

# **Bamboo Industry in India**

## **A Comprehensive Sectoral Approach**

Brief I: Challenges, Opportunities and Potential End Use Segments

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Research Brief

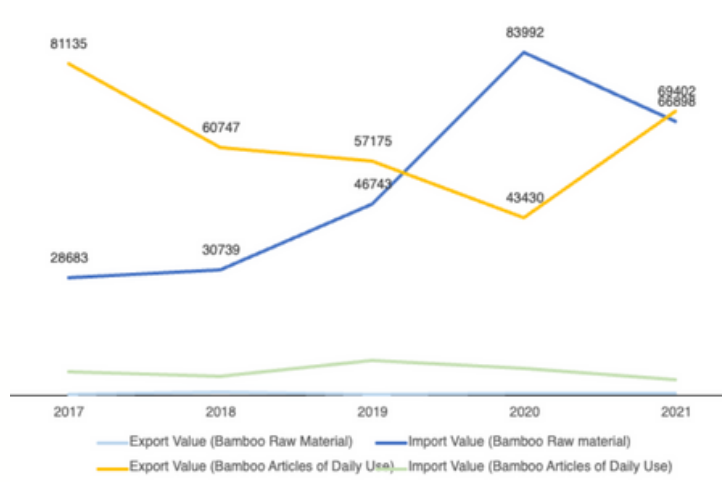
July 2023

# Bamboo Scenario in India

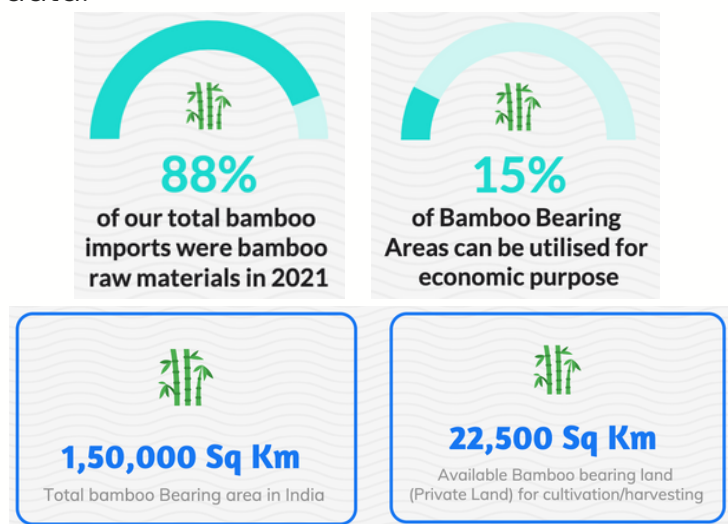
The bamboo industry has garnered significant attention due to its potential as a sustainable and versatile resource. It holds immense economic potential for India, serving as a source of livelihood for numerous rural communities engaged in bamboo cultivation, harvesting, and value-addition. With Tripura and Manipur having more than 50% of bamboo in their total forest cover, the northeastern states of India, along with Sikkim, account for close to 40% of the country's total bamboo bearing area [1]

In addition, India is the second largest producer of bamboo, with 14.6 MMT in 2019 [3], and has the largest bamboo resource base (cover) with an area of around 1,50,000 sqkm [1]. Various supply-side reforms have been undertaken in the policy landscape of the bamboo industry, both nationally and regionally, through an institutional body, the National Bamboo Mission (NBM). However, the industry struggles to develop, formalise and is still at a nascent stage when it comes to value addition, market penetration, and end-use. Even with a large domestic resource base, India still heavily relies on imports to meet the demand for bamboo raw materials, highlighting an interesting situation that necessitates the pursuit of the mission of becoming a self-reliant bamboo economy in India. For a better understanding of the scenario, let's look at international trade data.

In 2021, India imported bamboo raw material worth 66,898 thousand USD from countries primarily limited to China and Vietnam. This accounted for over 88% of India's total imports share for bamboo products. In contrast, a significant portion of India's domestic bamboo articles of daily use, approximately 88%, were also exported out of the country, with a valuation of 69,402 thousand USD as shown in the below figure [2].

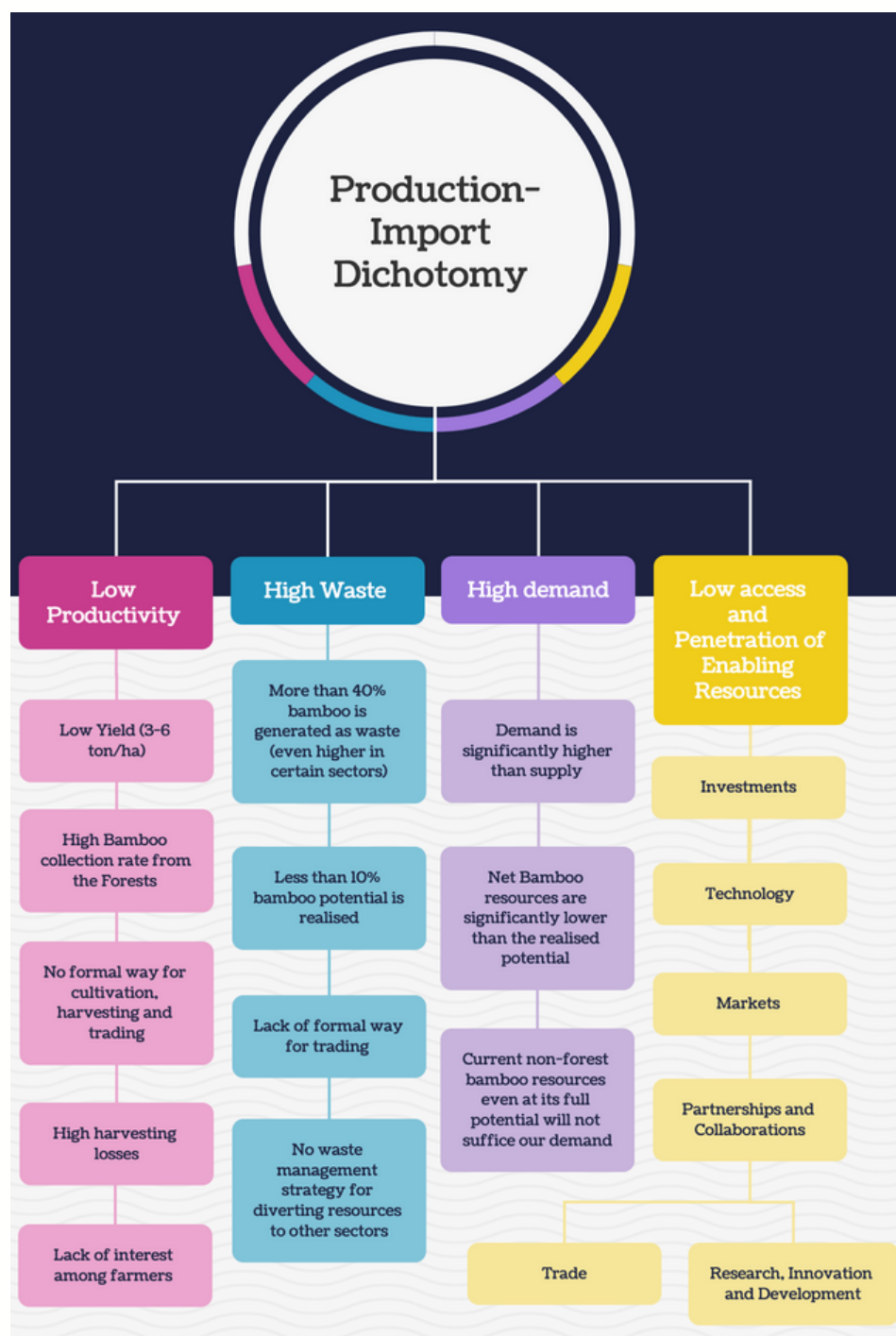


The trade scenario provides an interesting and unique perspective on India's domestic bamboo industry. Due to low productivity, low yield, and high waste (explained in subsequent sections), India's bamboo market is dependent on imported raw materials to produce finished, low value added exportable goods (largely limited to daily-use articles and incense sticks). On the contrary, Chinese imports are significantly low, specifically for raw materials indicating a strong domestic bamboo industry with high productivity of their resources. These statistics underscore the need for India to enhance its domestic production capabilities, promote high value-added exportable goods within the country, and reduce its dependence on imports for raw materials. Now, let's look at the dichotomy and how we characterised it in the paper.



# The Dichotomy

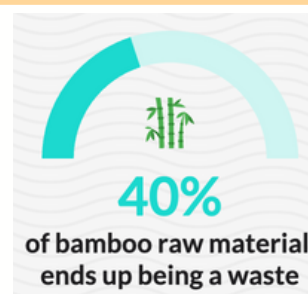
"Bamboo Industry has the potential to be worth 30,000 Crores" stated by Mr. Nitin Gadkari in 2021 at the bamboo exhibition [16] reiterating the mission of "AtmaNirbhar Bharat" and underscoring the importance of reducing dependence on imports and promoting self-reliance and self-sufficiency. As raw materials are the backbone of the economy, it is essential to have sufficient domestic capacity to cultivate, produce, process, market, and trade it. The dichotomy has been thoroughly characterised through inductive reasoning by conducting an extensive literature review in the figure below. These identified factors contribute to the imbalance between domestic production (current and potential) and imports, giving rise to the dichotomy as observed.



## The Need for the Study

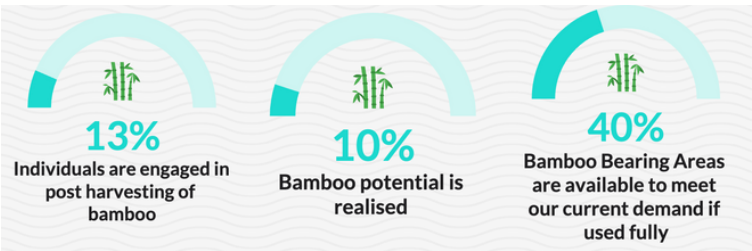
The Bamboo industry is at crossroads. India's high import dependence on bamboo raw materials from China is creating a dangerous dependence loop and negative impetus for the growth of the domestic industry. Despite implementing supply-side interventions under the restructured National Bamboo Mission (RNBM) 2018, the desired results have yet to be achieved. Therefore, it is imperative to reassess our existing policy approach to reform the industry effectively.

The team at NEF recognises the significance of demand-driven policies as a crucial strategy to rejuvenate India's Bamboo Industry. This will be undertaken by identifying priority end user segments and developing bottom-up sectoral strategies and roadmaps for high-value added industrial end use cases. The approach will create the required "demand pull" for the bamboo industry and will lead to the strategic development of the value chain.



# Insights from the Working Paper

The National Economic Forum (NEF) has conducted extensive research on identifying challenges and opportunities for the bamboo industry in India. The insights will get published in the form of a working paper by July 2023. This brief provides the general findings of the paper.



This paper aims to identify and conceptualise three distinct sets of problems currently faced by the bamboo industry within the context of this dichotomy. The identified problems have been thematically theorised into three distinct components; regulatory, value chain, and waste, as shown in the figure below.

| Challenges and Opportunities   |  |
|--|--|
| <br>Regulatory  | <ul style="list-style-type: none"><li>• Alignment between state and central regulations</li><li>• Irregularities in public funding/lack of strategic investments</li><li>• Lack of sectoral strategies</li></ul>                                       |
| <br>Value Chain | <ul style="list-style-type: none"><li>• Limited mid-stream segment development (automation and mechanisation)</li><li>• Limited access and penetration of market, technology, and partnerships</li><li>• largely informal and non industrial</li></ul> |
| <br>Waste       | <ul style="list-style-type: none"><li>• Lack of sectoral and inter-sectoral strategy for waste utilisation</li><li>• Low policy priority</li></ul>   |



The identification and characterisation of the problems led us to look at the data on demand and supply and provide projections to gain clarity on where the bamboo industry stands. These projections have been made through figures/data presented in relevant reports [3,6,9,10,12,15]

The estimation of bamboo demand provided in the NCHF bulletin published in 2017 by the National Cooperative Housing Federation of India (NCHF) is 27 million Mt. Assuming the reported demand is accurate, and considering a modest annual growth rate of 5% in India, the demand for bamboo products is estimated to have reached 34 million Mt in 2022. According to the MoDoNER report, the average yield for forest-based bamboo is reported to be 2-3 Mt/ha, while for non-forest bamboo (Plantations), it is estimated to be 10-15 Mt/ha [9].

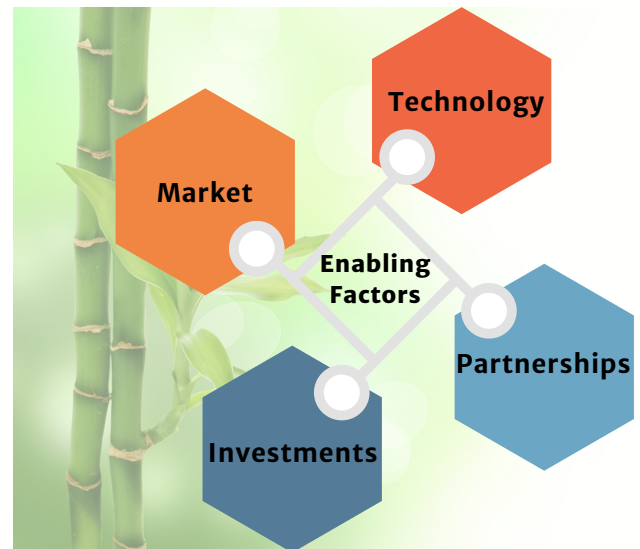
Assuming an ideal average yield of 6 MT/ha, meeting this demand would require approximately 5.6 million hectares, or 56,666 sqkm of bamboo cultivation in India. This area accounts for nearly one-third of the total bamboo-bearing area in the country. In contrast, the available nonforest bamboo area (private lands) turned out to be 22,500 sqkm (~15% share of nonforest bamboo's) [12,16]



Similarly, the bamboo harvesting as per estimates provided by the national bamboo mission is 14.6 Million MT in 2019; considering that harvest and assuming a yield of 6 Mt/ha, this amounts to the cultivated land area of around 50,000 sqkm (one third of the total bamboo area), representing the extent of bamboo exploitation from the forest lands as well as a huge supply gap of more than 50%. [9] Strikingly, according to NBM portal, around 76 sqkm of bamboo plantations have been done for over 100 species as of 2022. This has been done on both private and government lands [3] reiterating the point of higher collection rates from forest lands [7] where bamboo is legally considered a tree and hence under various regulations.

The existing regional studies on the bamboo value chain, such as Tambe (2020) reveal that only a small fraction, approximately 10%, of the full potential of bamboo resources is being realised in states like Maharashtra and Madhya Pradesh, despite them having the highest bamboo-bearing areas. Interestingly, the turnout of farmers for bamboo harvesting in these states is also low, with only 13% of farmers actively engaging in bamboo cultivation [6].

In the western Himalayas, bamboo's end uses are also primarily limited to local handicrafts (where our global market share is only 0.08% compared to China's 54%) and household articles (Kumar, 2023) [13]. Apart from this, the fragmented literature on waste generation has provided us with figures as high as 40%, going up to 70% in some sectors, elaborating on the need for higher scrutiny [14]



Finally, the MITP i.e., Markets, Investments, Technology, and Partnerships are crucial enabling resources for developing an industrial value chain for high value added bamboo products. The integration of these factors is essential for guiding the industry and formalising the economy.

With minimal formalisation, the high relevance of forest bamboo and a lack of sector and inter-sectoral strategies, the Indian bamboo industry struggles to develop. Ensuring uniformity in regulations governing the collection, trade, transport, and processing of bamboo resources has emerged as a critical factor in fostering the industry's development. Various studies indicate that the full potential of the bamboo industry is not being strategically utilised to its maximum potential. The paper is the first step in the series to describe, elaborate, analyse, and generate policy insights into how the bamboo industry can be developed. For more details on the insights, please refer to the working paper.

1. ISFR 2021, Forest Survey of India
2. INBAR Portal, <https://trade.inbar.int:10444/>
3. Operational guidelines of Restructured National Bamboo Mission 2019
4. National Bamboo Mission Dashboard
5. National Consultation on opportunities and challenges for bamboo in India, National Bamboo Mission, 2021
6. Tambe, S., Patnaik, S., Upadhyay, A. P., Edgaonkar, A., Singhal, R., Bisaria, J., ... & Surkar, P. P. (2020). Research Trends: Evidence-based policy for bamboo development in India: From "supply push" to "demand pull". Forest policy and economics, 116, 102187.
7. Bansal, A. (2020). NCCF Working Paper -2/2020 Unlocking the Potential of Bamboo Sector in India. NCCF.
8. Survey and Study of bamboo crafts in Narayanpur and Bastar regions, Chhattisgarh Handshilp Vikash Board, Department of rural Industries, Government of Chhattisgarh
9. Action Plan for the promotion of bamboo in the NER, 2021, Northeastern Council, MoDoNER
10. National Cooperative Housing Federation of India Bulletin 2017
11. Bamboo Resource Status and Business Opportunities in Madhya Pradesh, Foundation for MSME clusters, 2022
12. Dhyani, S.K., Ram, A., Dev, I., 2016. Potential of agroforestry systems in carbon sequestration in India. Indian J. Agric. Sci. 86, 1103-1112.
13. Kumar, S., Rawat, D., Singh, B., & Khanduri, V. P. (2023). Utilization of bamboo resources and their market value in the western Himalayan region of India. Advances in Bamboo Science, 100019.
14. Bamboonomics: the rollout plan for tribal prosperity, Shelly Shaurya Foundation.
15. Bamboo: A Potential Resource for Enhancing Rural Economy- A Case Study, Inder Dev, Asha Ram, S.P. Ahlawati, S.K. Dhyani2, R.K. Tewari, Ramesh Singh, K.B. Sridhar, Naresh Kumar and R.P. Dwivedi, ICRAF, 2019, <https://www.worldagroforestry.org/publication/bamboo-potential-resource-enhancing-rural-economy-case-study>
16. Ani. (2021, March 24). Bamboo industry has potential to be worth Rs. 30,000 crore: Gadkari. The Economic Times. <https://economictimes.indiatimes.com/small-biz/sme-sector/bamboo-industry-has-potential-to-be-worth-rs-30000-crore-gadkari/articleshow/81662655.cms?from=mdr>

# NEF Research Prospects

It is crucial to note that the prevailing policy framework in India has predominantly focused on production-centric objectives, primarily concerning plantation and cultivation, with less emphasis on subsequent value addition. This has resulted in a deficit situation both in our global trade and domestic production & consumption landscape.

A paradigm shift is necessary to prioritise end-user segments, establish roadmaps, and determine appropriate plantation strategies in terms of type, location, and quantity. This approach ensures that the produced bamboo is utilised effectively, based on well-defined use-case scenarios.

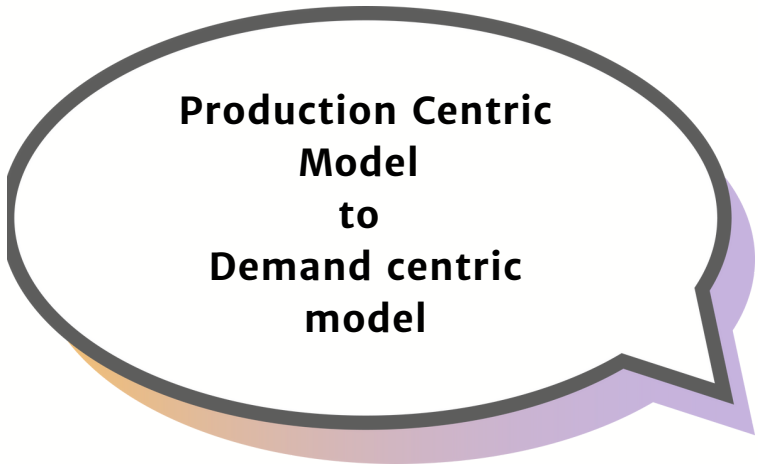
Hence, moving to a model/framework where the industry is being developed by providing strategic demand pull from high end sectors, can effectively address issues related to low productivity, & supply gaps and provide necessary impetus for the growth of the industry.

The project's primary focus will be on selected states that demonstrate high potential for bamboo utilisation in the identified priority end user segments. This research will address three key problems identified in the bamboo industry and subsequently, **develop a roadmap for the priority segments**. These sectors exhibit high growth potential, high demand, and offer opportunities for value-added products, which are crucial for economic growth and the industrialisation of the bamboo sector.

By conducting in-depth investigations, this study seeks to provide a strategic vision for the National Bamboo Mission (NBM) by effectively addressing the production-import dichotomy and synthesising targeted policy recommendations tailored to each specific industrial sector.

## Priority End User Segments

- 1 Bioethanol and Charcoal
- 2 Paper, Pulp and Packaging
- 3 Household Consumption
- 4 Construction
- 5 Textiles




**Production Centric  
Model  
to  
Demand centric  
model**

## Outcomes

The output would be a series of working papers framing the roadmap for the individual sectors. This will be concluded through the publication of a final report on the bamboo economy of India.

The papers will be centred on identifying sector-specific problems, challenges, and opportunities by mapping the value chain, ascertaining the potential of bamboo in the industry, and providing focused guidance on how the industry can effectively utilize the bamboo resources of the country.



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