

# **Bamboo for Pulp and Paper Industries**

**Presented By:**

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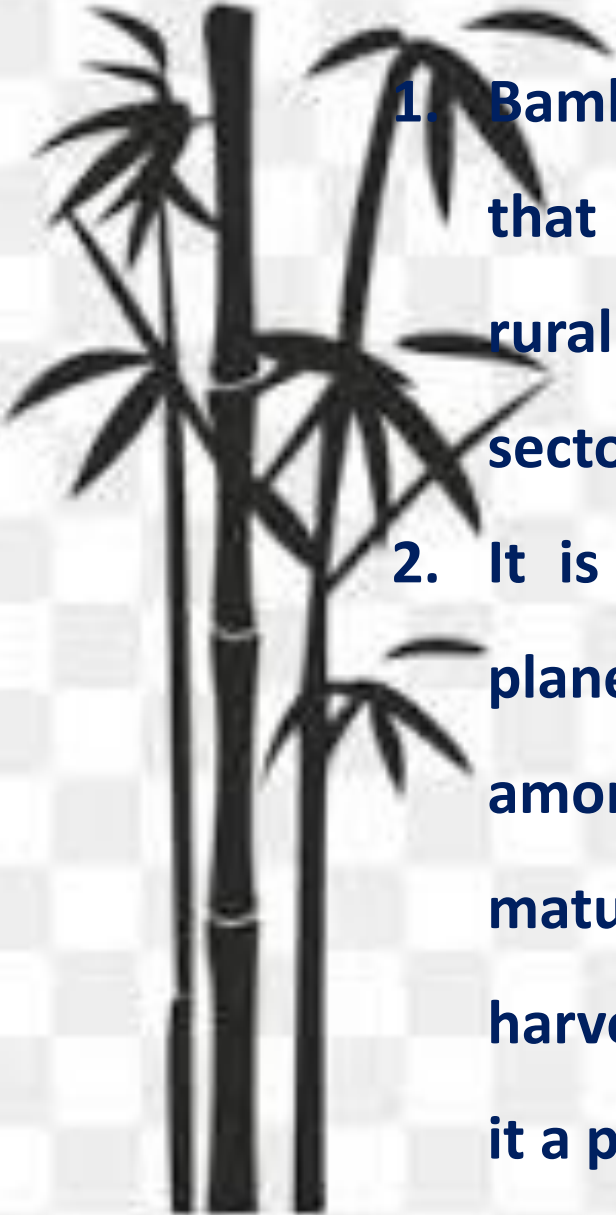
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# INTRODUCTION

- 1. Bamboo is a natural indigenous fibrous raw material that can play a key role in the rejuvenation of the rural economy impacting, both, the agricultural sector and industrial sector.**
- 2. It is the most environment friendly plant on this planet, being one of the highest carbon sequesters amongst all the floral species, which grows rapidly, matures within a few years and re-grows after harvesting without the need for replanting, making it a perennial 'renewable' resource**



# INTRODUCTION



Basic raw material for any pulp and paper industry is Wood, Bamboo , Agriculture residue and recycled fibre. Where bamboo is being used by few of the pulp and paper industry in India.

## Paper Mills Status in India (2020-21)

□ Total No's of Paper Mills in India :	861
Operating Mills	: 516
Wood based	: 20
Agro based	: 25
Recycle Fibre based	: 471

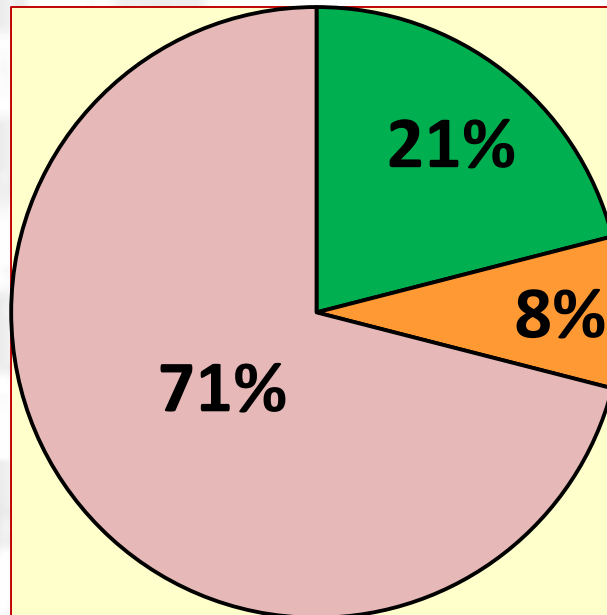


# CAPACITY OF INDIAN PULP AND PAPER INDUSTRIES:

<b>Total Installed capacity,( Million Tones)</b>	<b>: 27.15</b>
<b>Operational installed capacity( Million Tones):</b>	<b>22.35</b>
<b>Total Production( Million Tones)</b>	<b>: 19.36</b>
<b>Idle Capacity( Million Tones)</b>	<b>: 4.80</b>

# PRODUCTION SHARE : RAW MATERIAL WISE

**Wood : 4.20 ( Million Tones)**  
**Agro Residue : 1.66 MT(Million Tones)**  
**Recycled Fiber: 13.50 MT( Million Tones)**



■ Wood  
■ Agro Residue  
■ Recycled Fiber



# INTRODUCTION



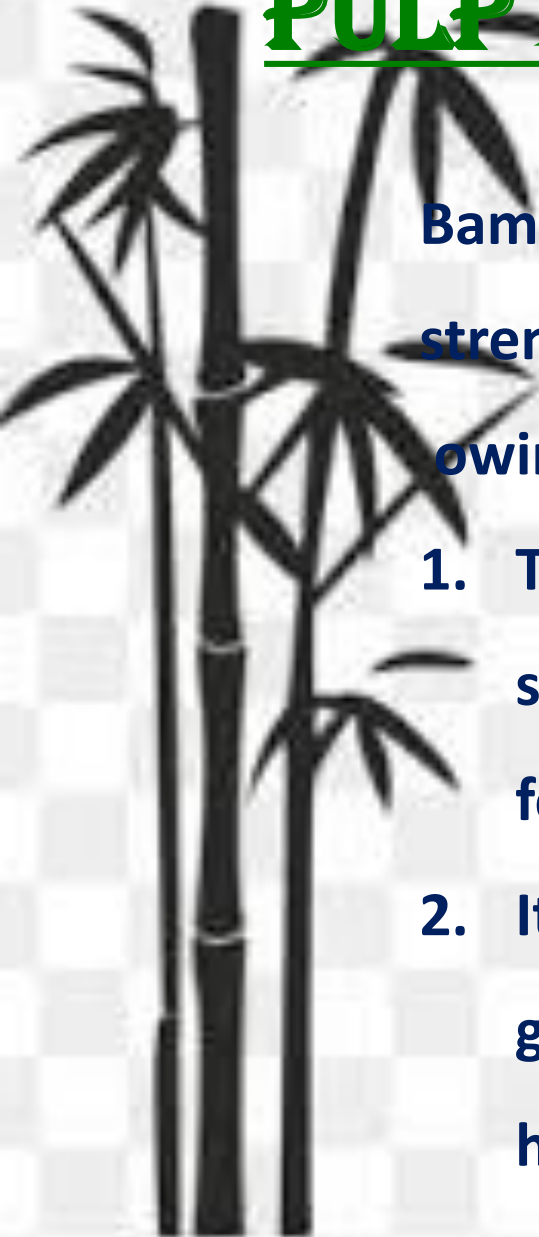
**Main reason for non popularity of bamboo in the paper industry are:**

- 1. Poor re-presentation of the bamboo**
- 2. Less accessibility**
- 3. High cost**
- 4. Technical limitation owing to it's high silica content**

# **UTILISATION OF BAMBOO IN INDIAN PULP AND PAPER INDUSTRY:**

**Bamboo is the best raw material for manufacturing high strength paper in Indian paper manufacturing units owing to the reasons mentioned below:**

- 1. The morphology and content of bamboo fiber is very similar to coniferous wood that is the most suitable for pulp manufacturing.**
- 2. It contains high cellulose content, thin , solid fiber, good plasticity, and fiber length lies between hardwood and softwood.**



# **UTILISATION OF BAMBOO IN INDIAN PULP AND PAPER INDUSTRY:**

- 3. Bamboo is attributed by high strength fibres and high pulp yield.**
- 4. Longer fibers always produce stronger paper. Bamboo fiber is thin and long, the average length is 1.5-4.0mm, higher than wood, reed, rice straw and bagasse. Bamboo also has large length-width ratio and good drain ability.**
- 5. Bamboo fibre is the best substitute to the costlier imported softwood fibre and economically sustainable raw material as well.**





# CHEMICAL COMPOSITION OF VARIOUS BIOMASSES USED BY PULP AND PAPER INDUSTRIES

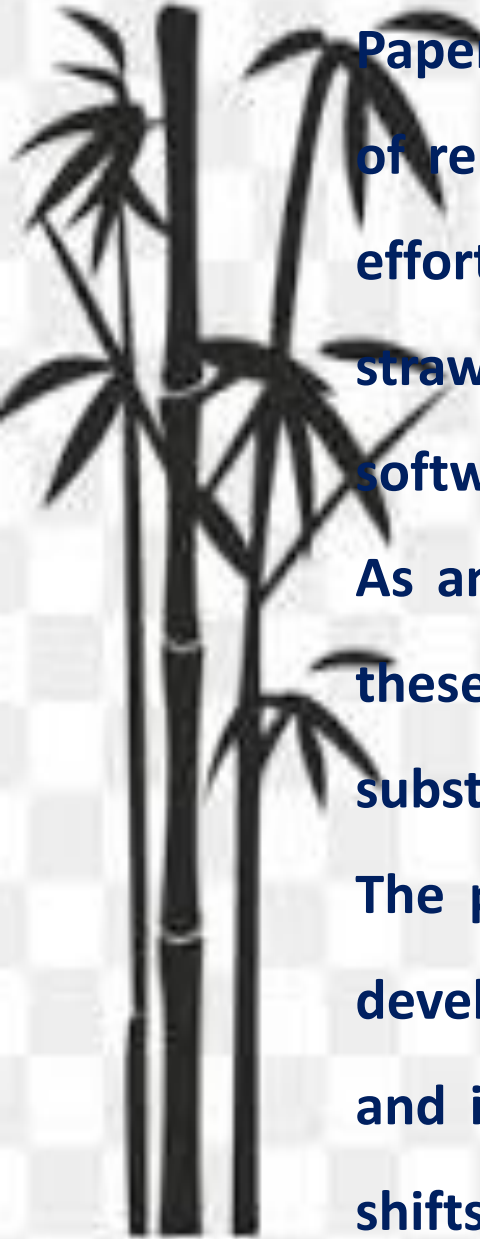
Chemical Composition of various biomasses used by Pulp and Paper Industries

Biomasses	Fiber Length	Cellulose	Hemicellulose	Lignin	Extractives
UOM	mm	%	%	%	%
Hard Wood	1-2	38-49	24-40	23-30	<1
Soft Wood	3-7	40-45	25-35	26-34	<1
Bamboo	1.5-4.0	45-50	20-25	20-30	(2.5-5.0)

The image features a vibrant green background with bamboo stalks and leaves on the left side. A central horizontal banner with rounded ends contains the word "OPPORTUNITIES" in a bold, blue, serif font. The banner has a slight gradient and a thin dark blue underline. The background also includes soft, out-of-focus circular light patterns.

# OPPORTUNITIES

# REPLACEMENT OF SINGLE-USE PLASTIC BY PAPER

A black silhouette of bamboo stalks and leaves is positioned on the left side of the slide, extending from the bottom to the top. The stalks are vertical and segmented, with several leaves branching out from them.

Paper industries had already cope up with the national initiative of replacing single-use plastic by paper and are making good efforts to produce products such as paper cups , tetra packs, straws, plates, sachets etc but they are using costlier imported softwood (SW) to meet out the characteristics of these products

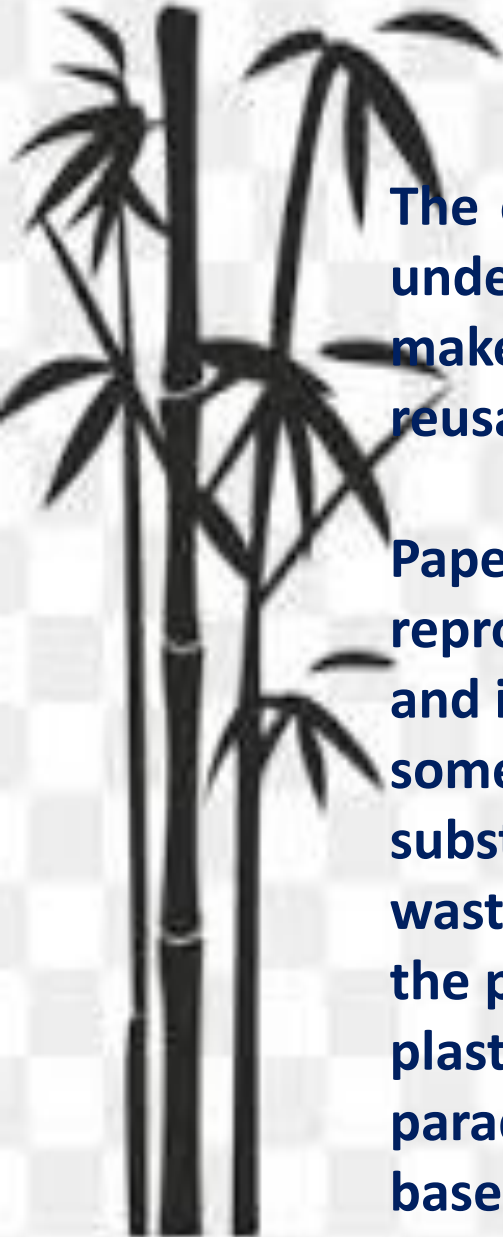
As an R&D expert, I must confirm here, that we can produce these products with our own bamboo pulp which will be a good substitution of imported softwood pulp.

The packaging market has always been at the intersection of developments in materials, technology, and consumer tastes, and it has gone through a number of incarnations and major shifts in its base material.

# **REPLACEMENT OF SINGLE-USE PLASTIC BY PAPER**

The objective to make packaging more sustainable has been undertaken by industry leaders, brand owners and retailers to make a significant proportion of packaging either recyclable, reusable or compostable and to increase the use of recycled content.

Paper is relatively easy to recycle as it can be re-pulped and reproduced. This means it does not rely on chemical reactions and is less sensitive to contamination. As such, there are some environmental advantages for using paper as a substrate for flexible packaging, if, it does not increase food waste and/or compromise all other properties essential to the packaged product. This has led to some brands replacing plastic packaging with paper. In this context, there is a paradigm shift in form of using paper instead of plastic as base material in packaging industry.



# **KRAFT WRAPPING AND PACKAGING PAPER IN ERA OF E-COMMERCE AND LOGISTICS.**



The global envelope market is classified into institutional (offices, medical, educational), e-commerce, logistics & shipping, and postal service. It is expected that logistics ,shipping and e-commerce segment are expected to generate significant demand for medium and large size envelopes in the near future.

In India, Kraft Paper industries are largely relaying either on costlier imported softwood pulp or using huge chemical with low productivity. This dependency can be put to an end by replacing imported softwood pulp with indigenous bamboo pulp, thus making the Indian kraft Paper Industry self reliant – giant leap towards “Ätma Nirbhar Bharat” initiative of GOI.

# **ESKP (EXTENSIBLE SACK KRAFT PAPER)**



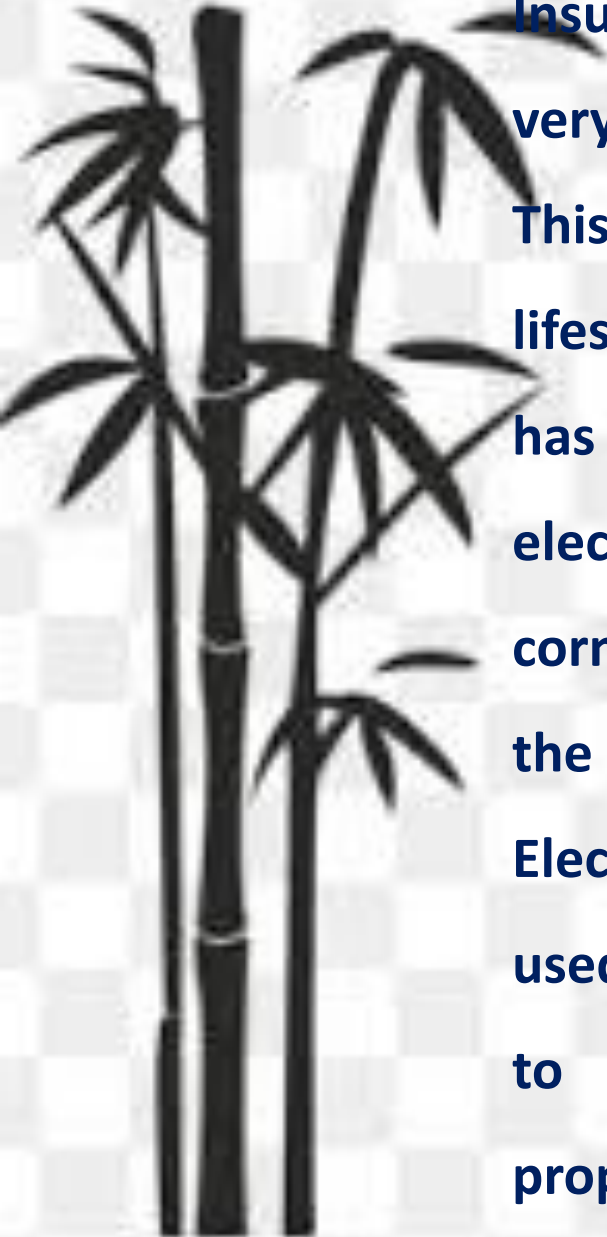
A paper sack or ESKP is shipping container made of high quality and heavy weight paper, which is being used for transporting powder materials, such as flour, cement, animal feed, etc. It is a highly elastic and high tear resistant, designed for packaging products. Even in this sector, imported soft wood is incorporated while manufacturing ESKPs for achieving required strength properties and tearing resistance. All these attributes can be achieved up to the mark by the use of Bamboo pulp, which again stands by the initiative of NBM by opening up opportunity of wise use of Indigenous bamboo.

# **ELECTRICAL INSULATION PAPER**

Insulation paper has very crucial end use from the very grass root level to highest canopy of the society.

This is owing to the tech based and tech savvy lifestyle of the era. Most importantly, Government has taken innumerable initiatives to promote electricity and internet connection to the remotest corner of the country. All the above factors involve the maximum use of insulation paper.

Electrical insulation papers are paper types that are used as electrical insulation in many applications due to pure cellulose having outstanding electrical properties. For this, imported softwood pulp is used.



# **BLEACHED CARRY BAGS:**

Recently, due to ban on plastic carry bags upto certain thickness, issued by GOI (Government of India), biodegradable, recyclable, environment friendly paper carry bag is of high importance. This has opened up a new sector of business for Indian entrepreneurs to get involved.

To develop paper carry bag, high strength pulp is required.

Currently, 30-50% imported softwood pulp are being used for this purpose . Indian Bamboo has all the merits which can successfully replace the costlier imported softwood pulp and thus, making the process economical.







# **CHALLENGES**

# **CHALLENGES OF USING OF** **BAMBOO IN PULP AND** **PAPER INDUSTRY:**



Bamboo is hollow in nature and have very low bulk density than any other industrial wood. Hence load ability will be low in railway wagons, trucks etc. This in turn increases the transportation cost.

Maximum high quality bamboo species are mainly found in North –East India. But, sadly there is no pulp and paper industry exists over there except HPC (Hindustan Paper Corporation) which is currently non-operative. Gigantic amounts of activities and time is invested right from falling bamboo to deporting them to transportation site. Hence, all these activities add on to the cost of bamboo available for industrial use, thus making it uneconomical in this competitive market.

# **CHALLENGES OF USING OF BAMBOO IN PULP AND PAPER INDUSTRY:**



Chemical composition of Bamboo especially with reference to high silica content, also plays complex nature while using it as raw material furnish in pulp and paper manufacturing process. Silica is responsible for tampering the recovery process and deprives the recovery efficiency by creating a critical nuisance known as silica scaling. This scaling is complex in nature and is very difficult to remove. However, industries are ready to adopt new black liquor management methodologies, to address high silication, to how to deal with high silica content in Bamboo to improve the chemical recovery efficiency.

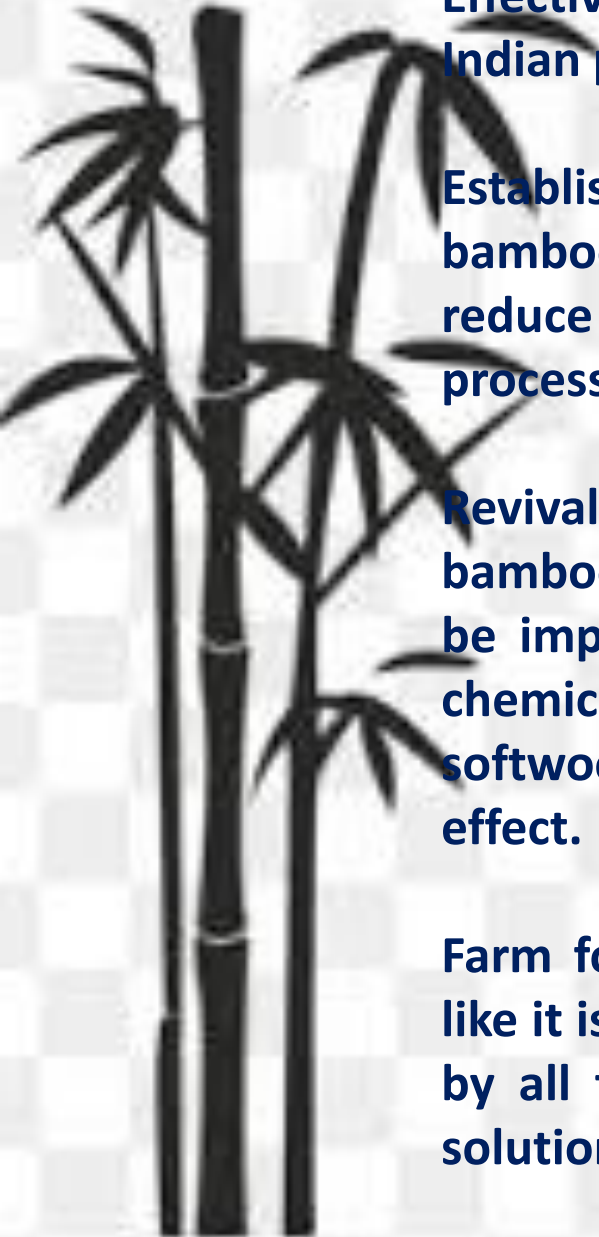
# **IMMEDIATE STEPS TO BE TAKEN:**

**Effective promotion of wide scope of bamboo application in Indian pulp and paper industry.**

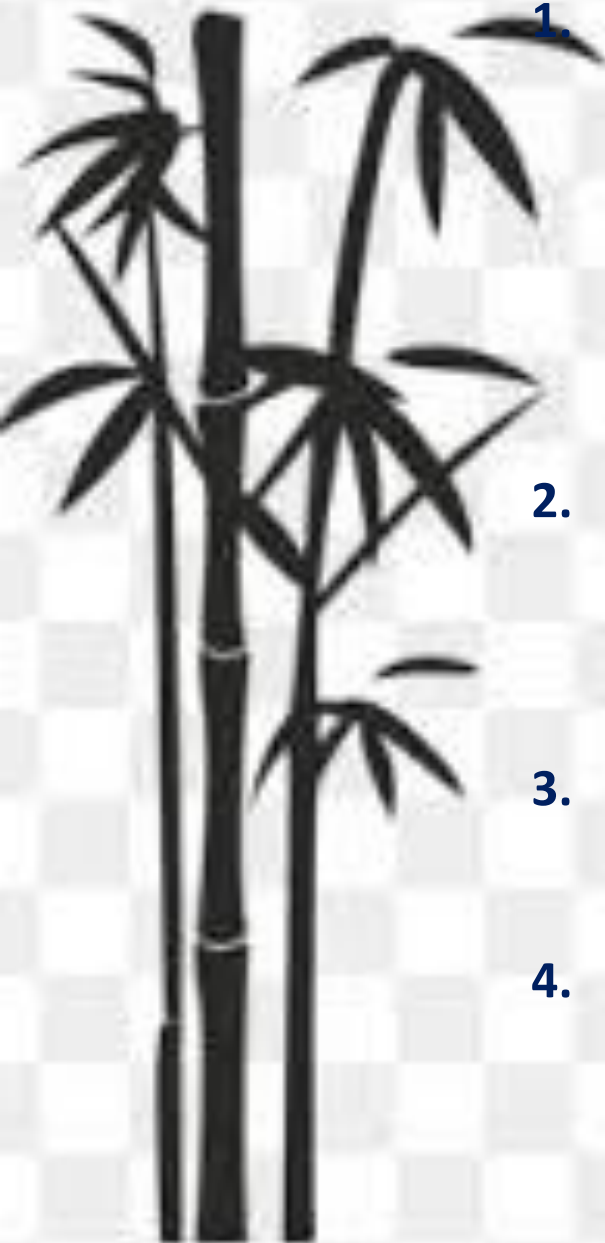
**Establishment of new pulp mill ventures near high quality bamboo cultivation especially in north-east region. This will reduce the transportation cost, thus , making bamboo pulping process more economical.**

**Revival of old shut down pulp mills and dedicating these mills for bamboo pulping only. This approach is more economical and can be implemented immediately .With the rich morphological and chemical composition of bamboo, it can replace costlier imported softwood pulp very conveniently and effectively with immediate effect.**

**Farm forestry should be promoted for the local nearby farmers like it is presently being adopted in case of eucalyptus and poplar by all the renowned pulp and paper industry. This is the best solution to promote cultivation and utilization of bamboo.**

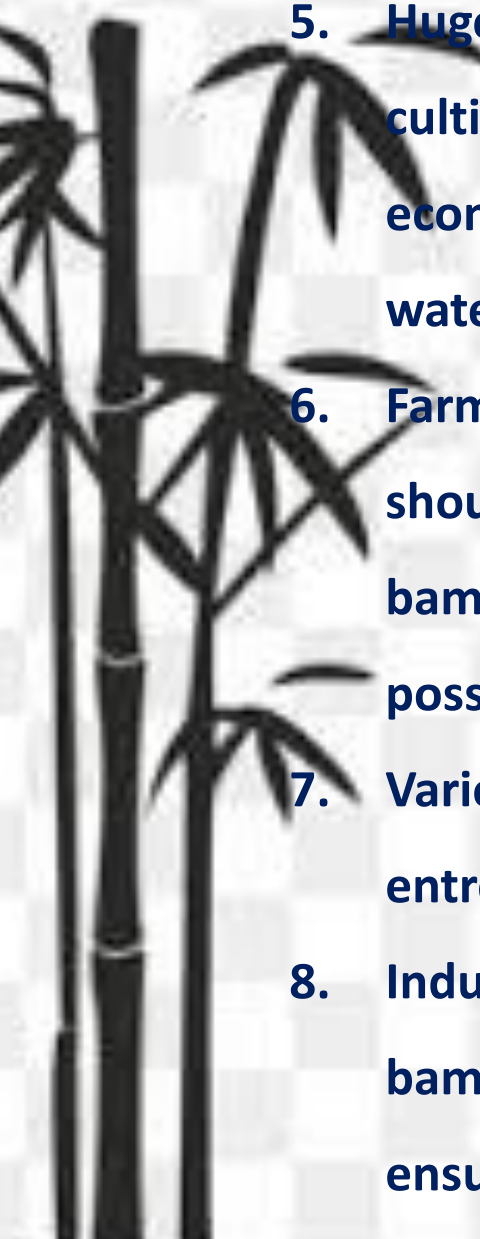


# WAY FORWARD:

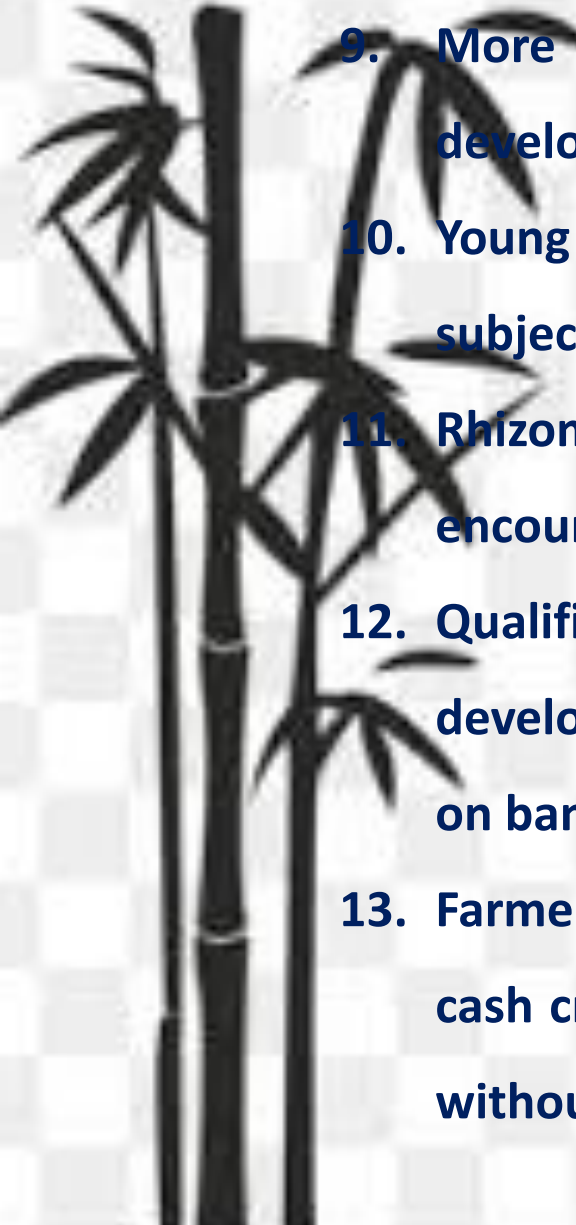


- 1. To compensate this issue, Bamboo should be cultivated near the Pulp and Paper manufacturing site. This can be made possible if only the industries cultivate rhizomes in their nurseries, distribute among local farmers and commit them for buy back.**
- 2. Local farmers should be encouraged and motivated to grow Bamboo. This will give dual benefit- Reduce the transportation cost and alleviate local economy.**
- 3. Elaborate publicity and marketing till doorstep for increased utilisation of Bamboo should done pan India.**
- 4. North-East Bamboo species rhizomes must be developed in all other parts of country having similar yield with quality.**

# WAY FORWARD:

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5. **Huge leverage to be paid for transportation of Bamboo from site of cultivation to other parts of country. The most suitable and economical mode of transport for transportation of Bamboo can be waterways.**
  6. **Farmers should be made aware of the government's initiatives; they should be trained about cultivation techniques and myths regarding bamboo cultivation among farmers should be eliminated as soon as possible by conducting on site workshops.**
  7. **Various National and International exposures of our farmers and entrepreneurs through field visits and seminars are highly required.**
  8. **Industries should be encouraged to take up initiatives for localizing bamboo cultivation as like eucalyptus through farm forestry to ensure the effectiveness of initiative.**

# WAY FORWARD:

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9. More Research Institutes must be established for the development of viable rhizomes of good quality bamboo species.
  10. Young generation to be motivated to take up bamboo culture as a subject of research.
  11. Rhizomes must be made easily available to the farmers and encouraged to initiate agro forestry.
  12. Qualified Biotechnologists and scholars must be recruited for development of viable rhizome and for providing on field training on bamboo cultivation.
  13. Farmers should be given economic security by making bamboo, a cash crop. Bamboo crops must be procured directly from farmers without involvement of any trader.

# CONCLUSION



**This humble grass, also known as green gold, not only has the potential of rejuvenating the rural economy but is also a key resource for building climate resilience and catalyzing an inclusive green economy.**

**Bamboo can become the cornerstone of the circular economy and offers India the opportunity to leapfrog to an inclusive green economy.**

**Bamboo is the main functionary object which can play significant role in meeting out the maximum national initiatives under the leadership of Honourable PM Sri. Narendra Modi Ji.**



# **CONCLUSION**

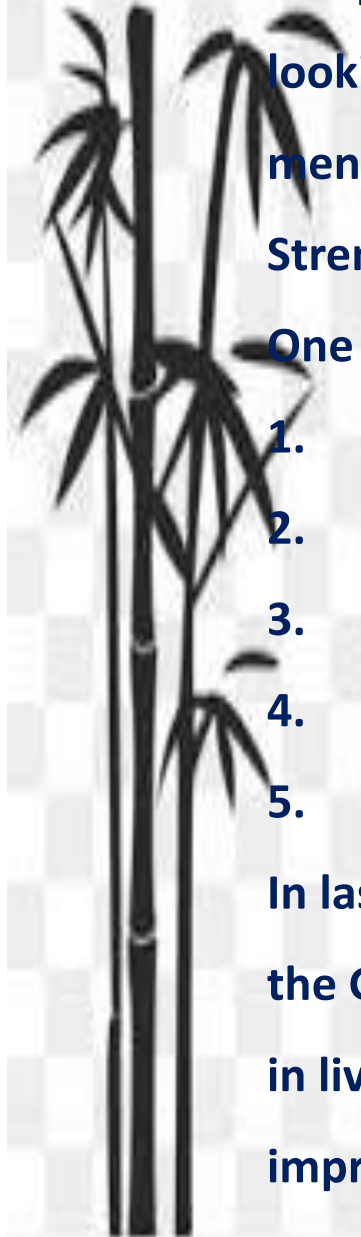
The presentation on usage of Bamboo as raw material can be concluded by looking forward to the multi-fold advantages in Indian paper industries, as mention herewith:

Strengthening of own currency (Rupees) by import substitution.

One giant leap towards “Atmanirbhar Bharat “ initiative .

1. Development of Infrastructure and transportation.
2. Establishing healthy communication and net connectivity
3. Health and Environment
4. E-Commerce
5. Employment opportunities

In last but not least National Bamboo Mission is a commendable initiative of the GOI. Besides enhancing the quality of nature, it will help the human being in living a healthy life. It will also generate more opportunities and will improve the livelihood for millions of families.



Thank You!

