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A Study on the Significance of Bamboo with Respect to the Development of Assam

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Abstract

Bamboo, recognized as a green gold, finds its uses from poor man's timber to rich men's luxury. It is a fast growing, wide spread, renewable, versatile, low cost natural resource in the earth. Bamboo with its multiple utility has immense potential in the sustainable development of any country with raising the level of employment and income opportunities of that place. Around 1500 species of bamboo are found in the world, China with 500 species enjoys the highest advantage whereby 138 species belonging to 24 genera are reportedly found In India. Northeastern states cover around 81 species of bamboo and among all; Assam is bestowed with 45 species. Assam with 8,955 sq. km of bamboo bearing area carries huge potential in the economic upliftment and sustainable development of the natives through the cultivation, processing and marketing of bamboo. Bamboo is a raw material of great versatility and forms an integral part of the lifestyle and economy of Assam. It is mainly used in handicrafts, building and constructions, food items, furniture, pulp and paper in Assam. Besides having great potential still the region lags in tapping the benefits out of it. Lack of knowledge, Financial and technological constraint, poor management, unfavourable forest policies etc. put significant barriers to the development of bamboo as a precursor to the economic and livelihood security of the people in Assam. This paper mainly tries to explore the various business possibilities of Bamboo in Assam along with the challenges and initiatives taken to revive it.

Keywords: 1.Bamboo, 2.Benefits, 3.Sustainable development, 4.Assam.

Introduction

In today's era, we are confronted with many new challenges like how to manage increasing human population with an equally matching demand for energy and natural resources, in such a way that does not negatively impact our future generations. Aggressively growing population pressure on our limited resources has resulted in resource crunch. In such a scenario, shifting our interest from conventional natural resources to an unconventional one of having the same potential for fulfilling the common man's needs seems to be of urgent need. In pursuance to this, bamboos possess an immense significance while providing us with a green and environment friendly resource requirement. With the ever growing economies and the need and greed for more, the doctrine of Sustainable Development is the buzzword of today's era. Bamboo has become one of such greatest contributor of Sustainable development.

Bamboo is a term for the members of a particular taxonomic group of large woody grasses that have a lignifying,

perennial and branched stem (subfamily Bambusoideae, family Andropogoneae/Poaceae), mostly grown in tropical and subtropical regions.¹⁰ It is strong, hard, and flexible renewable resource. Bamboo grows very fast that majority reaches a height of 30 meters or more and within 3 to 5 years we can get a matured harvest of bamboo.¹⁰ It has the capacity to capture carbon i.e it acts as carbon sink and reclaims land. It protects steep slopes, soils and water ways, prevents soil erosion and land degradation. With around 1500 documented uses, bamboo is popularly known as “Green gold of the forest”, which possesses tremendous potential for economic and environmental development along with international trade.²⁶ The International Network for Bamboo and Rattan reported that in 1994, bamboo generated substantial export income for the Philippines by USD 241 million.¹⁴ Further, it stressed that the resource is becoming increasingly important for developing countries because of the employment it generates for the marginalized groups. In addition to that, it has also contributed a lot to the wellbeing of the poor, deprived and underprivileged women in many instances. In this context, a report conducted on bamboo and its potential for employment generation mentions that, bamboo generated 432 million workdays annually employing nearly 10 million people in India in 2011, where women constituted majority in some craft industries.⁶

Bamboo encompasses 1250 species within 75 genera in the world and among which 24 genera with 138 species are particularly found in India.¹⁵ India stands as the second richest country in bamboo genetic resources after China. Surprisingly Northeast India solely stores 50% of India's bamboo reserves.¹³ Northeastern states cover around 81 species of bamboo and among all; Assam is bestowed with 45 species.^{6,12} Assam with 8,955 sq. km of bamboo bearing area carries huge potential in the economic upliftment of the natives through the cultivation, processing and marketing of bamboo and bamboo based products.¹³ With its diverse uses bamboo can make the development in true and sustainable manner. Recognizing this, an attempt is made here with an objective of analyzing the significance of utilizing bamboo and bamboo based products with respect to the development of Assam in a holistic way.

The study is entirely based on secondary data. Various books, journals, articles and reports are studied and reviewed to make a comprehensive study that fulfills the objectives effectively.

Usage and significance of bamboo in Assam:

Some of the important species of bamboo of economic value found here in Assam are like Bhaluka Bamboo (*Bambusa balcooa*), jati bamboo (*Bambusa tulda*), Muli (*Melocannabambusoides*), Dalu (*Teinostachyum dalloa*), Khang (*Dendrocalmus longispatus*), Keligoda (*Oxytenanthera nigrociliata*) and Pecha (*Dendrocalamus Hamiltonii*).¹⁰ In Assam, bamboo is cultivated in homesteads, village gardens, agricultural lands and field boundaries. Green gold of the forest finds its utility starting from construction of houses to crafts. The uses of bamboo can be widely discussed as below:-

Usage :

a. Construction

Bamboo is an indispensable material for construction besides its traditional application. Major uses of bamboo in construction include Scaffolding, Reinforcement, Roofing, Walling and Doors. Utilization of bamboo for the purpose of scaffolding is really high in India. Of the 13.47 million tons of bamboo, 3.4 million tones are being used for scaffolding alone all over India.³ Bamboo mat composites can be used for making panel and flush doors in combinations with timbers. Bamboo grids are also used for constructing rods. Bamboo mats known as Dhari, Dhara, Jharia or Darma in Assam have been extensively used in making temporary walls and sheds, big pandals, roofing of country boats, dwelling houses etc.²² Dhari is also used for mass prayer in villages by which we can say that bamboo forms an integral part of our religion and rich cultural heritage too. A study undertaken by a group of scientists has shown that bamboo elasticity and tensile strength is as same as steel, hence it is a valuable alternative of steel in construction material.¹⁰ In parts of India, bamboo is

used for drying clothes indoors and outdoors.¹¹

Bamboo is an environment-friendly, energy-efficient and cost-effective construction material. Bamboo can replace steel very effectively since tensile strength of bamboo is 28,000 pounds per square inch against 23,000 pounds per square inch for steel.³ Bamboo can very well relieve the growing pressure on forest resources like wood. Bamboo is the fastest growing plant that it can be harvested after 3-5 years against 10-20 years for most softwoods and hard woods.²³ It is not only inexpensive but also environmentally sustainable way to make construction works. Bamboo stands releases 35% more oxygen than equivalent stands of trees, also lowers light intensity and protects against ultraviolet rays and can tolerate extreme of precipitation, from 30-250 inches of annual rainfall.¹

b. Textile and Paper:

Since bamboo fibers are very short (less than 3mm), they are impossible to transform into yarn naturally. Textiles labeled as being made of bamboo is nothing but the rayon, which is being made out of the fibers with heavy employment of chemicals.¹⁸ Bamboo textiles are cloth, yarn, made out of bamboo fibers. The relatively long and wide fibers of bamboo make it a very acceptable material for paper and rayon making. The general consumption pattern of Bamboo in India indicates that 30% of bamboo is being consumed by pulp and paper industries.²⁵ The only two paper mills which used to produce 100% bamboo based paper in India under M/S Hindustan Paper Corporation Limited. They are Nagaon Paper Mill, Jagioad (Assam and Pachgram paper Mill, Cachar (Assam).¹⁹ Presently 1.4 million tonnes bamboo per annum is used by 10-15 paper Mills in India.¹⁵

The advantages of bamboo fabricare- it's very soft feel (chemically manufactured), or ramie-like feel (mechanically manufactured), its anti-microbial properties, its moisture-wicking capabilities and its anti-static nature. Bamboo textiles contain an agent, namely "bamboo kunh", which prevents bacteria from cultivating.¹¹ Bamboo made clothes require less water, chemical spraying and thus they are biodegradable, UV protective, soft, silky and luxurious, durable and economically viable etc. The quality of paper made out of bamboo is as same as that made from wood. Its brightness and optical properties remain stable, while those papers made from wood may deteriorate over the time.

c. Crafts:

Bamboo is used to make a number of craft and domestic items, such as furniture, mats, baskets, tools and tool handles, hats, traditional toys, musical instruments, trays, bottles, jars, boxes, cases, bowls, fans, screens, curtains, cushions, lampshades, lanterns and toothpicks.²⁶ Some of the bamboo products of Assam are like-Chaloni (sieve), Kula (winnowing fan), Khorahi (small basket), Dukula/Tukuri (Big basket), Dala (bamboo tray), Duli (Assamese) / Tali (Bengali), Big Basket, Doon (measure), again fishing implements like polo, Jakai, Khalai, Dori, Chepa, Paran, Jhuti, Hogra are also made up of bamboo.^{12,21} Bamboo has lots of cultural significance in Assam and different varieties of Japi (hats) made out of bamboo bears the testimony of Assamese culture. Many varieties of „Japis“ such as „haluajapi“, „pithajapi“, „sorudoiyajapi“, „bordoijajapi“, „cap japi“, etc. are produced in the districts of Kamrup, Nowgong, Darrang, Sibsagar and Lakhimpur.(kahikuci).²² This provides employment to rural masses in those areas. Bamboos are also used as a raw material in manufacturing of agarbatti, kite and in different industries like -cracker industry, ice-cream industry, and match industries.^{22,25}

Bamboo is also used for different kinds of furniture. It is used for producing beds, cupboard, table, upholstery chairs. When bamboo is laminated and used to produce furniture, it is difficult to differentiate it from wood. Some of the local furniture made of bamboo in Assam are-Murha, Garden Chair, Dinning Chair.¹²

Many musical instruments are also made of bamboo in Assam like- Dhol, Khol, Bahi, Gogona, Toka (Bamboo

Slapstick) etc. Bamboo's natural hollow form makes it an obvious choice for many instruments.¹²

d. Fuel

Bamboo is also used as a renewable source of energy. Bamboo gas can be used as a substitute for petroleum.²³ it can produce both wood fuel and charcoal for cooking and heating, and can be also used to generate electricity using biomass gasification technology, which takes pressure off other forest resources.¹⁴The relatively high cellulose and low lignin content of bamboo makes it suitable for bioethanol production, and it has the potential to generate 143 Liter of ethanol per dry ton of bamboo process waste.^{23,24} Activated charcoal made from bamboo is used as a deodorant, purifier, disinfectant, medicine, agricultural chemical, absorbent of pollution and excessive moisture.²⁰ These can also be used for thermal applications replacing furnace and diesel oil. Goldsmiths prefers to use bamboo charcoal in makingjewels.

Bamboo fuel can be a good alternative to fossil fuel since it is of renewable characteristics. Using fuel from bamboo biomass can save a lot of money spent on fossil fuel by a nation. If 5% ethanol is blended with one litre of petrol, it saves rupees 15 per litre. The annual requirement for 5% blending with petrol across the country is 100 crorelitre of ethanol, resulting rupees 1500 crore savings every year.⁸In 1983Molini and Irizarry (1983) proposed the use of bamboo as a fuel for power generation in Puerto Rico in preference to sugar cane, since its lower moisture content at harvest obviates the need for dryin.¹⁹ Flowered bamboos and wastes from paper mill are suitable for manufacture of activated carbon giving minimum fifteen times value addition depending on cost of transportation of raw material.¹⁸

Again, Bamboo offers a number of desirable fuel characteristic such as low ash content and alkali index. The Main environmental benefit of bamboo biomass over fossil fuel is sustainability low level of CO₂ emission.⁴ Bamboo biomass is a renewable source which signifies that it can re-generate in a sustainable rate for extraction. Bamboo charcoal is a good air purifier as it has the property of absorbing odor, moisture and harmful gases. Activated charcoal is also used in waste water treatment.¹¹ Thus, energy from bamboo biomass leads to lower level of pollution which helps to build a healthy environment thereby building a healthyworld.²³

e. Culinary:

The shoots (new culms that come out of the ground of bamboo are edible. Bamboo shoots are now processed into many kinds of food, including fresh shoots, dry shoots, and canned shoots, and are sold around the world, and some new products, such as bamboo candy, bamboo chutney, bamboo canned juice and bamboo beer are also readily available.²⁰ These bamboo shoots are young, new canes that are harvested for food before they are two weeks old or one-foot tall.¹⁰ The bamboo shoot in its fermented state forms an important ingredient in cuisines across the Himalayas. In Assam, India, for example, it is called khorisa.²² Pickled bamboo, used as a condiment is also be made from the pith of the young shoots. Bamboo juice, bamboo tea and Bamboo beer are some of the beverages made by processing bamboo leaves.¹¹

Because of the low fat content and high potassium, carbohydrate, dietary fibres, Vitamins and active materials, bamboo shoots are consumed in various forms in raw, canned, boiled, marinated, fermented, frozen, liquid and medicinal forms.⁶ Therefore, there exists a great hidden opportunity, especially for the organized food processing sectors to take up the processing of bamboo shoot-based food products in commercial manner. Bamboo can also address the food security issue through bamboo-based agro- forestry systems which helps in maintaining the fertility of adjoining agricultural lands, and by acting as a direct food source like edible bamboo shoots.⁶ Bamboo shoots hold the prospect of value added economic activities at industrial and society levels through cultivation, processing, packaging and commercialization. There exists a great market opportunity for food based industries to process bamboo in an organizedmanner.⁵

Bamboo shoots have many medicinal benefits from preventing cardiovascular diseases, cancer and weight loss to improve digestion. Due to high potassium content in shoots, bamboo is considered as heart protective vegetable. Thus, bamboo shoots help in nutrition and health security also.

Significance

Bamboo finds immense utility right from the production of construction material to textile and paper to craft making work to green fuel and also as a medicinal plant. All these have ensured both economic and livelihood security of the nation. Value addition will begin at community level with activities like- cultivation, harvesting, processing, and transportation. Livelihood opportunities will exist in cultivation for home use, local sales or supply to industrial processors. The Backward integration of bamboo into production will require significant labour input, with improved opportunities for women in view of ease of handling traditional skill requirements and greater time flexibility. Moreover, use of bamboo leads to a greener environment. Cultivation of bamboo helps in dealing with the problems like- soil erosion, land degradation, discontinuation of deforestation. It is adaptable to most climatic conditions and soil types, acting as an effective carbon sink and helping to counter greenhouse effect. Considering this ,the Indian Forest (Amendment) Act 2017 has replaced bamboo grown in non-forest areas from the category of "Tree".²⁷

A case study made in Kahikuchi cluster, in Kamrup district of Assam, it is revealed that bamboo and bamboo based products are highly demanded at the local market and other regions too. It not only leads to the creation of self-employment, but there exists immense scope for new diversified products which opens up ample of business opportunities for the artisans.⁷ Bamboo has benefitted rural illiterate women of the region very well which gives a gender phase to the utility of the bamboo and its products. A study conducted on the profitability and vulnerability of bamboo on artisans of Barpeta cluster of Assam, it is found out that bamboo craft making has benefitted 1382 artisans of this cluster, wherein 40% of them are women.¹⁶ Nagaon paper mill and Cachar paper mill both used to consume bamboo to a large extent which were supplied from Assam and other north-eastern states. The number of regular employees were around 1,500 but starting from bamboo cutting to production, the livelihood of two lakh people used to be linked to the two units.¹⁹ Again, emphasizing the benefits of bamboo biofuel, Numaligarh refinery limited of Assam has made an agreement with Chempolis of Finland to implement 950 crore bio refinery project. The project is designed to produce 49000 tonnes of bioethanol annually with co-production of furfural & acetic acid using „formicobio“ technology of chempolisoy for the first time in the country in commercial scale. Plant will use bamboo, which grows abundantly in the region, as its feedstock to produce the fuel grade bioethanol.⁹ Arunachal Pradesh government has signed a memorandum of understanding (MOU) with NRL for sourcing 3 lakh tonnes of bamboo per year from the frontier state.⁹ This will tremendously help in employment generation, Income generation, asset creation and finally to a socially, economically sustainable environment in the both the states of Assam and Arunachal Pradesh. There is an enormous untapped scope of Bamboo based industries in Assam in particular and India in general. Many bamboo based industries from this region are making their presence in international market, e.g. Rhino bamboo industry from Guwahati constantly exports goods to several countries like USA, Brazil, Australia, Europe, etc.²⁶ In pursuance to this, opening up of Mega Food Park in Tihu, Nalbari and an Industrial Growth Centre in Chaygaon will make an immense contribution.²⁶ Moreover under Assam Bamboo and Cane Policy 2019 ,a provision of a grant of up to Rs 5 lakh to the startups in bamboo & cane sector has also been introduced for bringing innovative ideas.²⁷

Again, bamboo in Assam also has social significance since it finds a place in ritual and recreation, in culture and ceremony.¹³ Bambooforamsan integralpart ofculturalheritage ofAssam.InAssam, bamboo plantation can be used to control river bank erosion, to arrest soil degradation, and to stabilize embankments.²² considering all these, center"s flagship programme like restructured National Bamboo Mission has been aimed at giving huge thrust towards its cultivation along with value addition.²¹

Problems so far:

In 2011, the Forest Service of India reported a total cover of bamboo forests in India of nearly 14 million Hectares, which is more than double the 6.7 million Hectares of bamboo reported by the State Forestry Administration of China in 2013. Yet, despite the fact that there is such a large amount of bamboo available in India, the potential size of bamboo industry of India in 2015 is estimated as USD

4.35 billion in a recent report by Aniket Baksy.¹ In Assam also, there arises the problem of demand and supply Gap with respect to quality bamboo availability. The main reasons for this kind of situation can be explained as follows-

1. Lack of awareness with regard to the benefits and potential of bamboo among policymakers, artisans and farmers etc..
2. Lack of funds released for the development and growth of bamboo plant. In 2014-15, funds released under National Agro- Forestry & Bamboo Mission for Assam were Rupees 296.64 lakh as against allocation of Rupees 1065.23lakh.
3. Weaknesses of global bamboo market. Lack of IT enabled marketintelligence.
4. Lack of training of the artisans, poor standardization,etc.

Suggestions

Since, bamboo constitutes an integral part in day to day life of the people in Assam, a greater consensus is required for the growth and development of bamboo so as to achieve livelihood security along with environment sustainability. Some of the suggestions to explore the potential of bamboo in Assam as follows-

1. It is very important to bring the knowledge of benefits of bamboo in the attention of the broadest possible audience like policymakers and artisansetc.
2. Resource mobilization necessary to deliver the benefits to the poorest members of the society.
3. Efforts to be made for sustained supply of quality bamboo. Encouragement should be provided to make bamboo plantation on private basis, which requires removal of variousrestrictions.
4. Government may also consider Bamboo Plantation to be a part of various plantation drives carried out in both community and individual basis under Flagship Schemes like Mahatma Gandhi NREGSchemes.
5. Utilization of modern techniques to the development of new and diversifiesproducts.
6. Research and development activities with regards to bambooplantation.

Conclusion:

With its diverse use bamboo can be an important vehicle for sustainable and widespread development, augmenting economic opportunity, income and employment in Assam. Like bamboo craft making does not require high skills and knowledge so can be easily undertaken by poor illiterate people. This makes bamboo a potent weapon for frontal attack on poverty. Employment and income generation takes place in every stage of cultivation, harvesting, processing and transportation of bamboo plantation. Despite the fact that bamboo finds its importance in everyday life of people, there remains a huge demand and supply gap which makes bamboo as an untapped resource of Assam. To explore its potential to the fullest extent, what is required is a coordinated program of interventions by Government, industry and community.

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