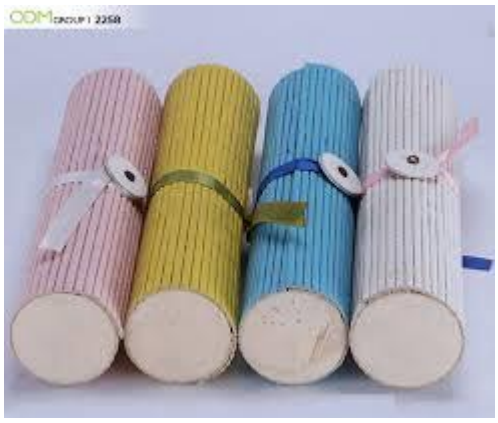
(vii)PECHA (DENDROCALAMUS HAMILTON-ii)



ECONOMIC IMPORTANCE :-

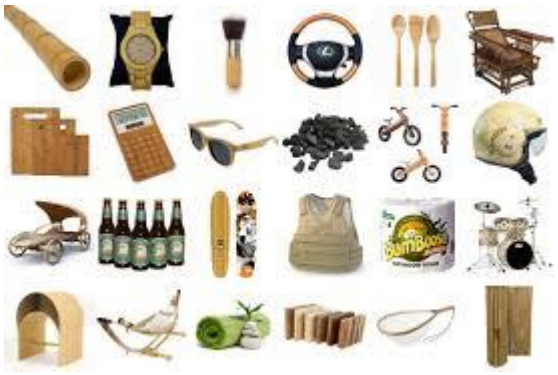
- Bamboo shoot has high nutritional value,is very popular in western countries.
- Fresh bamboo leaves used for wrapping material,dried bamboo leaves used for organic fertilizer.
- Bamboo culm is used for building material,handicraft products exported.
- bamboo root is used for fuel

Bamboo needs only 3-5 years to mature.after harvasting,bamboo will re-grow itself without planting new tree.just like this,bamboo brings economic values almost year around.

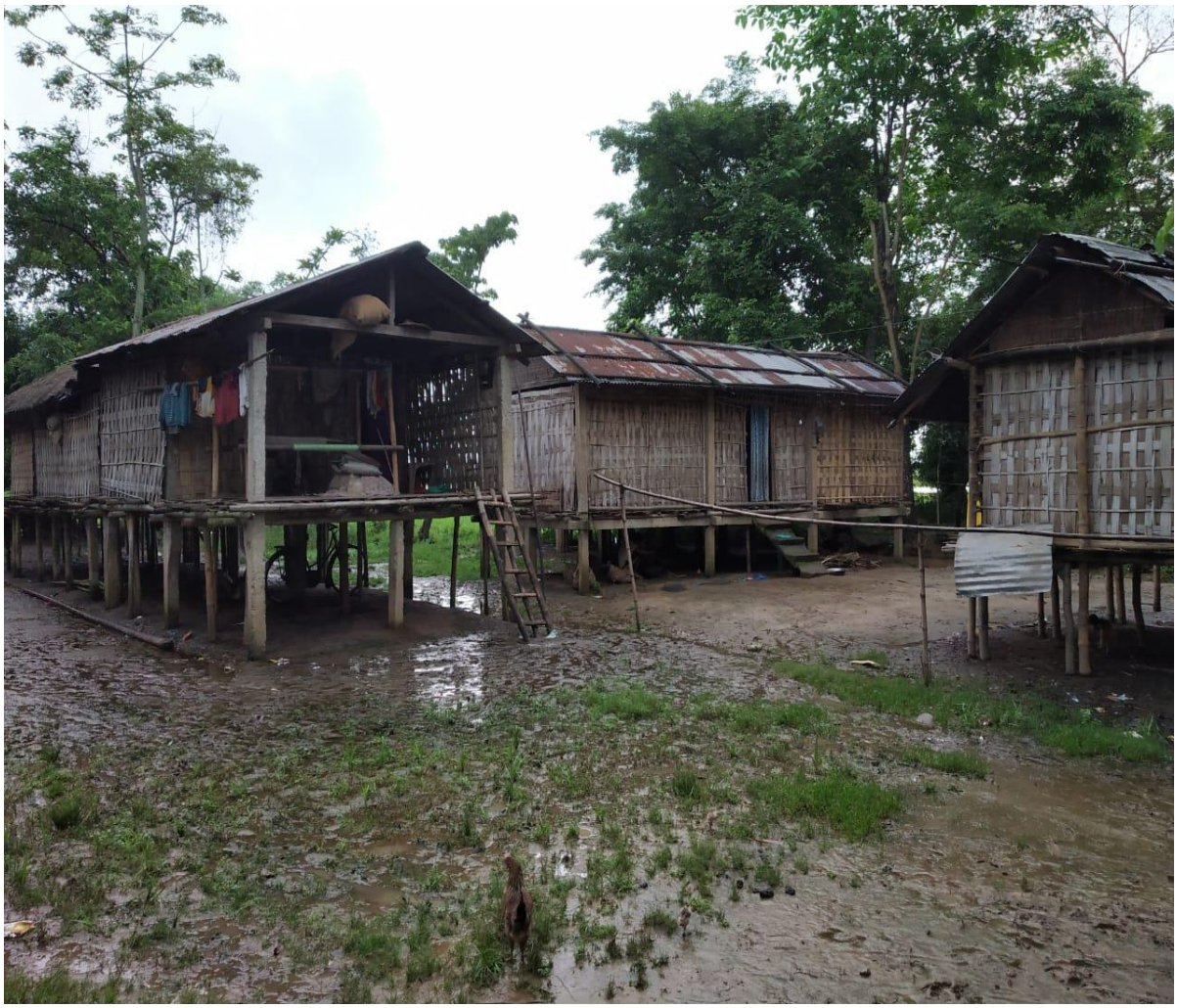


POUCH MADE OF BAMBOO

BAMBOO CULM



ARTICLES PREPARED FROM BAMBOO



“CHANG-GHOR” MADE FROM BAMBOO BY MISING COMMUNITIES

CHAPTER3:OBJECTIVE AND PLAN OF WORK

Objective :

(i) To encourage bamboo plantation
over the years,as mordenization is taking over , bamboo platation is also shrinking.now its the peak point to revive.this initiative will be helpful in doing so.

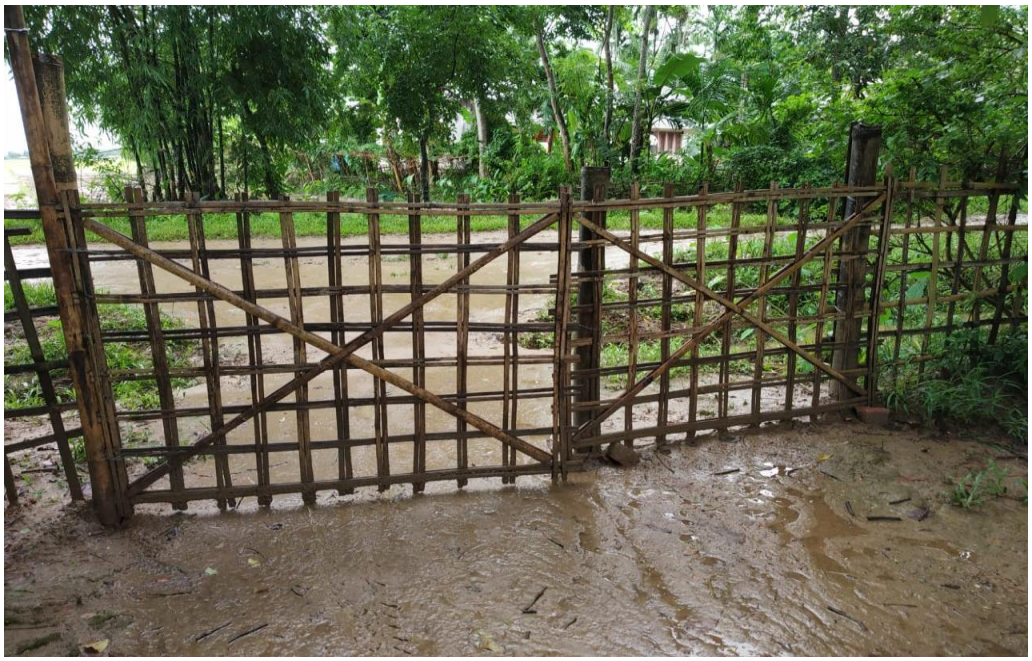
(ii) To provide an additional source of income for the people.
(iii) To provide an affordable feedstock.
(iv) To provide an easy to maintain feedstock.
(v) To boost bio fuel industry of India.
(vi) To increase the blending percentage of gasoline with ethanol to 5 %.
(vii) To provide protection to the environment.
(viii) To generate employment
(ix) To improve the socio-economic condition of rural people.
(x) To provide a sustainable fuel .

This tenure of internship was concerned with conducting survey in various regions of jorhat, discovering various information about bamboo plantation and developing a blueprint of the regions where bamboo is mostly available.This project helped the trainee in developing a strong understanding of the current status of bamboo cultivation in assam.

Bamboo a perennial flowering plant belonging to the subfamily bambusoideae of grass family demonstrates a wide range of advantages.

Concerning this project of nrl on bamboo bio-refinery,a proper deep survey was carried in various villages of jorhat starting from **bahor bari** to **pakamura kamargaon.**

It was discovered that how people of assam have been dependent on bamboo since ages.from building their houses to making bamboo articles such as “bisoni”, “shorahi”,etc...bamboo is being used in almost every day-to-day chore.



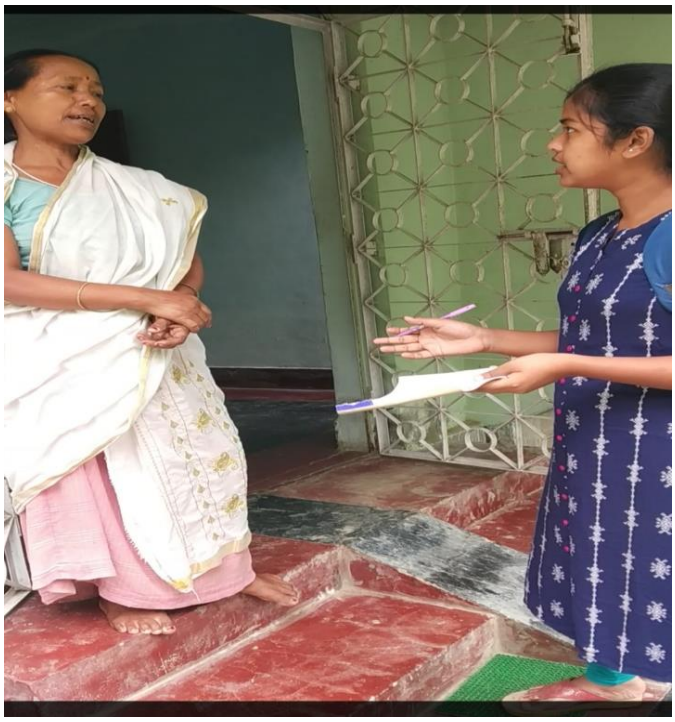
Plan of work:

(i)Visit villages having wide range of diversity

Targetting to visit an average of atleast 20 villages having a potential reserve of bamboo.

(ii)Develop a faithful bond with your respondant

The respondant don’t know who you are.nobody likes to waste his /her time with a stranger.hence developing faith in the minds of your respondant is necessary.



(iii)QUESTION THE PEOPLE ABOUT VARIOUS ISSUES RELATED TO BAMBOO.

Interrogate the people about each and every thing.they will be providing you knowlege everytging about bamboo base starting from diseases ,management,protection,to how much does each culm cost.

(iv)PROVIDE THEM KNOWLEDGE ABOUT SEWA NGO AND THEIR INITIATIVES

This internship would be meaningless if we are not able to inform people rightfully about the initiative of “sewa ngo” towards bamboo bio refinery.

(v)COLLECT ALL THE DATA POSSESSED FROM THE SURVEY.COMPILE IT AND PREPARE A REPORT DEMOSTRATING ALL THE DATA.

Data is the most important part in any project/internship.this internship is basically about collecting all the information rightfully and using it for purpose later on.here ,we have to prepare list of the data in excel,prepare report in ms word,etc...

CHAPTER 4: FINDINDS AND ANALYSIS

(i)TO DEVELOP A STRONG UNDERSTANDING OF RURAL LIVELIHOOD

This internship gave us good exposure to learn about rural livelihood.this survey was not only held in rural areas but also in semi-rural region.different area has its own unique culture .some region had tea plantation while other had paddy cultivation.whereas the semi-rural regions did'nt exhibit much agricultural practice.

AREAS WHERE OUR INTERNSHIP WAS HELD IN:

JALUKONI,THENGAL GAON

DATE:22 JUNE 2019

TIMTIYA GAON,SARDARALI

DATE:24 JUNE 2019

NAPUM JEC

DATE:25 JUNE 2019

DULIA GAON

DATE:26 JUNE 2019

UTTAR HATHICHUNGI GAON

DATE:27 JUNE 2019

HABUNGIA AND NEFAGATE

DATE:1 JULY 2019

BONAI POTHOLIAL GAON

DATE:2JULY 2019

OUGURI GOHAIN GAON

DATE:3 JULY 2019

BHOGAMUKH

DATE:5 JULY 2019

LAHDOIGARH MAINAPORIYA

DATE:6 JULY 2019

PAKAMURA KAMARGAON

DATE:7 JULY 2019

KAOIMARI GOHAIN GAON

DATE:8 JULY 2019

TEOK UTTARDALIYA

DATE:9 JULY 2019

PURONI MELENG

DATE:10 JULY 2019

BORHULA BEKAJAAN

DATE:11 JULY 2019

PAKHIMARI

DATE:20 JULY 2019

PAKHIMARI

DATE:21 JULY 2019

NATUN MELENG

DATE:23 JULY 2019

NATUN MELENG

DATE:24 JULY 2019

KAKAJAN GARUWALSUNGI

DATE:25 JULY 2019

MISING GAON

DATE:26 JULY 2019

INFERENCE:

LIVELIHOOD: For some depends on (i) paddy
(ii)tea
(iii)governmental jobs like middle school teacher,nurse,etc...
(iii)other micellaneous businesses

MAIN CULTIVATION:paddy OR tea

SECONDARY CULTIVATION:bamboo or fruits OR vegetables

INCOME: may vary from least i.e 5,000 a month to maximum such as 25,000 or 30,000 a month.

TRANSPORTATION:using local mode of transportation such as autorickshaws.

(ii)TO UNDERSTAND HOW PEOPLE MANAGE THE BAMBOO PLANTATION

To have deeper knowledge of bamboo,we need to know how these bamboo trees are handled.We spoke to numerous no. of people and we learnt that no intense care is required for the bamboo trees.

- No disease is noticed in bamboos.
- For preventing the bamboo trees to be eaten by cow ,the bamboo tree is most often protected by providing fencing.
- During fertilization period the soil is gathered at the roots.
- The edge of the roots i.e. the aag(in assamese) is cut off.

(iii)TO UNDERSTAND WHAT KIND OF DISEASES OR CALAMITIES OBSTRUCT OR CAUSE PROBLEMS IN GROWTH OF BAMBOO TREES.

Despite its record-breaking growth rate and its adaptability to a variety of conditions,bamboo is subject to disease and insect pests.

The rural people were not aware of the actual disease and its treatment,But on my deeper study I came to know that its decay rot and armillaria root rot affecting the woody plant bamboo.once established,not much can be done to manage rot diseases.But it is possible to reduce the severity of damage with cultural practices such as cutting away and disposing of dead or injured stalks.

(iv)TO UNDERSTAND HOW BAMBOO PLANTATION IS HELPFUL TO THE NATIVE PEOPLE.

Bamboo over ages have been demonstrating many traditional uses such as

- housing
- making musical instruments
- making baskets
- making snare/traps
- making household items
- making agricultural implements
- esssmaking rain shield and water pipes.

Bamboo has proved to be economically favourable for

The native people.people can earn money by selling the bamboo articles or also the bamboo culms.

(v)TO INTERROGATE IF PEOPLE HAVE NOTICED ANY CHANGE IN BAMBOO PLANTATION OVER THE YEARS.

People state that over the years the people have seen a dramatic change in bamboo plantation.the plantation had been shrinking .Earlier the land area which had bamboo trees on it,Now it has been destroyed due to urbanization.

(vi)TO DEVELOP AN UNDERSTANDING IN THE MINDS OF THE NATIVE PEOPLE THAT HOW DOING BAMBOO PLANTATION IN ASSOCIATION WITH "SEWA" WHICH IS WORKING ON THE PROJECT ON BAMBOO BIO-REFINERY PROGRAM OF NRL.

- **ASSAM BIO-REFINERY** A joint venture company incorporated on 4th june 2018 with equity participation of 50% by NRL,28% by m/s chempolis oy,Finland.the technology for bio-refinery will be provided by m/s chempolis oy of finland.this is a pioneering effort which will use this new technology for conversion of ligno-cellulosic bio-mass to ethanol for the first time in the country in a commercial scale besides ethanol,the bio-refinery will also produce furfural,acetic acid and bio-coal.the plant shall have capacity to process 300 tmt of bamboo (bone dry) and shall produce 49 tmt of ethanol together with associated platform chemicals.this initiative would give people have bamboo trees to fetch some earning.they will just have to grow bamboo trees in their yard and on maturation by selling the bamboo they would earn money.

CHAPTER 4:MATERIALS AND METHOD

MATERIAL REQUIRED:

NO MATERIAL AS SUCH WAS REQUIRED.

THIS SURVEY ONLY NEEDED CONFIDENCE AND GRIP ON LANGUAGE FOR ITS CONDUCTION.

OTHER THAN THAT,THE SURVEYOR NEEDED PEN AND PAPER TO NOTE DOWN THE DETAILS AND A LAPTOP FOR FINALLY COMPILING THE DATA.

METHOD:

THIS WHOLE PROCESS IS BASICALLY DIVIDED INTO FOLLOWING PHASES:

1)VISITING NEW NEW VILLAGES:

VISIT DIFFERENT VILLAGES AND ANALYSE THE DIVERSITY.NOTICE THE AVAILIBILITY OF BAMBOO IN THESE REGIONS.

2)INTERACTION WITH RESPONDANT:

Interact properly with the respondant so that they find you worthy enough to share details with.during this process you will develop understanding on different aspects of bamboo plantation.

3)NOTING DOWN THE DETAILS:

Each detail should be precise and authentic.note each and every thing.even the smallest of points.This would be helpful in making the internship friutful and conducting further jobs with more precision.

4)COMPILING THE DATA:

This is the most important and tiring phase.all the data collected during the whole internship should be gathered and properly assembled in order to be able to avail data more easily.

DATA GATHERED IS THE FOLLOWING:

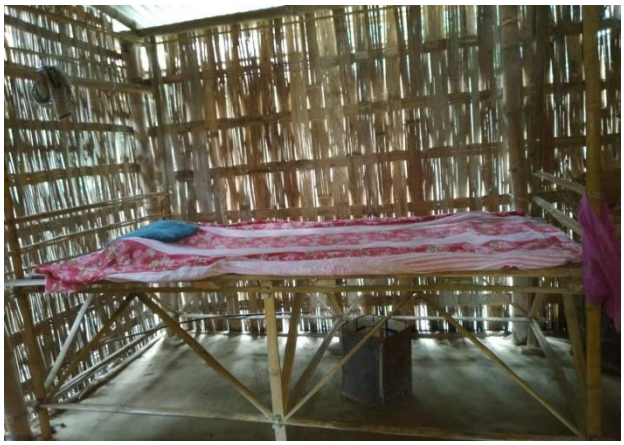
CONCLUSION:

Bamboo being easy to grow and maintain and not requiring any investment,is grown almost in every household.It has a lot of economic and traditional uses.bamboo has been useful to people since ages and it still turns out to be worth some investment.

Now as the joint venture company “assam bio-refinery” has kneeled down towards taking this chance of using bamboo as a feedback for preparation of bioethanol,bamboo will now come into some proper use.

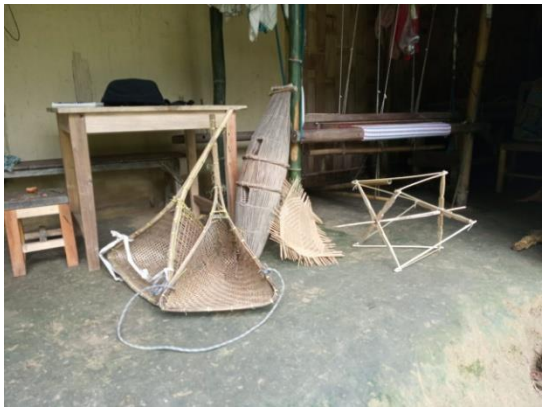
THIS INTERNSHIP HELPED US UNDERSTAND:

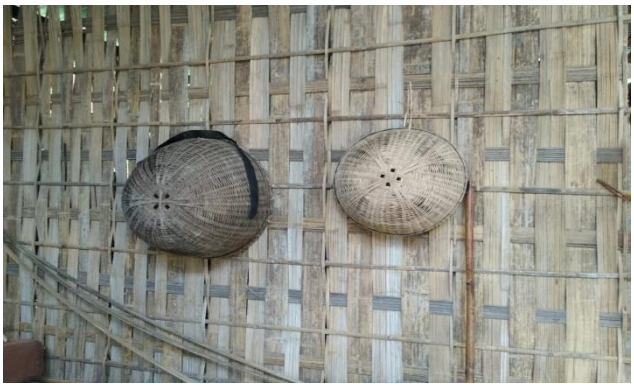
- bamboo is very easy to grow.
- doesn’t require much care.
- bamboo does’nt encounter any diseases except for insect or pest rot.
- bamboo is sold at an average of around 70-100 rs per culm.
- bamboo articles such as baskets,hand fan,decorative items etc are prepared by people which also help the people to fetch some money.
- land is available in some households but they have not planted much bamboo trees.these people have shown keen interest in performing bamboo plantation under “sewa ngo”.



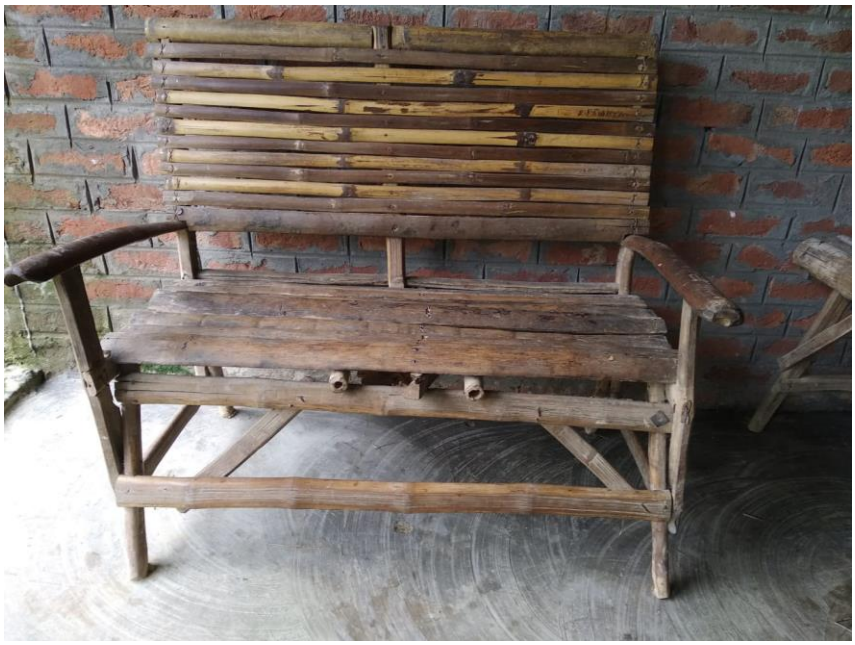
INTERIOR OF A HOUSE PREPARED

FROM BAMBOO

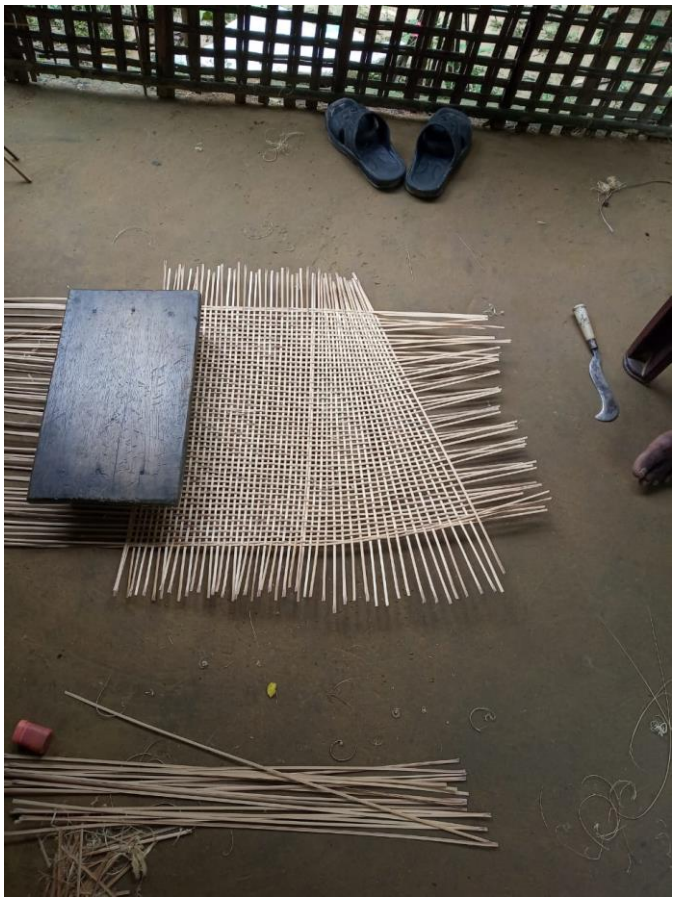


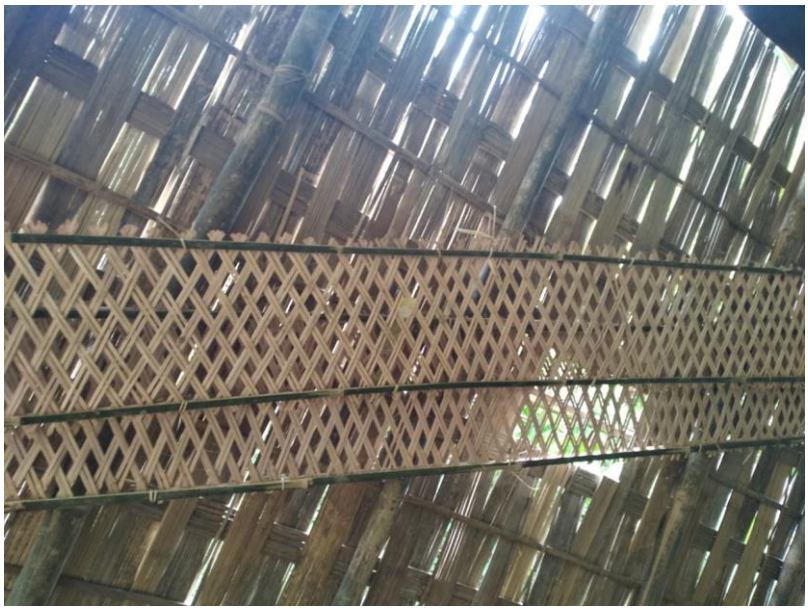


BAMBOO ARTICLES SUCH AS SHORAHI



A BAMBOO CHAIR





THE BASE PREPARED FROM BAMBOO BEFORE PREPARATION OF ANY MATERIAL FROM BAMBOO

ACKNOWLEDGMENT

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