

## UTILIZATION ASPECTS OF BAMBOO AND ITS MARKET VALUE

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### Introduction

Bamboo is an enduring, versatile and highly renewable resource in the Indian socio-economic-cultural-ecological-climatic-functional context with 1,500 recorded uses. It has been estimated that in the world market of bamboo, the combined value of internal and commercial consumption of bamboo is to the tune of US \$ 10 billion. The total revenue from bamboo and bamboo based products is estimated as Rs. 25,000 crores. Of this bamboo shoot accounts for Rs.7,500 crores while other bamboo based products account for Rs.17,500 crores (Anon., 2003).

### Industrial applications

Besides its role as a material for consumer products, bamboo has great potential as an industrial raw material. Industrial application of bamboo is in the areas given below:

*Food production* : Young and tender bamboo shoots are used as seasonal vegetables in both rural and urban areas. In Manipur, about 2.11 lakh tonnes succulent sticks are consumed annually for the processing of bamboo vegetable and Soibum for human consumption (Joykumar, 1977). Trade of bamboo pickle in a tourist spot on Nongpoh (Meghalaya) is estimated to be 1,170 kg to 2,210 kg

annually (Singh, 2002). While screening bamboo species for pickle preparation, Bhagwati and Deka (2004) found *B. balcooa* better among the species studied.

The species of bamboos commonly used as food are *Dendrocalamus asper*, *D. hamiltonii*, *D. brandisii*, *D. strictus*, *Bambusa blumenna*, *B. balcooa*, *B. polymorpha*, *Thyrsostachys siamensis*, *Thyrsostachys oliveri*, *Gigantochloa albociliata*, *Melocanna baccifera* etc. Among these species, only *D. asper* comes from commercial plantation whereas *D. hamiltonii* bamboo shoot is reported to be the best among the clump forming bamboo in terms of taste and nutritive value (Anon., 2005).

The present international market for bamboo shoot is valued Rs. 7,500 crores which is about 35% of the total commercial market for bamboo-based products. While domestic market for bamboo shoots is valued at Rs. 4.8 crore only. In the North-eastern region of India, where more than 50% of total bamboos of the country are available, the growth and consumption of shoots is largely restricted to private use of tribal families (Anon., 2003).

*Building and construction material* : In India, usage of bamboo for the purpose of scaffolding is high. But there is virtually no value addition on the raw bamboo used

for scaffolding purposes. Of the 13.47 million tonnes of bamboo, 3.4 million tonnes are currently being consumed for scaffolding alone all over India (Anon., 2003). Bamboo can be fashioned artistically to make doors and windows. Bamboo mat composites can be effectively used for manufacturing panel and flush doors in combination with plantation grown timbers. The most expensive holiday resort in the world is made of bamboo. Use of bamboo grids in road making is yet another potential area for its sizeable uses. The bamboo grid market size is estimated to grow at 25% per year with increased penetration in the total market and greater acceptability of the product.

*Bambusa balcooa*, *B. tulda*, *B. nutans*, *B. pallida*, *B. polymorpha*, *Dendrocalamus hamiltonii*, *Melocanna baccifera*, *D. giganteus*, *D. strictus*, *Gigantochloa apus*, *Guadua angustifolia* etc. are some common bamboo species suitable for construction.

**Wood substitute :** Bamboo is regarded as substitute of wood due to its physical and mechanical properties. The woody material in bamboos has vascular bundles, which remain separate in the long internodes, giving bamboo an easy splitting characteristic. They also give it great flexibility. Bamboos are endowed with another feature – long fibre length, which makes bamboo pulp suitable for papermaking. It also contains a relatively low proportion of lignin. In the tropics, therefore, bamboos are perhaps the best alternative to softwoods (Rao *et al.*, 1990). Although bamboo is reported to be susceptible to fire, borer, termites etc., it is nowadays increasingly used as wood substitute in some industrial products like bamboo plyboard, bamboo mat roofing, door shutters, bamboo mat board, bamboo

flooring, bamboo laminates, particle composites etc. after value addition. Various industries are looking for suitable substitute for wood in production of various things like pencil, match boxes, match sticks etc. Recently IPIRTI (Indian Plywood Industries Research & Training Institute) has developed a technology for making match sticks from bamboo and technology transfer in different match industries also been evolved. *Melocanna baccifera* (Muli bamboo) makes excellent matchsticks splints. One kilogram of splints equals 160 matchsticks packets containing 50 sticks each. The annual consumption of wood by the matchstick industry in India is 2.6 million cft. (Anon., 2003).

**Cottage industries :** Millions of tonnes of bamboos are utilized in different types of cottage industries such as agarbatti, kite and cracker industry, ice-cream industry and match industries. Some of the commonly used bamboo species in cottage industry are *Bambusa tulda*, *B. nutans*, *B. pallida*, *M. baccifera*. Tribal Development Agencies have also adopted bamboo resource for cottage industry. There are more than 10,000 units in the hand made sectors of match industry. Agarbatti is another important industry using bamboo. Bamboo from Tripura and other North-eastern states is transported all the way to Mysore and Bangalore for production of agarbatti (Kulkarni and Rao, 2002).

The current value of bamboo used in agarbatti market is approximately Rs. 135 crores. Besides the agarbatti industry, bamboos are used in some other miscellaneous items such as lathis and fishing rods and are valued at Rs. 186 crores (Anon., 2003).

**Handicrafts :** Another important area in which bamboo is being used is the bamboo craft sector where it generates about 250 million days of work by employing mainly women from the rural and tribal area, generating income of Rs. 15 billion a year.

Various craft products made of bamboo are: mats, flooring material, purses, bags, satchels, tea packaging, different kind of furniture, floor tiles, board, general household products, utensils etc. Craft products are to be developed differently, marketed and promoted in innovative and various ways, if they are to compete and survive in international market.

**Pulp and Paper :** The general consumption pattern of bamboo in India indicates that 35% of bamboo is being consumed by pulp and paper industries while the rest 65% is used by locals under cottage, construction, furniture implement industries etc. (Kulkarni and Rao, 2002). It is found that from four tonnes of bamboos nearly one tonne of pulp is produced which is utilized in different furnishes for production of paper and board. Presently 1.4 million tonnes bamboo per annum is used by 10-15 paper mills (Kulkarni and Rao, 2002). The total production of paper and paper board is estimated to be about 3.1 million tonnes/annum. The total import bill during 2000-01 was Rs. 3,300 crores making an increase of 10% over the previous year (Anon., 2003).

**Medicinal products :** It is found that bamboo plant has usually high levels of acetylcholine which acts as a neurotransmitter in animals and humans (Dharmananda, 2006). 'Tabashir' or 'banslochan' is a siliceous secretion found in the culms of various species of bamboo

and is used in Ayurvedic and Tibetan medicine. It is often called 'bamboo-manna' or silica. It occurs in fragments of masses, about 2 cm thick. It is the residue of the watery liquid occasionally found in the hollow internodes. It is used as a cooling tonic and aphrodisiac and in also remedy of asthma, cough and other debilitating diseases (Anon., 1991).

Medicine made from the leaves of another species, *Pleioblastus amarus*, a tall bamboo grown in southern China, is used in treating fever, fidgeting and lung inflammation (Dharmananda, 2006). Stems and leaves of *Bambusa bambos* are used in Ayurvedic system of medicine as blood purifier, in treatment of leucoderma and inflammatory conditions (Tripathi *et al.*, 2002). It is also given internally for remedy of bronchitis, gonorrhoea and fever. The burnt roots of this species are applied to control ringworm, bleeding gums and to painful joints (Tripathi *et al.*, 2002). The bark is used as a cure for eruptions. The leaf bud of another species *B. spinosa* is used in leprosy, fever and haemoptysis (Tripathi *et al.*, 2002). The sap of *Bambusa vulgaris* is given as a remedy for phthisis in the Philippines. (Tripathi *et al.*, 2002).

**Charcoal Production :** Bamboo charcoal is generally used by goldsmiths. In Japan, bamboo charcoal is used in gardening, as it is believed to preserve the moisture available to plants. Activated carbon is a non-graphitic form of carbon, which can be produced by activation of any carbonaceous material such as coconut shells, bamboo, wood chips, sawdust, coal, lignite and paddy husk. Until lately charcoal and activated carbon were commonly produced from wood. But in recent times, studies have showed that bamboo species are also a source of quality

activated carbon. 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 (Chakravarty, 2004). Activated carbon is widely used in foods, medicine, chemical and metallurgical industries. The demand for activated carbon in India is increasing day by day (Tripathi *et al.*, 2002).

### **Development of domestic and export market**

Undeveloped markets for raw bamboo, lack of market information, low profits and difficulties in marketing raw and processed bamboo are major factors impeding development of bamboo sector. Domestic markets are the main attraction so far for bamboo and bamboo products based on health, nutrition aesthetic and handicraft goods.

However, there is lack of information about the size of the domestic market although it is presumably a very large fraction of the total market. In the North-East, there is a thriving bamboo economy; thousands of people are engaged in

producing bamboo slivers for bamboo mat, agarbatti sticks, baskets, loom products handicrafts as an integral part of economy. In other part of the country this sector is still a peripheral activity.

The reason for unorganized and poor market in India is that except pulp and paper industry, there is no bulk consumer for bamboo. In many parts again adequate quantity of bamboo is not available to meet industrial requirement. Development of such industries based on bamboo which would lead to value addition will serve two purposes : (a) Bulk consumption on a sustainable basis and (b) Encourage growers towards bamboo as they will expect to get remunerative price as well as perennial consumers.

At present India has got no export market for bamboo products except an insignificant export of handicraft products. About half of the world's population of more than 5,000 million shares to some extent in the trade and subsistence use of bamboo valued more than US \$ 7,000 million (Bansal and Nath, 2002). India has still higher export potential only if bamboo products are produced and attempts made for export.

### **SUMMARY**

Bamboos are one of the versatile plant groups with multifarious uses and meet many needs of the society. Bamboo is a viable replacement for wood and industrial raw material for both traditional cottage and modern industrial sectors. The employment potential of bamboo is very high and the major work forces involved are rural poor. The paper elucidates the potential of bamboo as an industrial raw material in various sectors *viz.*, food production, building and construction material, wood substitute, cottage industries, handicraft, pulp and paper, medicinal products, and charcoal production. The paper also explicates the scope of development of domestic and export market for bamboo. With new technical, marketing finesse and renewed commitment, bamboo could take on the role as the material of the future.

**Key words :** Bamboos, Utilization, Domestic Market, Export.

बांस के उपयोजन पक्ष और उसका बाजार मूल्य  
ई० दत्त बोरा, के०सी० पाठक, बी० डेका, डी० नियोग व के० बोरा  
सारांश

बांस तरह-तरह के अनेक उपयोगों वाले सर्वकार्योपयोगी पादप समूहों में से एक समूह हैं जो समाज की बहुत-सारी जरूरतें पूरी करता है। बांस पारम्परिक कुटीर एवं आधुनिक उद्योग दोनों सेक्टरों में लकड़ी और औद्योगिक कच्ची सामग्री का मजबूत स्थानापन्न पदार्थ हैं। बांसों की रोजगार उपलब्ध कराने की संभावनाएं बहुत अधिक हैं और इसमें काम पर लगने वाला मुख्य मजदूर बल ग्रामीण गरीब ही होता है। इस अभिपत्र में विविध सेक्टरों अर्थात्, खाद्योत्पादन, भवन एवं अन्य निर्माण सामग्री, काष्ठ का बदल, कुटीर उद्योग, हस्तोद्योग, लुगदी और कागज, औषधियां तथा कोयला बनाने के औद्योगिक कच्चे माल के रूप में बांसों की संभावनाओं को स्पष्ट करके बताया गया है। अभिपत्र में बांसों के घरेलू और निर्यात बाजार के विकास करने का क्षेत्र भी बतलाया गया है। प्रविधि, विपणन चतुराई और नए समर्पण भाव द्वारा बांस भविष्य की सामग्री बनने की भूमिका निश्चयपूर्वक निबाह सकते हैं।

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