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Utilisation and conservation of bamboo: a natural resource of Jharkhand

Suniti Choudhary^a, Smriti Mishra^b, Harshit Lakra^c & Ritu Agrawal^d

^aDept. of Botany, Yogoda Satsangh Mahavidhyalaya, Ranchi

^bBirla Institute of Technology, Mesra, Ranchi

^cIndian Institute of Technology, Roorkee

^dBirla Institute of Technology, Mesra, Ranchi

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Abstract : Bamboo has been documented with over 1500 different uses world over. It is identified as an important and a sustainable resource by communities across the world. The paper therefore aims to identify the potential of bamboo as a natural resource; to provide a preliminary overview of the status of bamboo as a resource in India and in Jharkhand; to identify its sought contribution towards socio-economic development of the country and the region. The paper also looks at efforts necessary to maintain a regular supply of this natural resource, which can be derived from a set of clear objectives; mechanisms for action; and commitment from all stakeholders.

Key Words: Bamboo, Natural Resource, Renewable, Local.

INTRODUCTION

The *bamboo flora*, like the *biodiversity* generally, was considered a low priority issue. But today as a most important *non-timber forest produce* of India, it has gained greater popularity because of the increasing awareness of its importance in socio-economic development. Taking a closer look at bamboo, one finds that it meets the basic criteria for continuous use since it is: *Local, Plentiful, Renewable, and Waste-reducing*.

It is the process of establishing the production system appropriate to our culture and time that is most important to think through now and also to consider future efforts for conservation and management of bamboo natural resources.

*Correspondent author :

Phone : 09905717158

E-mail : sunitichoudhary.8@gmail.com

Therefore, this paper primarily aims to identify the potential of bamboo as a natural resource, to provide a preliminary overview of the status of bamboo as a resource in India, to identify its sought contribution towards socio-economic development of the country and also to look at efforts necessary to maintain a regular supply of this natural resource. This must be derived from a set of clear objectives, mechanisms for action, and commitment from all stakeholders.

2. The Multipurpose Bamboo and its various facets

World over bamboo exists naturally on every continent except Antarctica. It has found a niche for itself in sea-level tropics and on 13,000 ft mountain slopes. It is a cheap, abundant resource that is recyclable and can outgrow any other plant. A 60-foot tree cut for the market takes 60 years to replace, whereas a 60-foot bamboo takes just 59 days to replace.

2.1 Bamboo and the Environment: Protecting Earth's Health and Wealth

Call it green gold or nature's band-aid, bamboo is a great protector of the earth's health and wealth. Bamboo can tolerate diverse soil moisture regimes, can heal degraded land, stop soil erosion and help in drought-proofing. The Bamboo foliage acts as a shelter for the top soil against tropical downpours and cloudbursts, while the leaf litter helps in moisture conservation by forming a soft cushion on the soil. Bamboo has an extensive underground root-and-rhizome system that effectively binds the top one foot of soil, critical for soil health. A single bamboo plant can bind up to six cubic metres of soil.

Bamboo forests nurture wildlife. Apart from the endangered panda, many birds, monkeys and boars also depend on bamboo shoots.

It is a critical element in maintaining the balance of oxygen and carbon dioxide in the atmosphere. Carbon gets trapped within bamboo forests, thus reducing carbon dioxide gases. It also lowers the intensity of light and protects us from harmful ultra-violet rays.

Bamboo to the rescue: In two villages near Allahabad, rampant brick-mining degraded the land and devastated the environment. Bamboo was planted in large numbers to repair this damage. Within five years, the once barren land became green, the micro-climate improved and the water table level rose from 40 metres to 33.7 metres deep. This movement has now spread to 96 similarly affected villages in the area.

2.2 Bamboo and Energy: Bamboo an Eco-friendly Alternative

Bamboo is a good substitute for fossil fuels in the form of charcoal briquettes and the combustible gaseous product obtained by the process of gasification of the bamboo biomass. Use of bamboo as a fuel has a number of desirable characteristics such as low ash content and alkali index. The combustion of the gaseous product is also clean and less polluting. The heating value is higher than most agricultural residues, grasses and straw. The net calorific value of bamboo is comparable or higher than other wood species like beech, spruce, eucalyptus and poplars and is in the range of 18.3-19.7 MJ/kg.

Since bamboo has high biomass productivity and is self regenerating, it can provide power on a sustainable and environment-friendly basis.

Bamboo shows the light: In Tamenglong district of Manipur, Tamenglong Bamboo and Cane Development Centre (TAMBAC) is setting up a 100 KW electricity unit through a bamboo-based biomass gassifier to take care of the electricity problem of the area. Micro-enterprises too will be powered by these bamboo-based units.

2.3 Bamboo and Livelihood Security: Friend of the People

There are over 1,500 documented uses of bamboo. From A-Z, bamboo products adorn every letter of the alphabet and newer applications are being found by each day.

Therefore, bamboo provides tremendous employment opportunities right from resource generation to resource use, from plantation and harvesting to primary processing and making end products. Micro-enterprises can be set up that will make extensive use of bamboo to produce utilitarian products.

A tonne of bamboo creates 350 person days of work in the 'production by masses' sector whereas the giant mill sector gives us only 12 human-days.

Bamboo giving gainful employment: In Orissa, Gram Vikas, a non-governmental organization works with marginalized communities to make bamboo mat boards as an alternative to wood. The boards are used to make cupboards, furniture items and other accessories. This not only provides a substitute of wood but also provides economic benefit to the people engaged in this activity.

2.4 Bamboo in Infrastructure- The Best Building Block:

Bamboo is one of the world's best engineering material and perhaps the oldest.

It is used for bridges, scaffolding, roads and embankments. Buildings made from bamboo survive earthquakes while concrete structures do not. Its ability to withstand vibrations helps in mitigating disasters. The tensile strength of bamboo is 28,000 per square inch as against 23,000 per square inch for steel. Its load-bearing capacity is nearly double that of steel. What's more, bamboo costs just six percent of the price of steel. Traditional

bamboo houses provide shelter to more than 10 billion people worldwide.

Bamboo buildings: A school building in Ghana, weekend retreats at Phillipines and the three pillars of the 1987 Eucharistic Congress Tower has made extensive use of bamboo at a much lower price and without compromising on the structure strength. The United Nations High Commissioner for Refugees (UNHCR) and the International Network for Bamboo and Rattan (INBAR) use bamboo tents as a temporary shelter for refugees.

Quake-proof houses: Latin American houses that survived earthquakes became the model for the Zero Emissions Research Institute (ZERI) pavilion at an exhibition in Germany. The United Nations Development Programme (UNDP) is promoting bamboo as a low-cost building material across Latin America and Africa. In quake-hit Maharashtra and Gujarat, rehabilitation projects have used bamboo-based housing structures.

2.5 Bamboo and Handicrafts: Blending Tradition and Modernity

More than eight million households world over sustain on bamboo-based handicrafts. In India, the figure is about two million.

Many of the crafts reflect the mystic relationship of bamboo with people and culture. Ingenious skills revolve around slivering, weaving, stitching, splitting, layering, inserting, winding, stringing, and pinning and create hundreds of beautiful patterns, decorations and useful products. Different geo-climatic regions support over a hundred different species which are shaped into artifacts appropriate for the area.

There has been an overdrive in R&D activities to find newer applications for the plant but these activities need further boost.

3. Status of Bamboo in India

In the oldest sacred book of the Hindus, the Rig Veda, bamboo the plant with a thousand faces finds evocative mention. From birth to death, the divine grass is a close companion of every Indian.

3.1 The Extent and Distribution of Bamboo in India:

India has about 30 per cent of the world's total bamboo resources and the largest bamboo forests in the

world. As per estimates, 8.96 million hectare of forest area of the country contains bamboo amounting to 12.8 percent of the forest cover. India is very rich in bamboo diversity. The country ranks second in the world in bamboo diversity with 136 species across 22 Genera found naturally and/or under cultivation; out of which, 58 species belonging to 10 genera are found in the North-Eastern region. North-Eastern States grow about two-third of the growing stock of the bamboo in India. Other states of the country rich in this resource are: Andhra Pradesh, Maharashtra, Karnataka, Orissa, Gujrat, Uttranchal, and Jharkhand. It is found to grow practically all over the country except the Kashmir valley.

Bamboo forms a part of a wide variety of forest types. It may constitute a separate forest type or sub-type or occur as brakes. It grows mostly in areas found in between 770-1,080 meter above sea level where the annual rainfall ranges between 1,200 mm to 4,000 mm and the temperature varies between 16°C and 38°C and on areas.

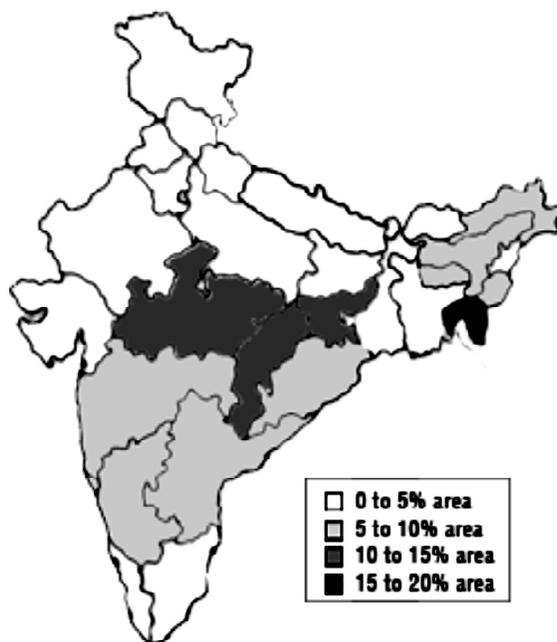
3.2 Bamboo Utilization in India:

Bamboo in India is utilized for various purposes depending upon its properties. It plays an important role in the daily life of people mainly the poor; for house construction, agricultural tools and implements, as food material and weaponry etc. Besides being a convenient source of cellulose for paper manufacture and rayon, it supports a number of traditional cottage industries. Bamboo craft is one of the oldest of traditional cottage industries in India which is spread in all rural areas of the country and it feeds millions of traditional workers.

Of the 13.47 million tonnes of bamboo consumed, 11.77 million tonnes are used in construction, small and cottage industries, handicrafts, paper production, as wood substitutes and for domestic purposes. The ten major species used in India for commercial purposes are *Bambusa bambos*, *B. balcoa*, *B. nutans*, *B. tulda*, *Dendrocalamus strictus*, *D. hamiltonii*, *Melocanna baccifera*, *Ochlandra ebracteata*, *O. scriptoria* and *O. travancorica*. About 1.7 million tonnes of bamboo are smuggled out to neighboring countries. The consumption pattern of bamboo is given in Table-1

Table 1: Percentage Consumption of bamboo in India for different uses.

Uses	Percentage consumption (%)
Pulp	35.0
Housing	20.0
Non-residential	5.0
Rural uses	20.0
Fuel	8.5
Packing, including basket	5.0
Transport	1.5
Furniture	1.0
Others, wood working industries	1.0
Others, including ladders, mats etc.	3.0



Source: http://dacnet.nic.in/nbm/grow_bamboo.html

Figure 1: Map of India showing bamboo forest distribution in the country.

3.3 The Bamboo Economy and its potential in India:

Bamboo in India generates 432 million workdays annually. Some 25,000 bamboo based Industries provide employment to about 20 million people.

Commercial consumption of bamboo in the world is to the tune of \$10 billion (Rs 46,000 crore), which is expected to double by 2012. While the size of the bamboo economy in 2001 was \$ 444 million (Rs 2,043 crore), the market potential is estimated to be \$970 million (Rs 4,463 crore) with a projected annual average growth rate of 15-

20 per cent.

Based on current trends, it is estimated that the bamboo industry in India could grow to \$ 5.6 billion (Rs 26,000 crore) by 2015.

Apart from its direct use, bamboo also serves as a major source of raw material for several processed products. The study of future market of bamboo reveals that it could emerge as an important sector playing a significant role in solving many of India’s development problems.

3.5 Socio-Economics of Bamboo in India

The different uses of bamboo, the level of its existence in our country and its future scope, all mark its potential to be very high, which presently has remained largely unrealized in India. The root cause of the problem is the increasing scarcity of the raw material, which is aggravated by the gross inefficiency in management, harvesting, storage and processing.

Currently there is a mismatch in demand and supply. At present the demand for bamboo is 26.9 million tonnes as against the supply of 13.47 million tonnes.

4. Initiatives taken up in the country

India though being rich in bamboo resource contributes to only four percent share of the global market. This is mainly because of its low productivity. Various organizations like International Network for Bamboo and Rattan (INBAR) and Centre for Indian Bamboo Resource and Technology (CIBART) are working towards strengthening the bamboo movement world over and in India, respectively, so that bamboo emerges as a big player in the sustainable development movement.

The International Network for Bamboo and Rattan (INBAR) established in 1997 is a multi-disciplinary network for addressing social, economic, policy, institutional and technical issues related to the development of bamboo and cane around the world. In order to help realize the benefits of bamboo for the rural communities in India, INBAR has facilitated the setting up of the Centre for Indian Bamboo Resource and Technology (CIBART) as an independent non-profit organization incorporated in December 2002, under Section 25 of Indian Companies Act 1956 to promote the bamboo sector in India and take steps in the initiative to harness the potential of bamboo and its benefits. Initiatives have been taken in different states of India starting from Uttaranchal, Tamenglong in Manipur, Tripura, Himachal Pradesh, Orissa & Kerala.

With efforts from CIBART and the state government several steps have been taken. Artisans, government officials, non-governmental organizations and the industry have been sensitized through awareness workshops on the potential of bamboo and the impact of design interventions on bamboo products. Links with communities working with bamboo have been established. A Bamboo Product and Design Development Center has

been set up. Institutional markets for bamboo-based products are being explored. Large-scale plantation activities have been launched. Infrastructure for training programmes as well as for setting up a workshop for product development and proto-typing is formulated in these states.

Tripura & Kerala are one of the few Indian states to have a defined bamboo policy. TRIBAC supported by CIBART have taken an initiative to setup a community-based industrial approach that is market driven. To start with TRIBAC is drawing on the strengths of the state. In Tripura, skills in handicraft development are legendary where the largely tribal population weaves magic out of bamboo. With technical support from INBAR communities make products of standardized quality to meet the challenges of the international market. Efforts have also been taken to link the programmes with Indra Awas Yojana (IAY), Swarnjayanti Grameen Swarojgar Yojana (SGSY) and Self Help Group (SHG). Only obstacle in remote and hilly areas is transportation for which new mode are being explored.

The Department of Agriculture and Cooperation, Government of India also launched a centrally sponsored scheme on National Bamboo Mission during 2006-2007 and its applications has been tasked with creating the basis for enlarging the bamboo sector, and with supporting the efforts of the Government of India towards augmenting economic opportunity, income and employment.

The Mission is multi-disciplinary in its approach, it;

- focuses on value addition & commercialisation of bamboo
- develops, tests & disseminates technologies
- Supports demonstration & entrepreneurial projects
- Is a knowledge & technology network in action

A coordinated action plan, aiming at improved silvicultural practices and methods for harvesting, storage and processing, creation of an effecting national network for faster exchange of technical information and establishment of linkages between producers and marketing agencies to make the market forces more activated and organized, could put this whole equation right.

5. Bamboo: A Jharkhand Perspective

Forest in Jharkhand extends over 23,605 sq.km., representing 29.61 % of the total geographical area of the

State; of which bamboo forests cover 843 sq. kms and 472 sq. kms of these bamboo forests fall within Protected Areas. These forests are primarily in the districts of Medininagar (Palamau), Latehar, Lohardaga, Gumla, Dhanbad and Giridih. According to a survey report of the State Forest Department, 75% of bamboo produced in the state is used for pulp and paper industry, 23% for household and constructional needs, and 2% for other bamboo based cottage industries. However there is a lot of scope of enhancement and improvement for bamboo to emerge as an important resource and being instrumental in the sustainable development of the state.

Looking at the opportunities and the benefits associated with bamboo to be developed as a Resource and as an Enterprise, the State of Jharkhand should take initiatives to undertake programmes and activities with the objective to foster ecological security and economic growth through development and utilization of bamboo as a resource. To achieve this, policy initiatives are required in all inter-related fields of plantation, research & extension, technology, industry, trade and financing. A mechanism has to be evolved to conserve, protect, promote and generate employment in utilization of this resource.

This section therefore aims at suggesting guidelines for utilization & conservation of bamboo based on the observations of experiences and approaches of other states of India.

The objective of the mechanism for utilization & conservation of bamboo adopted should aim at:

- i. Protection and conservation of Bamboo biodiversity both *In-situ* and *ex-situ*.
- ii. Enhancement of resources through promotion of bamboo plantation in forest areas and wastelands,
- iii. Promotion of bamboo cultivation in private lands as a commercial crop,
- iv. Improvement of bamboo productivity by use of improved planting stock and scientific management practices,
- v. Promotion of bamboo based industries at cottage, small, medium and large scale levels for utilizing the available resources at a sustainable level for generating assured income,
- vi. Revival and promotion of traditional sector for producing handicrafts and other value added items.

- Promotion of product diversification and value addition items in the organized sector,
- vii. Enhancing employment opportunity and livelihood security of the bamboo dependents at all levels through assured supply of raw materials and establishment of appropriate institutions,
- viii. Improvement and promotion of traditional bamboo houses and establishment of modern bamboo houses, thereby reducing pressure on forests and wood deficiency in the state,
- ix. Use of bamboo for environmental protection, greening up of degraded lands and other diversified activities such as watershed protection and river banks and as geotex in construction of roads and bridges,
- x. Promotion of bamboo sector development as a part of rural development linked with forestry and agro-forestry to enhance employment opportunities.

Different approaches which should be adopted to obtain the above mention objective are like:

- i. Creation and maintenance of database for sustainable management of bamboo resources and implementation of developmental programmes.
- ii. Conservation of biodiversity
- iii. Sustainable management of bamboo resources and controlled harvesting.
- iv. Promotion of bamboo resources in forests and non-forest areas by introducing high yielding species and scientific method of cultivation.
- v. Emphasis on commercially viable bamboo plantations in private lands and improvement of productivity.
- vi. Development of bamboo based industries through assured supply of raw materials and effective marketing.
- vii. Improvement of livelihood security of the bamboo dependents, through increased employment opportunity and institutional support and skill development.
- viii. Enactment of grower friendly rules and regulations regarding planting, harvesting and transportation.
- ix. Large scale use in environmental protection, watershed development, and riverbank protection.
- x. Effective publicity and extension work for popularization of bamboo
- xi. Make necessary institutional arrangement for

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implementing the bamboo mechanism

CONCLUSION

Proper realization and utilization of the resource potential, up-gradation of the skill, strengthening of the market at the nation and state level, exposing bamboo sector to research and technology, improved management by proper entrepreneurs and people's participation and industrial as well as craft specific value addition in bamboo products can promote food security, ecological security, livelihood and economic security. The state of Jharkhand can benefit immensely by adopting such integrated approaches to conserve and utilize Bamboo a potential natural resource of the state.

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