



**ORIGINAL RESEARCH PAPER**

**Botany**

**COMMERCIALIZATION OF BAMBOO IN INDIA: A REVIEW**

**KEY WORDS:**

Commercialization, Bamboo, India

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**ABSTRACT**

Bamboo is most versatile group of plants, are evergreen perennial flowering plants of the grass family poaceae and sub family Bambusoideae. The stem of bamboo is hollow ,vascular bundle is scattered and woody xylem is absent. Bamboo are one of the fastest growing plant on Earth with reported rate up to 910 mm (36 in) in 24 hours (Guinness World record 2007). However the growth of the plant depends on local soil and climatic condition as well as the species of the plant, They spread mainly through rhizomes the two types patterns of growth of bamboo are clumping and running. Clumping growth with short rhizomes and tend to spread slowly. Running bamboo grow fast with the help of underground rhizomes. Unlike Timber bamboo is self regenerating natural resources. Bamboo grow fast and matures early. The output of bamboo plantation is great and the use of bamboo stem is wide.

**INTRODUCTION:**

Bamboo 'The green gold' is a gift of nature has enabled man to draw a variety of benefits and has the potential to provide economic security to the rural population. Bamboo has played an important part in daily lives of people in India since the beginning of civilization. Due to its excellent physical mechanical and chemical properties along with massive diversity of applications it is called 'The cradle to coffin timber', 'The poor man's timber', '21<sup>st</sup> century steel' (Ahmad & Kamke, 2005; Archile et al., 2018; Azeem et al., 2020; Hou et al., 2009).

Rural people generally have adequate access to it and can be easily grown by them and harvested. So it is natural vehicle for development. Millions of rural people depends on bamboo for income and it has been an important source of profit in rural areas and contributes in sustaining the rural economy in India.

Increase research on bamboo has had a tremendous economic impact and has given rise to many new industries and products. Now a days bamboo is a wood substitute and a major non wood forest product from social economic and cultural point of view.

Bamboo is used in many industries such as- paper and pulp industry, housing and construction, food processing, medicines ,handicrafts, rural and agricultural application, packing industry, cottage industry ,furniture and household items, agarbatti industry, renewable energy and fuel industry etc.

35% of bamboo produced are used in paper industry (Tripathi et al., 2018). Paper making from bamboo depends on its content of cellulose (78.83%), hemicellulose (12.49%) and lignine (10.15%) (Li et al., 2010).

Enzyme industry plays a very important role in manufacturing of paper. It requires a high content of cellulose and an excellent mass ratio (MR). The quantity of the cellulose is depends on the age of culms and need to harvest after 3-4 years (Banik, 2015; Pandey and Ojha, 2013). The paper made by bamboo never deteriorates its brightness and optical properties.

Today bamboo is one of the best resources for the construction industry (Huang et al., 2017, Von Seidlein et al., 2017). The culms of bamboo have good tensile strength nearly equal to that of Steel. Its compression strength is also fair to that of concrete's compression strength (Archila et al., 2018; Mali & Datta, 2020).

Its cost is only 6% off the cost of Steel but nearly double the load bearing capacity. Most important bamboo species suitable for construction are *Bambusa balcooa*, *B. Tulda*, *B. nutans*, *B. pallidal*, *B. polymorpha*. Due to its mechanical strength and sustainability it is used in construction of

building and bridges. Bamboo culm is an excellent and healthy resource of food ( Choudhury et al., 2012; Silva et al., 2020). 2 week old or less than 1 foot tall shoot is used for edible purpose. It contains potassium & lignans phenolic acids and shoots are good source of fibre and low in fat and calories. Bamboo leaves are healthy food for cattle, goats and chicken as it meets the calcium demand for these animals since bamboo absorbs and accumulates calcium from soil.

Bamboo has great nutrients value it contains nitrogen (N), potassium (K) & Phosphorus (P) in content order N>P>K. Bamboo plant generates 60 tons of oxygen per hectare every year which is enough for over 200 human beings. It also shows a great potential to capture and store carbon. Bamboo absorbs 12 tons of harmful carbon dioxide per hectare from the air which is twice that of the similar size forest. Hence, it is the best plant to counter urban industrial pollution. It also absorbs more water than many plants and thereby helping in maintaining soil stability ,erosion prevention on hill slope and very importantly as forest plant.

Bamboo shoots have medicinal property like cancer fighting, anti inflammatory, and are helpful in weight loss, balancing cholesterol and boost immune system. Recent research revealed that consuming bamboo shoots increase appetite and good digestion, control obesity ,diabetes and also helpful in treatment of heart disease and cancer.

Bamboo is also used in flooring and panels with international trade value of 362 million USD, which is 20% of all the bamboo products worldwide. Bamboo floor is much smoother brighter and durable as compared to wooden floor.

Several desirable fuel characteristic also found in bamboo like higher heating value ,low ash content and low alkali index. Fuelwood, charcoal and agriculture residue made from bamboo are renewable in nature.

Paralysis is mostly used for converting feedstock into carbon rich material ( Singer et al., 2019; Kumar et al., 2019). Both pyrolysis and gasification can easily convert bamboo into three different fuel forms as charcoal, bio- oil and biogas ( Rangabhashiyam & Balasubramaniam, 2019). Activated carbon is manufactured by the waste of bamboo paper mill which is used in pharmaceutical ,chemical and metallurgical industries. Some dominant species used for commercial purposes in India- *Bambusa balcooa*, *B. bamboos*, *B. nutans*, *B. tulda*, *Dendrocalamus strictus*, *D. hamiltoniis*, *Melocanna baccifera*.

The furniture made from bamboo provides employment to artisans and most of rural people. The products made from bamboo are chair, table ,sofa, jar, box, baby carriage, basket, bed, bookcase, box, chopsticks, clothes racks cooking wheel,

couches, cups, dolls, fishnets, desk, guns, water storage, windmills, flowerpots etc.

### Micropropagation of Bamboo

Seeds are always in short supply in bamboo because of its monocarpia nature, due to which vegetative method are used for the production of planting stock. It includes offset planting, rhizome planting, rooting of cuttings and layering. Vegetative propagation has proved useful for only small scale production. Another means of vegetative propagation developed by scientists in the form of plant tissue culture where plant cells give rise to complete plants. Propagation of plants through tissue culture has become an important and popular technique to reproduce bamboo that are otherwise difficult to propagate conventionally by seeds or vegetative means. Micropropagation is one of the most effective supplementation to conventional method. This is one of the fastest way of getting healthy, disease free and genetically uniform planting material.

### DISCUSSION:

Bamboo is globally recognised now as an economic asset in poverty eradication and economic and environmental development. In India farm bamboo adds substantially to income of farmer. Availability of planting material is poor which is a main hurdle of cultivation of bamboo. Use of rhizome as planting material is not sufficient and is costly too. Over exploitation of forests threatened the existence of genetic resources of economically important bamboo species. Tissue culture offers and alternative method for rapid multiplication of bamboo. The market for tissue culture plant of bamboo is huge, highly competitive and ever-changing in India, therefore needs proper planning.

### CONCLUSION:

Bamboo is easily cultivated, adaptable and fast growing crop and become popular as an eco-friendly substitute for Timber. Bamboo has had a tremendous economic impact in the last decade and increased knowledge about bamboo has given rise to many new industries and products.

Bamboo is a valuable forest genetic resource which contributes in environmental benefits, promotes ecological security and improves socio-economic condition. Moreover, due to extraordinary performance of bamboo, there is an immense opportunity is available for growing bamboo industry to boost the rural economy in India.

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