

Bamboo cultivation : Generating income for the rural poor

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Diminishing resources and availability of forest wood and conservation concerns have highlighted the need to identify substitutes for traditional timbers. It is in this context bamboo assumes special significance. Bamboos are aptly called the poor man's timber and are found in great abundance. The word bamboo comes from the Kannada term *bambu*. Bamboo is a flowering, perennial, evergreen plant in the grass family Poaceae, sub-family Bambusoideae, Their strength, straightness and lightness combined with extraordinary hardness, range in sizes, abundance,

easy propagation and the short period in which they attain maturity make them suitable for a variety of purposes. Bamboo is a versatile, strong, renewable and environment-friendly material. It is the fastest growing woody plant on earth. Most bamboo species produce mature fibre in 3 years, sooner than any tree species. Bamboo can be grown quickly and easily, and sustainably harvested in 3 to 5 years

cycles. It grows on marginal and degraded land, elevated ground, along field bunds and river banks. It adapts to most climatic conditions and soil types, acting as a soil stabilizer, an effective carbon sink and helping to counter the green house effect. The diversity of this fascinating plant has to be conserved, not just for financial reasons and employment generation, but also more importantly in the revitalization of traditional science and technologies.

Bamboo distribution : India has one of the richest bamboo resources in the world, second only to China. The annual bamboo production in the country is estimated 3.23 million tons. According to Forest Survey of India (FSI), in India bamboo grows in 8.96 million hectares of forest area, which constitutes about 12.8 per cent of total forest area of the country. Of this, nearly 28 per cent occur in the North Eastern States, followed by 20.3 per cent in

Madhya Pradesh, 9.90 per cent in Maharashtra, 8.7 per cent in Orissa, 7.4 per cent in Andhra Pradesh, 5.5 per cent in Karnataka and the balance is spread in other States.

Diversified uses of bamboos : Bamboos are employed for a variety of uses, these are the followings :

Food purpose : (a) A kind of food in Thailand is glutinous rice with sugar and coconut cream is specially prepared bamboo sections of different diameters and lengths, (b) The shoots (new culms that come out of the ground) of bamboo are used in numerous Asian dishes and thin soups

and are available in various sliced forms, (c) The bamboo shoot in its fermented state forms an important ingredient in cuisines across the Himalayans, (d) In Nepal, turmeric and oil mixed fermented bamboo shoots are cooked with potato to make a dish, (e) In Indonesia, coconut milk and spices are mixed with thin slices of bamboo shoot to make a dish, (f) Coconut milk mixed sliced bamboo shoots are cooked with

vegetables to make a dish, (g) The sap of young stalks tapped during the rainy season may be fermented to make a sweet wine, (h) Bamboo leaves are also used as wrappers for steamed dumplings which usually contain glutinous rice and other ingredients, (i) Fresh bamboo shoots are sliced and pickled with mustard seeds and turmeric and kept in glass jar in direct sunlight for the best taste, (j) Pickled bamboo shoots are cooked with black-eyed beans as a delicacy food in Nepal, (k) Fermented bamboo shoot is used to prepare a sour vegetable soup, (l) The tender shoots are cut into very small pieces and cooked with crushed jackfruit seeds to make a dish in Konkan area.

Ornament purpose : Various ornaments are prepared from bamboo.

Structural support: (a) Used as a construction material



(b) Bamboo is used to hold up simple suspension bridges
 (c) In house making as posts, walls, roofing, flooring, fencing etc. (d) Used as decorative elements in buildings
 (e) Bamboo is used for drying clothes indoor (f) Make floating house (g) Used for making furniture (g) Bamboo is used for building roads.

Material making purpose: (a) Commonly used to make ladders, (b) Bamboo or wooden strips were the standard writing material during the Han Dynasty, (c) Paper mills use bamboo for paper production, (d) Bamboo has often been used to construct weapons, (e) Bamboo is used as substitute of metal, (f) Several manufacturers offer bamboo bicycles, surfboards, snowboards and stakeboards, (g) Used to make fishing rods, (h) Bamboo has been traditionally used in Malaysia as a firecracker called bamboo cannon, (i) Bamboo can be used in water desalination (j) Basket making (k) Used for making incense sticks and match splints (l) Handicrafts of various types (m) in packing various things (n) Bamboo waste materials can be used for making charcoal and briquetted coal

Musical instruments : Flutes, drums, digeridoos, even saxophones making, bamboo is used.

Kitchen utensils : (a) The empty hollow in the stalks of larger bamboo is often used to cook food (b) Used to make eating utensils *i.e.* chopsticks, strays and tea scoops (c) Cups and plates, spoons and ladles can all be made from bamboo.

Medicinal purpose : (a) Bamboo is used for treating infections and healing (b) Fermented bamboo paste is used for the treatment of impotence, infertility and menstrual pains (c) A primary use has been to treat coughs and mucous in children (d) Leave and roots have been used for fevers, especially in babies, and for convulsions (e) Tender bamboo shoots are used for treating respiratory disorders and for other uses

Other uses : (a) National plant of St. Lucia (b) Traditional Vietnamese villages are surrounded by thick bamboo hedges (c) Used as a fuel wood (d) Used for the cottage industry.

Cultivation method :

Bamboos in India : India is blessed with very rich bamboo resources. With about 22 genera and 136 species, it is one of the largest resources of bamboos, next only to China with 26 genera and 300 species. The areas particularly rich in bamboo are the North Eastern States, the Western Ghats, Chattisgarh, M.P. and Andaman Nicobar Islands. Bamboo production in North Eastern India on commercial lines would be an excellent tool for poverty alleviation and employment generation.

Land preparation : Before planting bamboo seedlings, test the condition of soil, particularly for acidity. Bamboos

grow best in slightly acidic soil. It may be that you would need to put in lime to adjust its pH level to a degree most suitable for bamboo growing.

Plantation : You can have bamboos for planting by growing them yourselves from a seed, using node cuttings or potted bamboo. To make sure the bamboo variety you've chosen is suited to your place's climate and soil, grow it on a small scale first.

Maintenance : Bamboos are drought tolerant and resistant to insects and diseases. But it may be that the variety you are growing needs special care. Learn what specific requirements your plant needs.

Spacing : For most species a spacing of from 6m to 8m between clump centres is usual. A plot with poorer soils should be planted at 8 metre centres and richer soils at 6 metre intervals. The proper number of plants is about 400 per hectare.

Propagation : Establishing a plantation using large plants or even big divisions is very expensive. Smaller plantlets are needed. Most plantations are established using divisions of mature clumps.

Current methods of vegetative propagation : There are several methods of obtaining vegetative propagules.

Layering whole culms: Bend outer culms of a clump downwards after undercutting at the base and bury the culm in the soil after cutting off all but the main branches. After a few weeks, if soil temperatures are sufficiently high and moisture levels maintained, roots and shoots develop at the buried nodes. Saw off the culm sections bearing new plants and transplant these directly into the desired plantation area .

Whole culm cuttings : Whole 18 month old culms may be severed from adult clumps and planted in a shallow trench. Leave the top of the culm and a few branches intact and allow them to protrude above the ground. After some weeks, new roots and shoots develop at the nodes. Cut these from the parent culm and transplant them directly into the plantation site.

Double-node cuttings : Make cuttings of culms with at least two internodes left intact. Trim branches from lower node. Plant prepared cuttings vertically in warm soil with the top of the culm and the branches left protruding. If using potting bags or pots, cover each with a clear or lightly frosted plastic bag tied in place after watering and leave in part shade until new roots protrude from drain holes. New roots and shoots are produced at the lower node. Single node cuttings planted on their side with the branch complement upwards will work with some species.

Branch cuttings : Propagation using branch cuttings has proved successful in some cases. Cut the whole complement of side branches from a culm using a sharp

hacksaw and plant in warm soil. New roots appear at the base of side branches within a few months. Obtaining new plants using these methods can take up to one year. A few more years of growth are necessary before young plants are strong enough to produce new shoots suitable for cutting as vegetables.

Tissue culture : Micro propagation techniques using emerging branchlets from mature culms might prove the most successful and cheapest method to establish a plantation.

Fertilizer : Fertilizer is important during transplanting to increase the vigour of the rhizomes. It can be placed in the hole near the rhizomes. A shovel-full of well rotted stable manure, a handful of chemical fertilizer will give new plants a good start.

Mulching : All transplanted bamboos, should be mulched with 15 to 20 cm depth of hay or straw to a diameter of about 2 metres.

Rhizome cuttings : Sections of vigorous rhizome about 30 cm long, taken from just behind the growing area can be either planted in nursery beds or directly into the plantation area parallel to the contour and watered in. These will produce new shoots from the viable buds and new rhizome in the next season.

Yield and harvesting: It is generally 3-4 tons/ha as understory in forest and 5-12 tons/ ha from plantations. It will take about six years before you can have your first harvest. After the first commercial harvest, however, cuttings will be done annually and could continue for 50 years with only maintenance required on your part.

Financial aspects : The unit cost for one acre of plantation is Rs. 9400 spread over a period of five years. Harvesting commences from sixth year onwards. The yield and income of bamboo plantations details are the following: at sixth year, yield 9.6 metric ton and income Rs. 5280; 7th year, yield 11.2 metric ton and income Rs. 6160; 8th year, yield 12.8 metric ton and income Rs. 7040; 9th year onwards, yield 14.4 metric ton and income Rs. 7920.

Preparing shoots for use as a vegetable : Preparing shoots for the table. Shoots of certain types of bamboo contain amounts of cyanogens and may be toxic, but cooking destroys these substances and renders the shoots edible and even tasty. Boil freshly cut shoots in lightly salted water before peeling with a sharp knife. Boiling (or steaming) softens the culm leaves covering the shoots and makes them easier to peel. Slice the shoot lengthwise into thin slices four or five millimetres thick.

Bamboo: fastest-growing plant : Bamboo is one of the fastest-growing plants on Earth, due to a unique rhizome-dependent system. Certain species of bamboo can grow 35 inches within a 24-hour period, at a rate of

0.00003 km/h (0.00002 mph).

As animal diet : Bamboo is the main food of the giant panda, red panda, bamboo lemurs, rats, mountain gorillas, chimps and elephants.

Bamboo and global challenges : Bamboo is well placed to address four major global challenges: (a) Shelter security, through the provision of safe, secure, durable and affordable housing and community buildings (b) Livelihood security, through the generation of employment. (c) Ecological security, by conservation of forests. (d) Food security through bamboo-based agroforestry systems and as a direct food source – example, edible bamboo shoots.

Planning commission's focus on bamboo: The Planning Commission of India had launched the National Mission on Bamboo Technology and Trade Development. The objectives of this Mission were to launch several initiatives to place bamboo as a key species and research in the developmental agenda. The principal objectives are: (a) To use Bamboo as a means to reclaim degraded land, conserve soil, improve environment, carry out drought proofing. Bamboo plantation could be an important ingredient in Greening India Programme. (b) To expand area under Bamboo plantation. (c) To improve, yield and stabilize the existing bamboo plantation; (d) to diversify, modernize and expand the bamboo based industries and handicrafts by application of modern technology and provide policy and financial support; (e) To use Bamboo development as an instrument of poverty alleviation and employment generation particularly in rural sector.

Opportunities: Demand- supply scenario : Country's bamboo economy is expected to grow by over 15 per cent to touch Rs. 260,000 million by 2015. The National Mission on Bamboo Technology and Trade Development under the Planning Commission, has estimated that if proper encouragement is given to bamboo cultivation and its use, it can replace the projected import of timber to the tune of Rs. 300,000 million in the next 20 years *i.e.* 2025.

NABARD's Bamboo development policy: The major objective is to commercialise Bamboo at farmer's level. All along bamboo has been considered as a poor man's crop. It is high time we put bamboo into industrial pedestal with appropriate tie-up arrangements with bamboo based industries *viz.*, paper, handicrafts and the new emerging areas of eco-friendly products *e.g.* housing, tiles, flooring, bamboo shoots etc. A linkage of bamboo farmers with bamboo artisans will also be made. Besides, wherever feasible bamboo projects will also be promoted...

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