Bamboo utilization redefined

Meena Das Mohapatra

Bamboo, commonly known as "cradle to coffin" timber is closely associated with life and livelihood of human being. Nearly one thousand five hundred uses of bamboo have been documented so far. The diversified uses of bamboo ranges from farm equipments to storage device, from dolls to measuring tools, from furniture to decorative items. The credit of this varied utilization of bamboo goes to the bamboo artisans, who since centuries have been engaged in shaping the bamboo strips into such varied uses. Though the number of bamboo artisans in Orissa enumerated is about 30000 in the year 2003 as quoted by Director of Handicraft and Cottage industry, in actual the number is fairly big and expected to cross one lakh if thoroughly surveyed. Apart from this, quite a large number of population eke out their livelihood from bamboo cutting operation in the state.

Domestic use

Since time immemorial, bamboo products are extensively used in the rural households in form of bhogai, tukli, kulei, koola, dala, pedi, binchana etc. Bamboo made artifacts; containers etc are indispensable in some of the Hindu ceremonies. Bamboo products are the pre- requisites in marriage ceremonies of many tribes and castes in Orissa. The population of the neighbouring state of Jharkhand and Bihar also include bamboo products during many of their rituals. Bamboo has remained part and parcel of the cultural practices in the region. Moreover, the forest produce has also aided livelihood practices like agriculture. The agricultural sector still remains the largest consumer of bamboo products. Right from sowing to stocking of grains, bamboo articles find wide usage. Baskets, containers, ploughs, planks, winnowers and range of other articles are used in all the operations in agriculture.

In rural households, it is used in construction of houses and fences. Even it serves as a food item in most part of the country. Bamboo can be seen in the urban homes as decoration pieces, as furniture or handicrafts and is an essential feature in any celebration that requires a structure – be it marriage or religious festivities.

Commercial use

The rich bamboo forests of the state had been a big attraction for paper industries since long. The use of bamboo in the state took a turn when in the year 1936- 37 Messrs Heilgers and Company first started drawing its raw material for paper and pulp manufacturing from Orissa. From then onwards a major portion of bamboo was consumed by the paper industries. Soon the Orient Paper Mills became operational in 1939 and the department finalized long-term leases of bamboo forests in their favour. Since then many mills were established, closed and revived. Keeping the convenience of paper mills to access raw materials in consideration, they had been permitted to operate in areas nearer to dense bamboo forest patches. Four mills held prominence in the state industrial scenario namely JK Paper Mills, Rayagada, Orient Paper Mills, Brajarajnagar, TPM (Now BILT), Choudwar and BILT (SEWA), Jeypore. Presently JK paper Mills and BILT (SEWA) are operational.

At one time, 80 percent of the total annual production was consumed by these paper industries, which declined over the years with the closure of the units in the state. The system continued for six decades successfully till it suffered a setback with the back out of the paper industries.

Alternative use

The honeymoon between the paper industries and government agencies suffered a grinding halt when the former shifted from bamboo to hardwood as raw material in pulp. The situation resulted in heavy stock of unsold bamboo with the government and finally ended up with the closure of bamboo operation in the year 2000. Moreover, owing to the government's intervention for providing pucca house through Indira Awas Yojna and the growing trend of mechanised farming, use of bamboo in house construction/ maintenance and agriculture has been reduced substantially over the years. This has fuelled for a serious rethinking on alternate use of such a vast resource of bamboo, which not only earns revenue for the government but also ensures livelihood for millions of people. However, in 2004, two paper industries have entered into an agreement with the government corporation to lift the unsold stock, but taking the past experience into consideration, a rethinking on alternative use of bamboo is the need of the hour. Research on bamboo is of relatively recent occurrence and the potential of this versatile material has remained largely unexploited.

Bamboo can be put to several uses in Orissa. They include

- **Aggarbatti or incense sticks**: In Orissa, Khadi and Village Industries Board gives finance to 15 cooperative societies in 12 districts for making aggarbatti sticks. In the year 2003-04, these societies have made a profit of Rs. 407062. (Source: KVIB office). There is a need of expansion of the process.

**The author is with RCDC Centre for Forestry and Governance*

- **Bamboo mat board**: It is the first bamboo- based panel to be produced commercially. One of the major uses of mat boards is in building interiors and construction. It has the potential to replace thin plywood. It is estimated that if bamboo mat board replaces wood veneers to the extent of one-fourth the volume of plywood production, about 400,000m^3 of wood can be saved annually which in turn will save 45000 hectares of natural forests from eco-destruction and will provide employment to a sizable population.

- **Bamboo match sticks**: To evolve suitable processes and parameters for making quality match sticks from two widely occurring species of bamboo namely *Bambusa bambos* (Dhaba)and *Dendrocalamus strictus* (Salai), extensive experiments were conducted at IPIRTI, Bangalore under a project funded by the International Network on Bamboo and Rattan. At present, the match industry is using 2 mm thick wooden splints for manufacturing matchsticks. However, bamboo match splints of 1.5 mm squared were found to pass the test of strength prescribed in the relevant Indian Standard specification for match splints. Limited trials in a factory at Sivakasi-Tamilnadu were carried out, especially on waxing and head fixing, and the results were found to be very encouraging. The processes and the results can be adopted in Orissa for developing match sticks.

- **Wood substitute**: Since bamboo can be grown in any part of the country in a short rotation of 3-4 years, it is emerging as a serious contender for providing substitutes for wood. The potential of bamboo has been known since long and considerable research projects had been undertaken by the various research institutes for converting low-cost bamboo into valuable wood substitutes. Now technology is available for commercial manufacture of products, which can be converted into wood substitutes. The finding of the research carried out by different institutes should be studied and best technology can be taken up by our state.

- **Furniture**: Traditionally, bamboo has been a widely accepted material for furniture making. It is a good substitute for wood. Furniture makers have commercialized the use of bamboo because of scarcity and high price of wood. Furniture making is being done in Orissa but there should be expansion of the process.

- **Edible shoot industry**: The available resources of bamboo and bamboo shoots are yet to be commercially utilised fully in Orissa. Keeping in view the existing resources and its utilisation, there is still a good scope for commercial utilisation of bamboo in the food- processing sector. With the high moisture content, Bamboo shoots can be processed into canned Bamboo shoots in brine, bamboo shoot candies, chutneys, pickles etc. There is a good demand of the above bamboo shoot products (orient food) in the local and export markets, specially, in countries namely Japan, Singapore, China, Thailand, Hongkong and U.K. etc. It is one of the prospective areas for investment.

- **Bamboo charcoal briquettes**: Bamboo generates a lot of waste when processed for silvers, incense sticks, toothpicks, matchsticks etc. This waste can be effectively converted into charcoal and activated carbon. The charcoal from bamboo has a higher calorific value than wood charcoal and is used by goldsmiths. It produces more than 7000kcal/kg, more than wood and half that of raw petroleum. Bamboo charcoal after boiling and cleaning thoroughly in running water is dried in sun and can be used as deodouriser, water purifier, food preservative, dehumidifier and carbonized bamboo fibers

- **Application in tourism industry**: Tourism department builds resorts for eco tourism where bamboo can be used, as it is a sustainable construction material and an alternative for wood. The Government of Orissa has already taken initiative to construct tourism sheds in the sanctuaries using bamboo as a major raw material.

- **Bamboos in structural use**: Bamboo is accepted as a versatile construction material. About one third of the entire bamboos in India are utilized for construction purposes like columns, beams, roofs, purlins, and trusses. The various structural uses in bamboo are Bamboo-grid reinforcement- Bamboo- grid reinforcement of the road- base is used in case o village/small-town roads, which makes the roads very durable.

  Foundations: Bamboos are used in foundations, floors, partition- walls, doors, windows, ceiling, roofs, ladders, cooperage and joinery. Massive stems form posts, columns, trusses, rafters and purlins, and usually thick-walled culms of larger diameter and closer nodes are employed in foundations.

  Scaffoldings: Bamboo scaffoldings are popular for use in high- rise buildings. Dendrocalamus srictus are commonly used as scaffolding material.

  Rafter- purlin- Purlins are important components of roofing system, which act like beams, support and roof grid and transfer the roof- load to the trusses below. Long, straight and comparatively small diameter culms having thick walls are selected as purlins.

Roof- grid- It is made by bamboo reeds or half or quarter- split bamboo culms. The individual pieces are first fixed over the purlins 25 cm apart like the rafters running from edge to edge. Similar structures are wired over these perpendicularly with similar spacing to constitute a grid system to contain the roof covering materials.

- **Reinforcement in concrete**: Bamboo is suitable for reinforcement in concrete for small span structures and for ancillary uses in building construction after due precautions. A process has been developed in Forest Research Institute, Dehradun to use bamboo in the construction of roof slabs, beams, electric posts, etc.

- **Bamboo in disaster management:** Bamboo is suitable for housing in earthquake- prone areas. Its strength and flexibility make it a viable material for building shelters that offer protection against hurricanes and earthquakes. In regions of frequent earthquakes, construction of bamboo- framed houses is recommended. Bamboo- framed homes have excellent wind resistance strength.

- **Betel vines:** Bamboo is used for supporting crops like betel vines. Betel vine cultivators cultivate betel vines in specially made bamboo mat enclosures provided with interspersed long bamboo stakes for supporting the betel vine. In Orissa, betel leaves are in great demand for paan chewing, a popular custom among a majority of the population.

Through resource generation and utilization, bamboo is expected to create employment opportunities, improve infrastructure, increase ecological security and improve the economy. Utilisation of bamboo has witnessed several changes with time. The proportion of consumption of bamboo has been tilted as per the sectoral demand and related policies. Sometimes monopoly of major users has put this vast resource to doldrums. They have tried to manipulate the trade of bamboo and have managed to successfully twist the policies in their favour.

Intervention initiative for alternative use

- A case of Ply –Boo Industries, Mahuda

Fifteen years ago, a bamboo- based industry was set up in Mahuda, a place around 8 kilometers away from Berhampur, the district headquarter of Ganjam district. It is argued by the present management that the industry was first of its kind in the country. Being promoted by Gram Vikas, an NGO of repute, during inception, the enterprise was not completely guided by business or profit motive. A major part of the product was used by the organisation itself. This continued till the closure of the unit after the super-cyclone in the year 1999. After two years, the unit revived and in the year 2002, the unit was given on lease to a private entrepreneur for a period of 20 years and renamed as M/s. Ply boo Industries Pvt. Ltd.

The production chain process of the bamboo mat products passes through a series of stakeholders. Primarily the bamboo is collected by the villagers from the forest. The weaver communities, who prepare mat board, purchase the raw material from the villagers. These mat boards reach the industry through middlemen, where it is finally transferred into final products.

Almost all the final products are designed for domestic use. It ranges from small house hold articles like pen stand, newspaper holder, mobile stand, letter holder, key ring holder to furniture like table, computer stand, TV stand, shoe rack, sofa set, table lamp, tea poi etc. The products are foldable, so easy to handle and occupies less space when not in use.

The products have ample market opportuity both inside and outside the country. A rough estimation entails that nerly 60 to 70 percent of the total products are sold in the exhibitions. As per the present management, major part of their finished products is sold in the Berhampur market only. The products have also found market in places like Bolangir, Malkangiri and Parlakhemundi inside the state. A good quantity of the products is sold in the exhibitions held in Hyderabad, Lucknow, Delhi, Ahmedabad, Jaipur etc. Dealers from Bangalore, Delhi, Pondicherry etc have a regular marketing tie up with the unit and purchases 20 percent of the product bimonthly. There are also incidences of direct consignments from all over India.

After the unit has been taken over by the new management, a remarkable growth rate has been achieved. As reported by the present management, the turn over was 2 lakhs in the initial year 2003 which increased 9 fold and reached 18 lakhs in the year 2004. The management expects that the turnover might increase nearly 3.5 times and reach 60 lakhs by end of 2005.

Technology used

Mat Ply board/ Bamboo Mat Board (BMB)

BMB is essentially a layered composite comprising several layers of woven mats having excellent internal bond and are resistant to decay, insects and termite attack. They have better mechanical properties compared to waterproof ply- wood and are fire resistant. 0.6- 0.8 mm thick silvers are used for weaving into mats. The products vary from two to five layers. Common BMB are made of thick coarse mats. Thin boards are mainly used as packaging material and covering material. The splitting and weav-

ing operations can be done in rural households without complicated equipment.

Bamboo Mat Veneer Composite (BMVC)
In BMVC, wood veneers are placed in between the layers of bamboo mats. The properties of BMVC depend upon the mechanical properties of the wood veneers that are placed in between the bamboo mat layers. Investigations have shown that strength of a panel made by plantation timber is substantially enhanced when made in combination with bamboo mats.

Value added product (By- products)
BMB and BMVC are converted in innovative household utilities, furniture, construction items like door shutter etc. and marketed at state and national level.

Product specification

The mat boards are prepared taking the market demand into consideration. Normally, the size of the board is 6 feet length and 4 feet width. The thickness varies from 2mm to 12 mm. The rate of the board starts from Rs. 18 for 2 mm thickness to Rs. 65 for 12 mm thickness. The boards are comparatively costlier than the other commercial ply available in the market. Enquiring into the extent of market competition faced, the producer ascertained that though a stiff competition prevails in the market with the similar products, it has its own market and customers. The products are durable, water and termite resistant. It is evident from the growing demand of the product that there is a good number of satisfied customers who do not sacrifice quality for price.

The producers are emphatic about their frustrations over the inadequate and erratic availability of the raw materials. Besides, the villagers are harassed most of the times by the forest officials while collecting bamboo from the forest. One of the most dissapointing factors affecting bamboo enterprise development within Orissa is, even if bamboo is plentily available in the forests, industries are mostly dependent on bamboo from Assam, Tripura and Chattisgarh, because of the strange bamboo extraction policies of our State.

Future plan

In order to expand the present business, a proposal has been submitted to National Bamboo Mission for support. The said proposal has been approved and support in form of machinery will be received in near future.
Last but not the least, there is a future plan for developing an organized market network in different parts of the country, which will cater to the needs of the customers with immediate effect.

Bamboo is mainly found in forests of Central and South Orissa, but one can come across it in whole of Orissa in commons as well as individual holdings. But the State of Orissa has always treated bamboo at par with timber and has accordingly devised policies which are primarily revenue-oriented. Though there has been changes in the policies of bamboo management over the years, it has always favoured paper and pulp industry, more importantly, at the cost of the needs of artisans and common people who are dependent on it. What we need urgently is a long-term policy for bamboo management where all the stakeholders are taken into confidence and the communities' interest are given paramount importance. This long-term approach should open up the hitherto present but unexplored as well as newer vistas of bamboo utilization. This will be possible only after markets are sought and developed for the alternative use than traditional, along with appropriate bamboo management policy where people dependent on it are very much a part of all the aspects. This will help bamboo becoming a development resource that helps improving the economic condition of the people and the region.

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