

# Social, Environmental and Economic Impact of Promoting Bamboo Furniture Industry in India

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**Abstract:** Bamboo is regarded as the most versatile and sprightly growing perennial grass. Rapid globalization and industrialization is leading to depletion of many viable natural resources like timber. Mitigating the needs of timber, a surpassing surrogate is needed. Bamboo being a multifunctional and fast growing species, may be considered as a viable alternative to timber. Therefore, to review the Indian bamboo furniture industry it was necessary evaluate the various social, economic and environmental impediments the industry is facing.

Bamboo has a huge social and economic impact as it can provide livelihood to the rural people in remote areas and also aid in women empowerment as most of the grass root artisans are women. Improved cultivation, processing, designing and production of high quality bamboo products can lead to increased exports and foreign exchange income. The promotion of bamboo furniture industry will help to maintain the ecological balance and contribute to sustainable development. In spite of the perceived benefits, bamboo furniture industry is currently facing huge uncertainty and roadblocks.

The bamboo furniture industry suffers from the lack of facilitating government policy encouraging growth. There is no connection between the consumer demand, taste and the manufacturers, artisans. This leads to production of bamboo furniture that are considered as “outdated”, “rustic” or just “poor”. Moreover, in India there is no educational course or curriculum to educate young designers, architects about bamboo and stimulate interest amongst the end users.

Hence, this industry needs a impactful change in government policy, rigorous promotional measures and training to low skilled workers to increase commercialization of bamboo furniture. This will lead to rejuvenation of rural economy and can help India become a exporter of bamboo products.

**Keywords:** Bamboo furniture, impact, renewable resources, sustainability

## Introduction

Bamboo is one of the most versatile perennial grass belonging to the family of Poaceae (Graminae). It is found in all parts of India except Kashmir because of its cold climatic conditions which does not let bamboo grow naturally (Singh, 2008). Being one of the major bamboo producer globally and with the largest bamboo production area of nearly about 11 million hectare of the area, production in comparison to China who owes nearly about 5.5 million hectare, India's productivity is very low (Ministry of Environment, Forest and Climate Change Government of India, 2019) and its contribution towards global market is only 4%. Bamboo has always been a main source of livelihood for the rural sector in India and around 8.6 million people depends upon it for their daily needs (Hegde, 2018). As per Marsh *et al.*, 2007, industrialization in value chain of bamboo sector has an excellent potential in poverty alleviation. Indian bamboo industry is on back foot because of legislative barriers, inefficient government policies non-promotion and awareness of the bamboo product. There is less than 1% of pure Bamboo breaks of total forest area, whereas dense

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bamboo occurrence is 5% and regenerating bamboo crop is 2%. The development of a bamboo-based sector has been facing many challenges because of irregular and scant supply of bamboo and acceptability of bamboo for industrial, constructional and furniture trade. There are total 1575 species of bamboo in the world (Suhaily *et al.*, 2019), whereas India has wide varieties of species like *Bambusa balcooa*, *B.bambos*, *B.nutans*, *B.pallidas*, *B.polymorpha*, *B.tundla*, *B.vulgaris*, *Dendrocalamus Brandisii*, *D.gigantentus*, *D.giganteus*, *D.hamiltonii*, *D. strictus* etc. More than 58 species of 10 genera are found in the northeastern region itself (APN Asia pacific network for global change, 2017) *Bambusa balcooa*, *B.bambos*, *B.nutans*, *B.polymorpha* are some of the Indian species which are ideally used for construction and furniture purpose. Whereas, Mosobamboo (*Phyllostachys edulis*), *Guadua* (*Guadua angustifolia*), *Dendrocalamus giganteus* are the (Marsh *et al.*, 2007) other giant bamboo species that are been for various constructional working world wide (Escamilla *et al.*, 2014).

The gradual improvement in the economic condition and life style of people has drastically increased the demand of furniture in India and evolution of furniture industry. The furniture industry is the biggest wood processing sector who is serving to the necessities all the human sectors (Dongel *et al.*, 2009). Due to depletion of natural resource (timber), to meet the chain of demand and

supply of wood, many furniture manufactures are looking forward to designing environment friendly furniture. Bamboo is an ideal solution which can cater to the need of creating a sustainable bio based products and furniture.

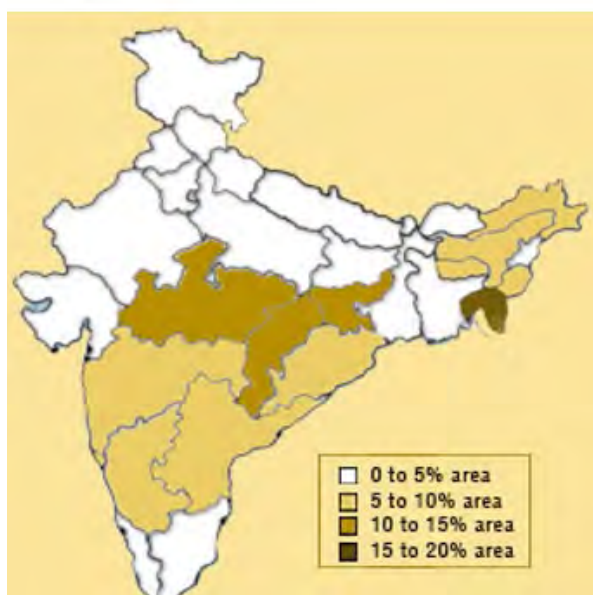
The paper attempts to answer the following questions;

- What is the status of bamboo furniture in India in the context of availability and social/consumer acceptance?
- What is the potential of bamboo furniture in the future, considering the stress non-renewable material?
- What regulatory reforms does the government need to encourage and promote bamboo as a sustainable material for furniture and interior?
- What are the socio-economic impacts of promoting bamboo as a sustainable product on the livelihood of bamboo cultivators, rural artisans and sellers?
- What are the present challenges facing bamboo product markets in India and what role can architects and interior designers play to overcome them?

This paper tries to assess the potential of bamboo furniture industry and its economic impact based on research and market survey. It also analyses the gaps in the promotion of bamboo furniture industry in India and the legislative norms required to be framed by the government for the industrialization of bamboo market.

### Available Bamboo Resources In India

The most accurate, assessed resource to analyse the status of bamboo in various sub states are the 'India State of Forest Report' (ISFR) by Forest Survey of India. This report also documents the total availability of Bamboo resources in India. As per the FSI report, India is covering 16.0 million hectare of total bamboo area, which includes total 136 species (125 indigenous and 11 exotic) from 23 genera, and in the North-eastern region of semi- green and deciduous forest bamboo is found more abundantly. These north-eastern states contribute majorly up to

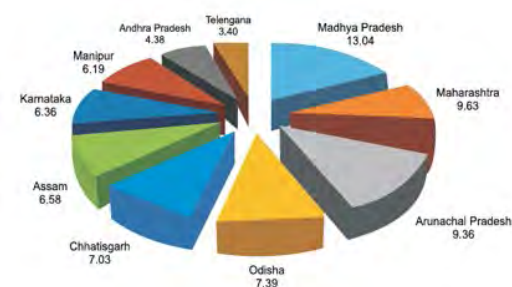


[Source: National bamboo Mission]

**Fig 1.** Bamboo growing states in India

50% to the bamboo resources of the country. As bamboo is not common in urban area, the data has been collected from the rural area of all the states for forming national level estimates. According to available data, total number of culms estimated is 39454 million, which shows the total increase of 11351 million in comparison to previous data by (State forest report, 2017) and the total percentage of Green Sound, dry sound and decayed culms bamboo is 74.41%, 17.14% and 8.45% respectively.

Considering at the national level the estimated green weight of bamboo culms is 278 million tonnes in which green sound bamboo are 65% and dry sound bamboo is 35% accounted from earlier data (Ministry of Environment, Forest and Climate, Change Government of India, 2019). It shows increase of 88 million tonnes. Analysing the state wise data, Madhya Pradesh has maximum bamboo area (2.0 million hectare) followed by Maharashtra (1.54 million hectare), Arunachal Pradesh (1.49 million hectare) and Orissa (1.18 million hectare). Comparing the data from the earlier assessment done by (State forest report, 2017) shows an total increase of 0.32 million hectare of total bamboo bearing area of the country. Madhya Pradesh has highest increase of (0.27 million hectare) whereas Nagaland and Orissa had shown a uncertain decrease of (0.17 million hectare and 0.06 million hectare respectively). As per the bamboo density of different states, pure bamboo brakes is found in less than 1% of area, whereas dense bamboo area is 4% and scattered bamboo area is 14% respectively. These data indicates that with wide varieties of bamboo, India is the second largest bamboo resources country. But in spite of growing the stock within its territories, India is a net importer of bamboo and its by-products.



[Source: Ministry of Environment and Forests, 2017]

**Fig 2.** Bamboo Bearing States (%)

### The Bamboo and Bamboo based furniture Industry Acceptance

Bamboo has been one of the excellent materials for furniture production because of its superior mechanical properties, ease in workability and availability. Its unique colour, texture and tie on its outer skin give a unique identity to the produced design. As per Suhaily *et al.*, 2019, quality of some bamboo based bio composites (Oil Palm Trunk Veneer Hybrid Bio composites), medium density fibreboard, ply board and veneer board are more resistant to damage than traditional hard wood. Therefore these material can be used as an alternative to traditional timber for furniture applications. These material are been globally used for various furniture application. But in India the Bamboo furniture industry is been constrained to small scale cottage industries, as there is a gap between the proper processing knowledge of bamboo and its awareness among the users. It has been also found that processed bamboo product has better mechanical proprieties and durability as compared to the traditional timber. In India, only 15.4% bamboo resources lie in the private land and rest 84.6% are unavailable for the industrial purpose (FAO, 2005). As shown in fig. 3, Indian bamboo market cover wide range of bamboo based products and large percentage of bamboo harvesting is being consumed for supplying raw material to pulp and paper industry and other major part is being used in housing and for the local consumption of cultivators. Furniture industry consumes just 1% share because non-acceptance of bamboo as a furniture resources and huge gap in the supply and demand chain.

### The Supply Chain of Bamboo Furniture

Bamboo is capable of thriving in an extreme range of climatic condition and edaphic condition and there is nearly 1,500 documented variety of applications (Khan, *et al.*, 2007). In India, the demand of bamboo for various purposes is estimated at 26.69 million tonnes whereas the supply is only 13.47 million tonnes i.e. only half of the total demand. The industries like pulp and paper, construction, cottage

Uses	Consumption %
Pulp	35%
Housing	20%
Non - residential	5%
Rural uses	20%
Fuel(non - industrial)	8.5%
Packing,including basket	5%
furniture	1%
Others including ladders,mats etc	3%
Total	100%

[Source: Kumar and Tanya, 2015]

**Fig 3.** Bamboo Consumption (%)

industry and handloom, food, fuel, fodder and medicine annually consume about 13.4 million tonnes of bamboo amounting to Rs. 2042 crores. Demand of bamboo for industrial use are met from state owned forests, while for non-industrial purpose it comes from private as well as state owned resources. The extent of commercial forestry is low and very few cultivators are interested in cultivation of bamboo. For the adequate working, supply chain of bamboo products formulated with various sub structures until it reaches finally to the consumers. There is an considerable variations in the length of the supply chain followed in India.

The supply chain usually follows the cultivators who is responsible for the entire process until bamboo is harvested, this process is executed by rural and the tribal sector which includes cleaning, intertwining of the branches and smoothing their nodes. The bamboo workers divide their working by analysing the demand

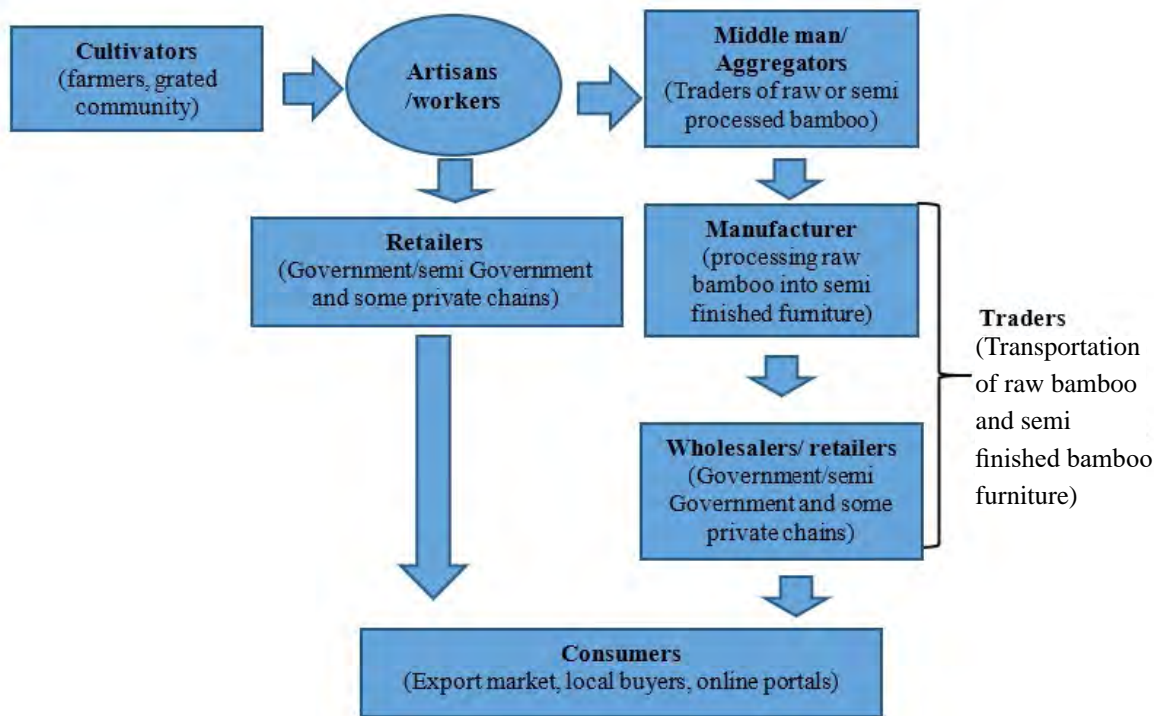
in agriculture and furniture sector as shown in fig. 4 and plan their working accordingly.

Harvesting is manual process, which nearly take 8-10 days for harvesting one tonne bamboo. An average of 6 million tonne bamboo is harvested for commercial use which means 60 million harvesting days are been occupied for commercial harvesting (Chikkaranga, 2011). The cultivated bamboo is supplied to the middleman or bamboo collector for sorting as per the grades .The small sample is used for the aggregate grade check of the hundreds of sample. After grading, the bamboo supplied to the local traders for basic processing. The local traders supply this variable quality bamboo to manufacturer on 400% more price than what is been paid to the cultivator. The bamboo, which received is generally of raw and semi clean state, which needs chemical treatment .This process lead to 50% of the wastage till it is finally been traded to the wholesaler from whom individual government and private furniture retailers procure it as per their demand.

Activity	January	February	March	April	May	June	July	August	September	October	November	December
Engagement in Bamboo furniture	High					Low			High	Low		
Engagement in Agriculture	Limited					High			Low	High		

[Source: Foundation of MSME Clusters (FMC), 2019]

**Fig 4.** Seasonality working Chart of bamboo workers



**Fig 5.** Bamboo Supply Chain

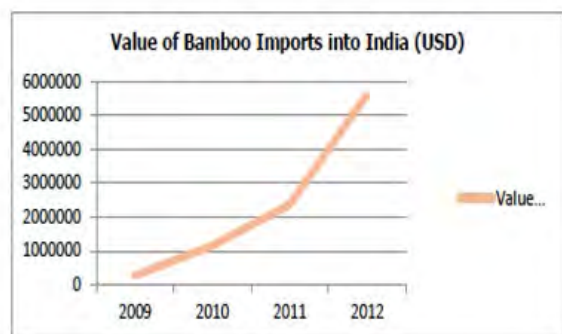
The supply chain of any product is dependent on the distributors and retailers who channelize the product to the customers. Due to large number of intermediaries, the supply chain in India, is much more fragmented and makes the extent of commercial furniture industry low. Industries willing to use bamboo for their industrial consumption face ineffective cost because of large chain of intermediates shown in fig. 5 this lead to increase in prices and decrease in demand. The ineffective demand affects the share of worker and artisans, which obstruct them from getting involved in the production of bamboo furniture.

#### **The Value Chain of Bamboo Furniture in Furniture Industry**

Value chain is an important factor to analyse flow of product and these are dependent on the relationship between each milestone level. In the value chain process, the nodes at each level cordially aimed to share the investments, risk, resources and gains. India produces extensive quality of bamboo product every year although the data is inadequate and scant as until recently,

bamboo was classified under the wood product in GLOBAL TRADE STATISTICS. Analysing the import data available from INBAAR on individual countries trade value we can see that there is rapid increase of bamboo imports in India shown in fig. 6, which depicts gaps in bamboo harvesting, its procurement and limitation in the supply.

Bamboo furniture in India is labour intensive, with lack of skilled labour to meet the demand. The local bamboo markets are underdeveloped and charge a huge freight cost from production hubs to the market place and plays a contributing factor, in affecting the value chain. Indian consumer's have lack of knowledge and awareness in term of bamboo tensile strength and comes with the perception that bamboo furniture is less strong and durable than timber, which is leading to inclination towards the commercial wood furniture. The lack of awareness amongst the consumers and end-users lead to low demand. Due to this reason, most of the premium retail brands does not stock or display bamboo



[Source: Inbar COMTRADE data (Baksy, 2013)]

**Fig 6.** Bamboo Import Analysis

furniture. Low market popularity brings less flowing buyers and makes the bamboo manufacturer to sell their product on online portals. Due to lack of branding value and inefficient internet friendly user's bamboo furniture is been ignored. Many segments needed to introduce to build a direct link with manufacturer and consumers. New facility centres, removal of aggregator and international promotional fairs will induce the participation of more foreign customers and industries, which can lead to a well-defined model for bamboo product trading. The bamboo industry has many unfilled gaps in the value chain affect the development of bamboo furniture industry and its economic growth in Indian furniture market.

### Environmental Aspects on Promoting Bamboo Furniture Industry

In the recent times many environmental problems have been experienced globally which indicates that the current patterns of development is not sustainable (Akwada *et al.*, 2016). To access the environmental aspects Life Cycle Analysis (LCA) method is used. This is a leading tool for assessing the impact that product and services have on the environment. There are very few LCA based studies on bamboo materials in India. Instead of the LCA impact categories, this review will be focusing on the following environmental aspects of bamboo-based furniture material.

### Sustainability

The United Nation Brundland commission states that sustainability means, "Meeting the needs of the present without comprising the ability of

the future generation to meet the future needs". Bamboo is one material that totally fits to the definition of sustainability given by Brundland commission. Bamboo has shown a positive impact on environment than any other furniture material.

Sustainability in harvesting is achieved by cutting 20% of the mature stem, which soon can be replaced by the young shoots (Minae, 1989). Indian harvesting is done in four phase and unlike timber, bamboo can be harvested every 2-3 years after initial planting and after that it can be harvested yearly as the roots are unharmed. Bamboo is also suitable for afforestation as it has a very fast growth rate (Mohamed, 2003), so it can also be planted for soil conservation, reforestation and can be interplant with other crops (National Bamboo Mission, 2011).

### Land Restoration and Biodiversity

Bamboo is the fastest growing natural resources with unsurpassed rate of biomass generation. On the ecological front bamboo absorbs more water than any plant, thereby help in maintaining soil stability. The strong roots system makes bamboo appropriate for degraded landscape. As per (Inbar, 2019) single bamboo plant can bind 6m cube of soil, by encouraging bamboo cultivation on waste land and river banks helps in reducing soil erosions and deforestation. Bamboo cultivation mitigates the fertility of available soil and improves the quality of surrounding environment. It also provide shelter and dwelling habitat to lots of primates.

Bamboo is non-wood forest product and a viable substitute for wood. Switching to the bamboo as a substitute to the wood helps in saving rainforests and shall give 30% increase in biomass resources in comparison to tree which provide 2 to 5%. As bamboo can be harvested after 2-3 years than other soft wood which takes 10-20 years, using bamboo can offer a better substitute for Land and biodiversity conservation.

### Carbon Sequestration

Bamboo plantation plays a major role in "Carbon Trading" method which is also known

as “Cap and Trade”. This is a method developed to reduce the carbon emission, which leads to global warming. As per Environmental Bamboo Foundation (2001), bamboo growth habits allow high rate of production of oxygen than equivalent stand of trees. Bamboo growth holds significant implication for reduction of atmospheric carbon dioxide. It release 35% more oxygen than any other plant (Akwada *et al.*, 2016). The carbon storage and sequestration rate of bamboo is 30-120 mg per hectare and 6-13 mg per hectare per year respectively (Manandhar, 2019). With the immense storage properties, it does not release the carbon content stored in it even after it is being used in making furniture and other by-products till its end life. Although bamboo lasts only for 3-4 years in its natural form, chemical processing bamboo to protect it from climatic effects and invasion of wood eating insects can make the bamboo last for 20-30 years. Increase in bamboo production and more utilization in furniture based products there will be increase carbon sequestration as bamboo is a sink for carbon than source (Seethalakshmi *et al.*, 2009).

### **Social Aspects of Bamboo Furniture Industry**

Bamboo always been considered as part of rural livelihood and “poor man timber” because of its readily availability and affordability. The promotion of bamboo and bamboo-based industries is not only helping in removing poverty in India but also increasing the social life standard of the peoples, by giving them more working opportunities.

### **Income Generation Opportunity**

Bamboo is considered as natural vehicle for the development of rural sector because of their adequate access and availability. It is mostly found in poor tribal area and known as “poor man crop”. Due to lack in knowledge regarding the concepts of value addition products production and development the industry is not widely accepted in India. Bamboo furniture industry is highly labour oriented and can create huge jobs opportunities. It is estimated that bamboo has potential to generate 600 million jobs annually.

Developing bamboo furniture industry locally can skill the local people and can support them in income generations. As Indian village workforce is traditionally male dominated, Bamboo industry provide the opportunity to set up small-scale household businesses which can generate the employment opportunity for women also.

### **Skill Development**

Bamboo processing is a technical activity, which requires technical proficiency. While Indian artisans are naturally trained, their skills are insufficient to allow them to cope with the industrial requirement. Establishing semi-automated learning facility centres in local bamboo area will encourage the rural community to learn new furniture technologies and get them aware of the new market trends. Training and educating the local bamboo workers will boost the productivity and will give better foreign exchange opportunities in the form of capital and machinery. Focused programme on bamboo production and uses will indulge cultivators for more bamboo production and will give them better adaptability towards processing and harvesting techniques (Manandhar, 2019).

### **Shifting of Industries to Rural Sector**

Insufficient contact between bamboo workers and manufacturer lead to underdevelopment in bamboo sector. Market mechanism and industrialization in bamboo sector will indulge the interest of many furniture industries to shift to the rural sector. Developing bamboo processing and manufacturing unit locally will establish better linkage between small domestic units and large industrial production hubs. This will give better potential development to the industry.

Shifting of bamboo furniture industry to rural sector will eliminate the burden of extra transportation cost on traders which add on to the cost of product leading to overall increase in the cost of finished bamboo products. This will help to keep the cost of finished products lower and give more profit to both manufacturer and artisans.

### **Disaster Resilience and Economical Material**

Bamboo had shown a positive impact on areas affected by natural disasters, in these areas bamboo came up as an rapid and economical constructional materials (Manandhar, 2019). Bamboo is a locally available timber substitute found in almost all parts of India. Due to easy availability, it is very much economical for poor and rural class to satisfy their needs of essentials in form of tables, chairs, beds, school furniture etc.

The study has shown that there is no property difference in bamboo panels and wood bamboo composite, bamboo can be used as furniture material as substitute of wood in disaster prone area. Popularity received by bamboo in different countries like Indonesia as an earth quake resistant building material is been diminished because of devastation cause by the fire. Study done on the Bahareque system of Colombia showed by combining with material like cement for plaster and improvising design, it is effective earth quake resistant materials and also added in Colombian Code of Earthquake Resistant construction (Seba, 2001). Many countries have considered Bamboo as an reliable resource for poor and disaster prone areas but in India the tensile strength and Durability of bamboo and its furniture is facing lags and not been firmly accepted.

### **Economical Aspects of Bamboo**

The economics assessment has pointed to many unexplored benefits about bamboo industries. In India Bamboo industries and furniture sector provides lots of income generation and employment to the rural sector. Around 8.6 million people are dependent on bamboo industries but this resource based industry remain underutilized as it has potential of generating 516 million man days of work every year. Although bamboo is a locally available material but the biggest hurdle in the expansion of the bamboo market domestically and globally is the lack of designs and fewer designers, architects showing interest, leading to less option for customers. Activities related to bamboo and its products can create 8.6

million new jobs as estimated in Tenth plan with an investment of 2600 crore. This can enable about 5 million families of bamboo artisans and workers to cross the poverty line (National Bamboo Mission, 2011).

Study has shown that the community development projects by the industries and legislative government policy can improvise the stability in bamboo industry. Economic development is a most important pre-cursor for social and economic development (Jamatia, 2014). Commercializing of bamboo trade can promoted by international market and domestic market linkage and with various displays and awareness platforms. Various national and international events increase visibility among the foreign client and can create wide spread dominance on the foreign market.

### **Role of Furniture Hubs (IKEA) in promotion of Bamboo furniture in India and Asia**

As per the World Bank organised furniture industry of India is expected to show growth of 20% and projected to cross more \$32 billion 2020 and the luxury furniture market is expected to garner \$27.01 billion. The increasing organized retail establishments in the country along with the surging demand for branded products and rising income levels has led to many brands foraying into the furniture market (Goel *et al.*, 2018). As a result, more number of companies in the furniture space such as IKEA one major giant in the furniture sector globally making inroads into the India furniture market. It is the world's largest furniture retailer with more than 301 stores and 30 franchised units. In China and Russia they are working on synthetic material, while in India they are looking to expand in bamboo and natural fibre such as waste grass.

IKEA is looking to source bamboo and other sustainable indigenous wood species from the India for its global operations, has recently collaborated with a bamboo grower in Bangalore, and is looking at roping in at least a dozen suppliers from primarily North-Eastern states. The firm is in talks with a few state governments to incentivise bamboo cultivation

and supply. It has already identified dozen odd suppliers for bamboo from States such as Arunachal Pradesh, Assam, Madhya Pradesh and Karnataka. Currently, most of its bamboo wood requirements being met from China, Vietnam and Indonesia. Furniture products made out bamboo currently account for less than one percent of IKEA's global sale. Whereas, it will be generating employment for more than 3,000 workers in the supply chain (farmers, aggregators, factory workers, artisans, logistics, Modern Woodwork).

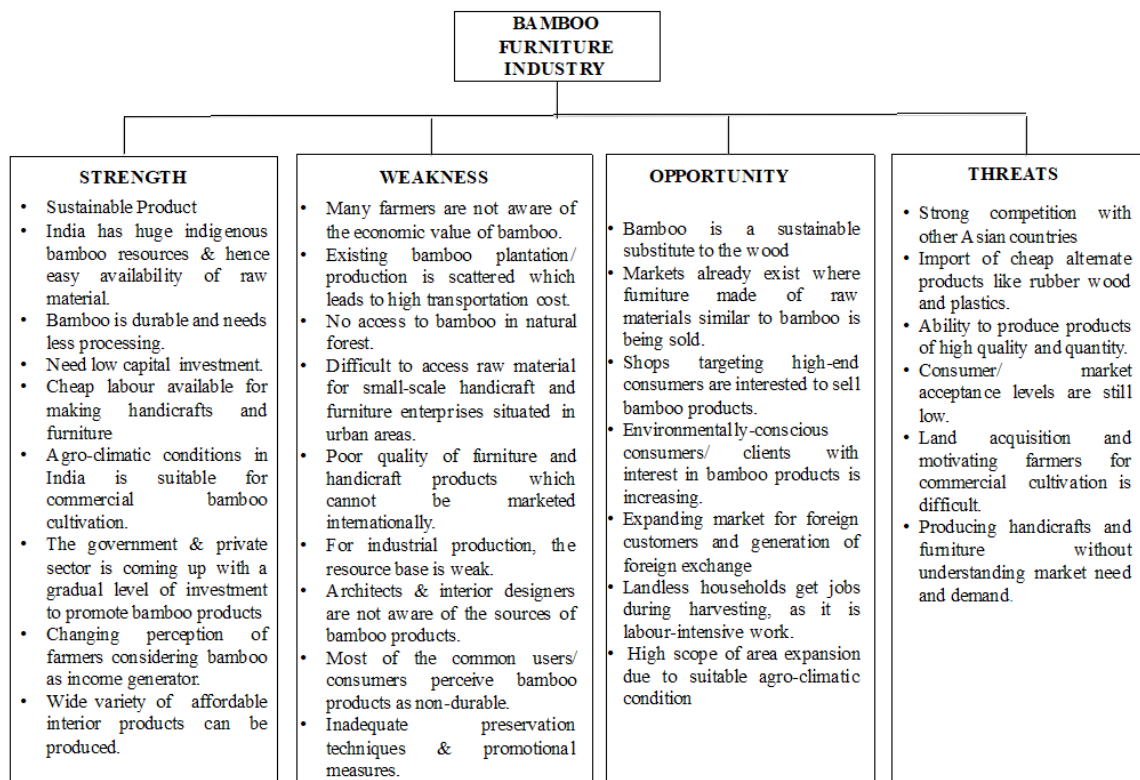
### Strength, Weakness, Opportunity and Threats analysis of Bamboo Furniture Industry

There is no such thing as perfect resources. Each resource including bamboo, has its own specific strengths, weaknesses, opportunities and risks whose analysis help in proper planning so that the required objectives may be achieved.

Analysing the strength of bamboo furniture industry, it is one of the low capital investment industry, producing more durable products

with less processing cost. Many private and government sector are also actively coming to promote this industry which turning up the Bamboo industry a income generator. A product or industry uses its strength to take advantages and opportunity to rise. With the increasing number of environmentally conscious customers in India, bamboo furniture has a huge market potential in India. Bamboo furniture also has a ready market in foreign countries which may be tapped to generate foreign exchange.

The bamboo furniture industry have some weakness and threats as well which need a proper planned strategies to overcome .The workers involve to bamboo furniture industry are not aware of its economic value. There are inadequate promotional and preservation measures, which leads to the production of poor quality of handicrafts and furniture. Bamboo industry also has a weak resource base, which make industrial production difficult. Additionally, cheap timber alternatives like plastic and rubber wood is gaining customer acceptance very fast. The grass root artisans are often not well trained and



in the absence of any design interventions, they produce furniture, which are not in-line with end user expectation.

## Conclusion

The study analysed that India has one of the most extensive bamboo resource in the world, but the resource is not being well tapped. Hence, the bamboo furniture industry is currently unable to expand at the expected rate. Studying the current bamboo furniture market, it is observed that there are various challenges at each node of the value chain.

The Indian government had recently promulgated an ordinance removing bamboo from the definition of tree. The Lok Sabha passed the Indian Forest (Amendment) Bill, 2017 that would bring bamboo outside the definition of tree. This would not only help increasing the income of farmers, but will also generate employment in big number in remote and tribal areas.

The bamboo furniture industry needs a lot of impactful changes in the social awareness amongst the end-users regarding its stability, flexibility and strength as the general conception associated with bamboo furniture are “cheap”, “non-durable” and “out dated”. It also needs better-specialised agencies for bamboo processing in order to protect bamboo furniture from fungi and insect’s invasion.

Promoting the local use of bamboo could be an entry point for commercialisation/ promotion of the bamboo furniture industry. Until, and unless, there is a strong resource base, its promotion will not be possible. To develop a resource base, there should be a high level of participation from local communities, especially farmers, harvesters, local artisans, retailers.

In spite of having immense market potential in India, the bamboo furniture industry is facing various critical issues that need to be addressed by the policy makers. The government can step-in by promoting commercial plantation of bamboo through collaboration with MOEF and financial institution like NABARD (Baksy, 2013). Promoting the use of bamboo furniture in public

sector or by making the policy like mandatory use of 25% of bamboo furniture as imposed in Philippines can create awareness domestically among the people and can stimulate demand.

Designing a national level curriculum in bamboo application, engineering and design; organising workshops; encouraging, inviting and funding local craftsmen in research projects of bamboo shall stimulate interest in the minds of students regarding bamboo. Regular survey of the grass root artisans, bamboo cultivators and traders is needed to evaluate their needs, difficulties and usage patterns so that suitable facilitating policies or programmes may be rolled out. These are some of the major amendments needed for better commercialization of bamboo furniture. Many research institutes in India have been dedicatedly working on bamboo furniture research and recommendation measure, but lab to land transfer is still low.

Establishing online portals for bamboo furniture sale like Feelbambu.com etc and promoting bamboo furniture’s through e-commerce portals through advertisements nationally and internationally can also be helpful to develop a direct contact between the buyer and the manufacturer.

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