

Bamboo (Green Gold) Farming: Future Prospects & Economic Importance in Bihar

*Ankita Kumari¹, Supriya Bharti², Navneet Kumar³, Shivani Ranjan⁴ and Aman Raj⁵

¹Ph.D., Department of Seed Science and Technology, Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya-224249

²M.Sc. Agriculture, Department of Genetics and Plant Breeding, Sunrise University, Alwar, Rajasthan, India

³M.Sc. Agronomy, Department of Agronomy, Veer Bahadur Singh Purvanchal University, Jaunpur, UP

⁴Student of Agricultural Science, Sai Nath University, Ranchi, Jharkhand

⁵M.Tech. Agricultural Engineering, Department of Soil and Water Conservation Engineering, Sam Higginbottom University of Agriculture Technology and Sciences, Prayagraj-211007, Uttar Pradesh, India

*Corresponding Author's email: chaudharyankita66@gmail.com

The economic and environmental viability of bamboo cultivation in Bihar is discussed in the present document as a versatile and renewable resource and as a "green gold". The warm climatic conditions, good monsoon rainfall and fertile alluvial soils are favouring the planting of species such as *Bambusa nutans*, *B. tulda* and *B. balcooa* which are valuable commodities in Bihar. The potential of bamboo integration into agroforestry, the establishment of a robust value chain and local processing, to shift the raw bamboo production into a vibrant green economy to support livelihood of rural communities and restoration of degraded lands.

Keywords: Agroforestry, Bamboo Farming, Economy, Green Gold

Introduction

The plant that can grow quickly, grow back after being cut, supply food, shelter, furniture and, in the same time, provide a raw material for paper, textiles and renewable energy? This versatility is a truly remarkable one and certainly more than bamboo is just a simple grass. As one of the fastest-growing, biomass productive, renewable, and multipurpose resources of nature, bamboo is becoming popular as "Green Gold" (Maurya *et al.*, 2025). It has also been known in many rural areas as "Poor Man's Timber" as it offers a less expensive and readily available alternative to traditional wood and timber. Bamboo is one of the fastest growing plants in the world, and in many production systems can be repeatedly harvested without replanting because of the regeneration ability from established rhizomes. As opposed to traditional timber plantations that can take decades before they can be harvested, bamboo can yield usable culms in a relatively short rotation. Usefulness of Bamboo is in food, handicrafts, construction, furniture, pulp and paper, textiles, packaging and bioenergy. The young shoots are eaten and the mature stems are used for baskets, matting, furniture, houses, scaffolding and engineered construction materials. Bamboo fibres and pulp are being more widely used for making textiles and papers, and residues from the processing can also be used for producing bioenergy, such as briquettes and charcoal.

Especially it's significance in the field of finding alternative materials to timber, plastics and other resource intensive materials. Life-cycle studies have shown that bamboo products,

under certain production and processing methods, can have lower global-warming impacts than a number of conventional materials. Bamboo's versatility is also reflected in a recent systematic review, which showed that it has an increasingly important role in the circular economy and sustainable development, while simultaneously contributing to economic development, environment sustainability, agriculture, construction, textiles and energy. As such, bamboo is now recognized not as a plant, but as a source of renewable economic resources of global and national importance, especially from traditional village economies to emerging green industries.

Bamboo in India: From Traditional Resource to Emerging Green Economy

For centuries, bamboo has traditionally been valued for its strength, flexibility, rapid growth and versatility. But now bamboo is coming out of its niche and becoming a vital part of India's fast expanding green economy. India is one of the important bamboo producing countries in the world and has a good variety of bamboo species in the agro climatic regions. As enhanced awareness of sustainable materials is growing, bamboo becomes more significant as a renewable resource as compared to the conventional materials and timber. The applications, however, have been broadened, with modern processing technologies, such as furniture, flooring, engineered boards, construction materials, paper and pulp, textiles, packaging, handicrafts, food products and bioenergy. This transformation has paved the way for not just large industries, but also for the farmers, artisans, rural entrepreneurs and small-scale industries. Besides the sale of raw culms, the economy of bamboo is significant. Value addition can significantly improve its market value as it creates jobs along the supply chain from nursery production and cultivation to harvesting, processing, manufacturing and marketing. Meanwhile, bamboo plantations can help to protect soil, store carbon, restore land and mitigate the effects of climate change.

Why Bihar is Suitable for Bamboo Farming?

The warm, subtropical climate, monsoon rains, high humidity and rich alluvial soils of Bihar are conducive to the growth of bamboo. Bamboo does well in warm and moist conditions and the fertile soils of North Bihar are suitable for plantation. The state has many long rivers like Ganga, Kosi, Mahananda and Gandak, which also form moist alluvial landscapes. But, it is not advisable to use permanently wet areas. Specific degraded, bare and marginal lands could offer other opportunities for land restoration and income generation through bamboo activities. The areas of north Bihar hold great promise with Purnia, Araria, Kishanganj, Katihar, Saharsa, Supaul and Madhepura being the areas with possibilities of expansion. A 2025 habitat-suitability study identified northern Bihar as favourable for *Bambusa nutans*, *B. tulda* and *B. balcooa*, with Supaul and Madhubani among the highly suitable areas.

S. No.	Factor	Suitable for bamboo cultivation
1.	Temperature	Warm climate
2.	Rainfall	Adequate monsoon rainfall
3.	Soil	Fertile alluvial soils
4.	Humidity	High during monsoon
5.	Land	Marginal/degraded land potential
6.	Key region	North & northeastern Bihar
7.	Promising districts	Supaul, Purnia, Araria, Kishanganj, Katihar, Saharsa, Madhepura, Madhubani

Regional Potential for Bamboo Cultivation in Bihar

North and northeastern Bihar provide very good prospects for the cultivation of bamboo because of their humid climate, favorable rainfall, alluvial soils and extensive agricultural landscape (Kittur et al., 2022). The Northern East Agro-climatic Zone is characterized by sandy loam to clay loam soil, moderate rainfall and includes Purnia, Katihar, Saharsa, Supaul, Madhepura, Khagaria, Araria and Kishanganj districts. The Bihar Government's National

Bamboo Mission is also actively working on these areas by focusing on plantation of bamboo and farmer field boundary plantation.

Table 1: Bamboo Cultivation in Region/District Potential with Major Opportunity

Region/District	Bamboo potential	Major opportunity
North Bihar	Very high	Commercial plantations and agroforestry
Kosi region	High, site-specific	Marginal/elevated land and flood-resilient farming
Purnia	Very high	Plantation, processing and value addition
Araria	High	Farm plantations and boundary planting
Kishanganj	High	Humid-climate bamboo production
Katihar	High	Plantation and agroforestry
Saharsa	High, site-specific	Diversification in suitable Kosi areas
Supaul	Very high	Suitable for multiple bamboo species
Madhepura	High	Plantation and agroforestry
Madhubani	Very high	Highly suitable zone for selected species
Other districts	Moderate-high	Expansion according to soil and site suitability

Source: Scribd agricultural archives / Regional agricultural surveys.

Bamboo Species Suitable for Bihar

Species	Major potential
<i>Bambusa balcooa</i>	Construction, poles, furniture
<i>Bambusa nutans</i>	Poles, construction, multipurpose uses
<i>Bambusa tulda</i>	Handicrafts, construction, industrial uses
<i>Bambusa bambos</i>	Traditional uses, construction
Other locally important species	Food, handicrafts and household applications

Bamboo Based Agroforestry: A Special Opportunity for Bihar

Bamboo can be integrated with the existing on-farm activities to boost income instead of relying on a single crop.

- **Bamboo + field crops:** Planting of bamboo on broader boundaries and field crops like wheat, maize or pulses.
- **Use bamboo along field boundaries:** Use bamboo along field boundaries to benefit from the culms without competing with crops in the main field.
- **Bamboo + fruit trees:** Grow bamboo together with mangoes, guavas or lemons in spaces and conditions that allow them to grow which generates income from both bamboo and fruit trees.
- **Bamboo + livestock:** Combine with livestock like cattle, goats or poultry and manure from livestock farms can be used for the cultivation of bamboo; bamboo residues can be used for farming.
- **Bamboo on degraded land:** Grow appropriate bamboo species on marginal and underutilized land to develop the land gradually into a productive resource.
- **Bamboo + farm ponds:** Plant bamboo around appropriate pond edges to utilize the unused space and to help stabilize the soil and to harvest marketable culms.



Fig. 1: Multiple uses of Bamboo

Bamboo Value Chain: From Culm to Consumer

Bamboo starts its value when it steps from the farm gate. The raw culm can be sold to a farmer at a small price, while processing, designing and converting it into useful products can generate a lot more value and employment for the farmer. Hence, the need to create an integrated value chain of bamboo is crucial to ensure that bamboo becomes a source of real income to the rural people in Bihar. Recent research emphasizes the need to transition from raw bamboo sourcing to processing, value creation and new markets (Sharma *et al.*, 2023).

From farm to market

Farmer → Collector → Primary processing → Artisan/Industry → Wholesaler → Retailer → Consumer

Raw bamboo → Treatment → Drying → Cutting/Splitting → Processing → Product manufacturing → Marketing → Higher value

After harvesting, bamboo can follow several pathways:

How Bihar Can Turn Bamboo into a “Green Gold Economy”

With adequate support from plantation to marketing, bamboo can provide potential income source, employment and rural enterprise to the farmers in Bihar. The focus should be simple:

- **Plant appropriate bamboo species:** Farmers need to identify the appropriate bamboo species to be planted based on the soil, climate and market demand.
- **Use quality planting material:** Plantation performance can be enhanced by quality planting material and scientific planting techniques.
- **Proper management of clumps:** Regular cleaning, thinning and scientific harvesting to maintain productive bamboo clumps.
- **Value addition:** Farmers and rural entrepreneurs can add value to the bamboo poles and produce furniture, baskets, mats, handicrafts, agarbatti, boards etc. instead of only selling bamboo poles.
- **Establish local processing centres:** Small processing centres in the villages would limit the transportation costs and generate employment locally.
- **Organize farmer groups:** Farmer groups/FPOs can be formed to enable farmers to purchase planting material and sell bamboo in bulk and negotiate fair price.
- **Connect farmers with markets:** Farmers need to be connected with traders, industries, online markets to enable better and stable returns (Garai *et al.*, 2025)

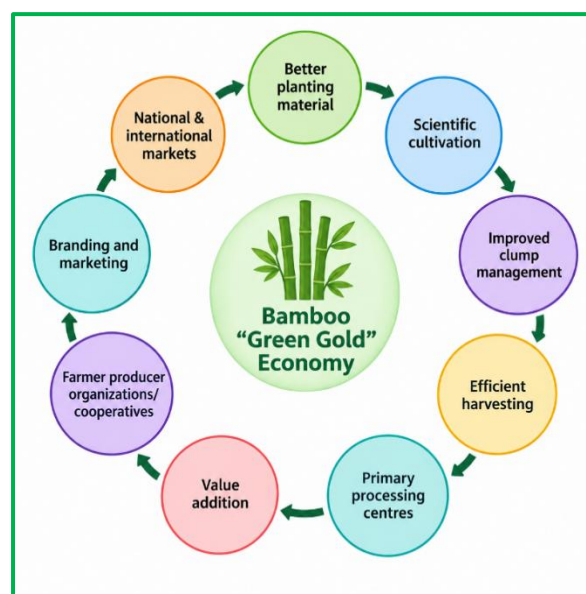


Fig. 2: Strategic Roadmap for Bamboo Based Economic Development

Future Prospects of Bamboo Farming in Bihar

1. **Growth of commercial cultivation of bamboo:** Bihar has huge potential for promoting the cultivation of bamboo, especially *Bambusa nutans*, *B. tulda* and *B. balcooa* which are commercially important for bamboo, in the north of the state where climatic condition is suitable for the same.
2. **Bamboo Based Industries:** Availability of bamboo can facilitate the development of industries such as furniture, construction, handicrafts, paper, bamboo boards, packaging, textiles and bioenergy to establish new rural industries and job opportunities.
3. **Value Addition and Better Farmer Income:** Transitions to sale of processed and value added products, instead of raw culms can lead to significant value addition and

improvement in farmer income. This is where processing and common facility centres will be vital to development.

4. **Employment and Rural Livelihood Generation:** Bamboo has employment potential along the value chain starting from nursery production, cultivation, harvesting, processing, handicrafts and marketing, especially for the rural youth and women's groups, who can be employed as artisans.
5. **Land Restoration and Climate Resilient Agriculture:** Bamboo can be utilized to rehabilitate degraded lands, conserve soil and stop soil erosion, especially in the erosion and flood prone areas of Bihar and can also be used as an income generating crop for farmers.
6. **Strong Policy and Market Support:** The opportunities for plantation, farmer training, market development and entrepreneurship with bamboo are being created through the support of the National Bamboo Mission and Bihar bamboo programme. All districts covered by the current programme in Bihar have provided a solid platform for expansion in the future.

Conclusion

The cultivation of bamboo is a very promising option for economic development and climate-smart farming in Bihar. This potential can be realised only if stakeholders move from selling raw culms to creating a value chain that is based on local processing and value added products. The strategic shift will create a variety of jobs, significantly boost the incomes of farmers, encourage the development of new rural industries and rehabilitate degraded lands throughout the state with the support of policy measures, such as the National Bamboo Mission.

References

1. Garai, S., Malakar, A., Mishra, Y., Kumar, R., & Kumar, L. (2025). Where to grow "Green-Gold" to mitigate land degradation? Identifying appropriate habitat for three economically important bamboo species in eastern India. *Discover Forests*, 1(1), 14.
2. Kittur, B. H., Jhariya, M. K., Raj, A., & Banerjee, A. (2022). Nature's green gold: Strategies to improve livelihoods and sustainability through bamboo resource. *Climate Change and Environmental Sustainability*, 10(1), 82-92.
3. Maurya, L. L., Singh, Y. A., Bhardwaj, A., Kumar, V., Jamaludheen, V., & Shil, S. (2025). Diversity, threats and conservation aspects of bamboo: a review on green gold. *International Journal of Ecology and Environmental Sciences*, 51(1), 27-35.
4. Sharma, S., Kumari, K., Behera, J., Ranjan, M., Panda, K. K., & Jha, R. K. (2023). Forest resources of Bihar: Bio-ecological and socio-economic perspectives. *forest*, 2266, 29-97.