

# BAMBOO BASED AGROFORESTRY MODEL AND DVARA E-REGISTRY'S INTERVENTION WITH BAMBOO GROWERS

Authored By SHOAIB RAHMAN MANAGER- IMPACT AND EVALUATION, VALUE CHAIN Agroforestry systems based on bamboo are one of the key elements to raising stakeholders' yearly incomes, socioeconomic standing, and environmental sustainability. This case study seeks to determine the viability of the bamboo industry as a source of sustainable income and the contribution of bamboo to the livelihood and ecological security of the Khandwa, Khargone, and Dhar districts of Madhya Pradesh. In Madhya Pradesh, bamboo are grown around the edges of agricultural fields to shield crops from the high-velocity winds. It exhibited excellent growth and development and could endure water stress. Harvesting bamboo aids in making up for the financial losses agricultural crops suffer because of water restrictions. Bamboos are efficient soil binders and hence play a vital role in soil and water conservation due to their fibrous root systems.

Bamboo has a strong capacity for carbon sequestration which could help to mitigate climate change, global warming, and greenhouse gas emissions. It also gives protection from UV rays and light intensity. The shade effect is diminished when bamboo is planted in an east-west direction, lowering soil and air temperatures as well as sun radiation, all of which have a direct effect on soil water evaporation and humidity. Bamboo leaves were specifically used as goat feed and as mulch. Therefore, a wide-scale implementation of the bamboo-based agroforestry model can enhance farmers' socioeconomic circumstances and ecological sustainability in Madhya Pradesh's water-stressed areas.

## Madhya Pradesh and Bamboo Cultivation

Madhya Pradesh has a geographical area of 308,245 sq km and a forest area of 77,482.49 sq km, making it the second largest state in the nation after Rajasthan. An essential part of the state's economy is forestry. Bamboo, a crucial forest product, is extremely significant to rural MPs' socioeconomic existence. It is referred to as "poor man's timber" and used for a variety of purposes for different forms of livelihood options. India has 125 species of bamboo in 23 taxa, this makes us second only to China in the world. In India, Dendrocalamus strictus is the most significant species. The country's projected 8.96-million-hectare bamboo area is more than the 80.428 million tonnes of total growing stock. 32,30,000 tonnes of bamboo are thought to be produced annually in India. States in the northeast account for 28% of the land and 66% of the increasing stock. 20.3% of the land and 12% of the growing stock are in Madhya Pradesh.

The Basod and Nistari tribes are the two biggest consumers of bamboo in Madhya Pradesh. The people known as Basods are members of a group of artisans who traditionally rely on bamboo for their livelihood. Bamboo is used by the Nistaris to repair houses, crop harvesting, and for other domestic purposes.

#### Methodology

For this case study, the project manager and a total of 20 farmers were interviewed from Barwani, Dhar, Satna, Khandwa and Alirajpur districts of Madhya Pradesh. A purposive sampling procedure was adopted for the selection of the farmers who provided information on about the role of different bamboo species in agroforestry systems for livelihood and environmental security. During the subsequent interviews, data on the role of bamboo in the agroforestry system for livelihood and environmental security were explored and documented. The open-ended interview was conducted to collect information on the use of bamboo for livelihood purposes.

## **Findings**

The findings from this study have been categorised as follows:

Growth Pattern: According to farmers and secondary data, the bamboo plant can grow between 30 and 100 cm each day during the growing season. In the rainy season, it completes its entire growth in three to four months. It was claimed that the production period may be extended by 6 to 8 months every year with the right irrigation, mulching, and nutritional additives. After plantation, it begins to produce in 3 to 4 years and reaches its peak productivity in 7 to 8 years.

Soil Type: The red, sandy, and laterite soil regions of Madhya Pradesh are appropriate for the bamboobased agroforestry system. Bamboo has the capacity to guarantee stable income. In addition to elevated ground, marginal and degraded soil, field bunds, and riverbanks, it also grows there.

Bamboo's impact on soil: Growing bamboo on degraded soils enhances soil quality and traps carbon in the ground. Bamboo is regarded as suitable for rehabilitation of degraded lands within a short period of time in the Nimar region of Madhya Pradesh due to its rapid growth and extensive root system, which also improve soil physical, chemical, and biological properties, control soil erosion, filter sediment, and improve soil quality. Since bamboo tends to grow new culms every year from underground rhizomes, sustainable yearly harvesting is possible without harming the soil.

Environmental Impact: Bamboo helps to keep the atmosphere's CO2 and oxygen levels balanced. because it has the ability to effectively sequester carbon, aiding in the fight against the release of greenhouse gases that cause global warming and climate change. Additionally, it reduces light intensity and offers UV radiation protection.

Seasonal litter fall and nutrient cycling in an agroforestry system: The biomass of bamboo litter greatly increases soil organic matter and feeds both wild bamboo stands and cultivated bamboo with nutrients. Provide edible bamboo shoots: Some bamboo species produce edible, sweet-tasting shoots. Young bamboo shoots from an agroforestry system based on bamboo are edible. Young bamboo shoots are referred to as "Karil," which is crushed and fermented wet as "Sandhana," and fermented dry." Sandhana is used as vegetable by tribals in MP, Jharkhand and Chhattisgarh. As per locals, it is a great food source and is used to make pickles and vegetables. Young leaves are additionally used as feed, primarily for goats. In this method, bamboo-based agroforestry systems provide food security, especially in the waterstressed areas of Madhya Pradesh's Nimar region.

**Employment generation:** Bamboo based agroforestry system has great potential to provide employment in planting and provides raw materials for construction, craft and manufacture of value-added products and increases the source of income in the rural areas of all these districts of Nimar region of Madhya Pradesh. For the tribal and underprivileged residents of Madhya Pradesh's Nimar region, the growing of bamboo ensures their access to food security and generates revenue. This abundant supply of bamboo shoots can satisfy local demand while boosting the income of the underprivileged and tribal people. According to estimates, over the course of 30 years, a bamboo plantation with 500 clumps would provide 3.9 man-days of work for unskilled labour and 47.3 man-days for supervisors.

Sustainable development: Interaction with the project manager, farmers, bamboo suppliers, and other stakeholders makes it evident how bamboo may be used as an existing resource in an agroforestry system to meet needs without compromising their capacity to do so in the future. because it spreads widely and develops swiftly. Bamboo is a renewable, widely accessible, low-cost, and environmentally friendly wood resource that can be used in place of forest timber. In this way, bamboos preserved the forest and aided the ecology. The planting of bamboo as a part of an agroforestry system restores the productivity of degraded land in the Madhya Pradesh district of Nimar. From the above findings, it can be concluded that the bamboo-based agroforestry systems are very important as regards to socio-economic and environmental status in the region of Madhya Pradesh. Bamboo can be incorporated into profitable agroforestry systems due to its quicker harvesting time and excellent growth and survival on any type of soil strata. In addition, bamboo can play a significant role in soil and water conservation as well as a significant impact on various features of physical and chemical properties of soil. In addition to this, bamboo plantations aid in greater carbon sequestration and the addition of different types of nutrients to the soil through the fall of their litter.

## Problem plaguing bamboo farming in Madhya Pradesh

The irregular and limited availability of bamboo for commercial usage has been the main barrier to the growth of a bamboo-based industry. Due to this irregular and limited supply, India's paper and pulp industry, which has been employing bamboo for more than 50 years, has continuously innovated to use less of the material in its production. And very little is left behind for any other use once the paper mills who typically have long-term contracts with the forest departments have used it all. Not just Madhya Pradesh, but all of India, follows this pattern. India's current regulatory system has not been of much help and it's erratic and insufficient supply does create impediments. For markets to expand in a sustainable way, especially when environmental concerns are combined with corporate development, an effective regulatory agency is necessary. With a clear focus on sustaining the forest cover, transaction costs must be as low as possible and information accessibility must be maximum. Unfortunately, the regulatory framework for the bamboo business is still mired in the maze of antiquated forest rules, which describe bamboo as a tree and so classify felled bamboo as lumber. Trade and transit restrictions apply to this.

India may want to learn from China. By integrating the bamboo industry with both home and foreign markets, the Chinese were able to industrialise the usage of bamboo. For the domestic and international markets, China has developed an integrated chain of bamboo plantations, semi-processing, and industrial product production, including bamboo flooring, furniture, furnishings, charcoal, and fresh bamboo shoots.



#### **Role of FPOs and Other Actors**

Government of India is seeing bamboo key crop to double farmers' income, increase employment opportunities and improve the livelihood of the people, especially in the Madhya Pradesh and Northeast region. Formation and development of new and existing FPCs will encourage small and marginal farmers for taking up bamboo plantation. It will ensure handholding of the farmer groups for providing correct procedures for raising nurseries and plantations.

There is abundant opportunity for farmers to be agripreneurs (agriculture entrepreneurs) and for individuals to start their bamboo nurseries. Interventions from State bamboo boards as the funding entity and Forest department as the implementing agency is imperative to nurture this stage. FPCs will be an effective way to undertake cooperative farming. Cultivating on marginal-land holdings is not economically feasible, therefore, more FPCs should be formed, or farmers should be encouraged into cooperative farming. Bamboo samplings could be distributed free, and detailed orientation will be provided with respect to plantation. The Forest department needs to conduct training programs for farmers. Agriculture Universities can institute a course in bamboo farming to encourage young farmers.

## **Dvara E-Registry's Intervention with Bamboo Farmers in Madhya Pradesh**

Dvara E-Registry through its FPCs in Sidhi, Barwani, Dhar, Alirajpur, Satna and Khandwa is working with Bamboo farmers. Dvara E-Registry from the onset understands that bamboo is a versatile group of plants which is capable of providing ecological, economic and livelihood security to the people of Madhya Pradesh. The various works carried out by the organisation is helping it to serve the following objectives.

- Enhancement of productivity in non-forest land, both Government and private lands to supplement farm income
- To improve post-harvest management through establishment of innovative primary processing units near the source of production, primary treatment and seasoning plants, preservation technologies and market infrastructure
- To promote skill development, capacity building, awareness generation for development of bamboo sector from production to market demand
- · Innovations in value addition and new product development
- Development of market infrastructure and linkages with farmer producers
- Strengthening of existing bamboo-based industry and explore new emerging areas to make the industry competitive

#### **Interventions by Dvara E-Registry**

Capacity Building: Capacity building of the officials, field functionaries, entrepreneurs and farmers through skill development and trainings have been undertaken in all the six districts. The major idea behind these trainings was to make farmers aware about the various benefits of bamboo plantation and how it can provide steady source of income in the times to come. Range officers as resource persons were delegated by District Forest Officers. More than 900 farmers have attended the trainings.

Bamboo Plantation:One of the major achievements of this programme is the motivation provided to farmers for bamboo plantation. In the span of 9 months, Dvara E-Registry through subsequent trainings and farmers meeting have motivated 210 farmers got 51057 plantations done. The plants were of two varieties, Manvel and Balkua.

#### Bamboo plantation across four FPCs

22310



Number of plants

Bamboo Cluster: Dvara E-Registry is committed towards creating a cluster of bamboo farmers comprising of three districts i.e., Barwani, Alirajpur and Dhar. The cluster will be having 1400 farmers of which 1200 are FPO shareholders while 200 are non-members. Through this cluster, a bamboo crushing unit will be established in Barwani. The farmers will be able to supply their raw bamboo in this unit which will be further used in ply making. Dvara E-Registry organisation is seeking funds from Scheme of Fund Regeneration of Traditional Industries (SFURTI) which comes under Ministry of Micro, Small and Medium Enterprises. The scheme helps the local and traditional artisan s of the rural parts of India in the various associated clusters to improve their skills and manufacturing capabilities so that they achieve better employment and economic success.

Number of farmers

Laisioning with CSIR-AMPRI, Bhopal: Dvara E-Registry is striving to associate with CSIR- Advanced Materials and Processes Research Institute (AMPRI), Bhopal in order to bring new innovative technologies to its bamboo farmers.

#### **Dvara E-Registry's Efforts to Associate with Potential Buyers:**

Bambooram Agro Private Limited: Bambooram is a Madhya Pradesh based agro company involved in commercial bamboo farms and bamboo-based industries for the sake of environment protection, greenery enhancement and sustainable economy. Bambooram treats the raw bamboo thus increasing its longevity and later supply it to other buyers. Dvara E-Registry is in talk with Bambooram for providing bulk raw bamboo through the FPO affiliated farmer members.

Orient Paper: Orient Paper Mills is one of India's major players in Paper with a wide range of writing, printing, industrial and specialty papers. A major paper mill in Central India, it uses Bamboo and hardwood as raw material and produces writing printing grade paper from virgin fibre. Dvara E-Registry is striving to associate with Orient papers for providing bamboo raw material in bulk through its associate FPO shareholders.

Keshav Baans Shilp: Dvara E-Registry is looking out for collaborating with Keshav Baans Shilp, an organisation which works on manufacturing of bamboo products.

Science & Technology Resource centre, Gondwana University (STRC): It is an autonomous institute located at Gondwana University, Gadchiroli, Maharashtra. STRC is entrusted with generating livelihood opportunities by deploying appropriate science and technology, particularly for the underserved tribal communities. Dvara E-Registry has a MoU with STRC to provide skill building trainings to FPO shareholder farmers. Trained Master Trainers from STRC will be engaging in creating a cadre of skilled and traditional artisan groups through basic and higher order skill training with an aim to develop master artisans.

Bio Trend Energy Private Limited: This is an environmental waste solutions company specializing in creating energy from waste. It is developing Bio Pellets, a sustainable fuel substitute that solves a number of environmental issues including air pollution and the waste of agricultural crop leftovers. For bamboo pellets, Dvara E-Registry arranged a field visit for their representative in Barwani and Dhar.

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I grow Bamboo on 1.5 acre of land, I became shareholder in the Badhauranath FPC, Sidhi last year and I along with and other farmers are benefitting from the FPCs. This year I have been able to sell 8 MT of bamboo through my FPC. This is for the first time that I have been able to sell the complete harvest in one go and have received the payment on time. There are no avenues to sell bamboo in our region and we were not able to sell the complete harvest, in addition, earlier the bamboos were procured from other states like Assam but through the efforts of FPC, we have been able to show that bamboos can be made available locally in our region. As far as cost is concerned, this is the initial period, and I am sure that we will be able to make better profit in years to come.

Rakesh Kumar Mishra, Naudia Village, Mahjaluli, Sidhi, Madhya Pradesh