

State Bamboo Policy

1. Preamble

Bamboo is one of the most important non-wood forest resources used extensively by tribals and rural poor in Tripura. While it plays an important role in the economy of the State and in subsistence activities, employment generation and household income, the economic potential is significantly greater. At present only 1-2% of the total extracted bamboo is used for value addition and this is a matter of concern, keeping in view that bamboo handicraft, with superior design, craftsmanship and fineness has been a traditional activity in the State. It is estimated that around 6.1 million mandays per annum of employment is generated on account of management and extraction of bamboo. Around 1.49 lakh artisans are engaged in value addition in bamboo, producing an estimated annual craft sale value of Rs.35.34 crores. Efforts to date have not been taken a focused approach and as such the drafting of this policy is a step to achieving the same.

The entire area of the State lies in one of the highest CVP (Climate, Vegetation, Precipitation) Index zones (a measure of potential productivity) of the country. State is endowed with rich and diverse bamboo resources (annexure-I). The endeavor has been to cover all areas of the bamboo forests of the State under scientific management by way of working plan prescriptions as formulated by the Forest Department. Despite this effort, the resource survey in the past has shown that there has not only been a decrease in the areas supporting bamboo forests but such areas have also witnessed severe decline in productivity. One of the reasons for such resource degradation has been excessive biotic pressure. The other major factors responsible for hastening the process of degradation include over exploitation and damage from fire and grazing, and the occurrence of gregarious flowering. To add to this situation is the fact that a large number of bamboos are illegally felled and transported to Bangladesh using the rivers and also overland. In the absence of a planned usage program that directly involves and benefits the people, bamboo is an easy temptation to those who can lay their hands on the forests.

With this background, the 'State Bamboo Policy' envisages to develop bamboo sector in the State through a market-led community-based utilization, development and conservation of the resource in forest and farm areas. It would:

- λ Provide a fillip to conservation ;
- λ Develop the resource, both in forest and farm areas through scientific means such as tissue culture, planned cultivation and improved management using community based initiatives amongst other practices;
- λ Improve the utilization of bamboo establishing small and large enterprises in the processes; and

2. Develop effective marketing for the bamboo-based products.

The 'State Bamboo Policy' is based on the following sound economic and social principles and reasons :

1. Market-led community based development in the bamboo sector is based on the principle that development can only be truly sustainable if markets are viewed as the primary driving force behind the utilization, processing and supply of raw materials. It is a demand-driven solution based upon cash realisation of the end product at the market. The price paid at the market strongly influences the supply chain, thereby acting as a powerful controlling and cost effectiveness-inducing force, in comparison to other more traditional supply-driven solutions.
2. By taking the markets as paramount, the identification of development options aimed at increasing income-generation and employment are given a clearly defined focus at the outset.
3. Bamboo is not a staple commodity like rice or sugar, nor does it have a guaranteed market like electricity. This means that changes in market demand can greatly affect processors and suppliers, and cause undue pressure on natural resources, resulting in unsustainable harvesting. This is one of reasons for the degradation of the bamboo resource. Both higher and lower prices for bamboo products may lead to increased harvesting in the short term with subsequent depletion of the resource in the future. Higher prices increase harvesting because people want to capitalise on the increased prices but is tempered by the quality that the market demands, and lower prices increase harvesting because people need to make up for loss of income.

Effective steps for developing local manufacturing are therefore important for encouraging local demand and increasing prices for raw materials and helping stabilise the demand for them. Emphasis on supply-driven solutions such as establishing plantations would not have any effect until this is addressed.

4. Market-led community based development is driven by the desires of the people involved to better their lives. Removal of full State control from aspects such as resource management and their transfer to the community, but on a sustainable management basis, is vital in order to maximize their incentives. Sustainable resource management will occur when the people understand that proper management of the resources will bring the maximum benefits to themselves.

The community is best capable to tend to a resource like bamboo, which actually needs management on an annual basis like an agricultural crop, unlike a typical forest resource like trees. The people do not participate in natural resource management since the benefits of investment do not directly accrue to them. Sense of participation and ownership of the resource by the community through Joint Forest Management (JFM), is therefore key for effective resource management. A change from the present system will

have tremendous benefits in terms of increase of bamboo resources, reduced degradation, better quality, reduced smuggling, and overall growth of tax revenues to the State. There will also be benefits in terms of increased income and poverty alleviation, and building up of rural assets.

5. The development of communities involves proactively integrating them into the market mechanism, and empowering them against shocks, rather than just protecting them. In order to achieve this resilience, the share and role of the community in the economic process must be increased by direct means through the establishment of community based cooperatives, companies or similar commercially oriented manufacturing structures owned by members of the community and that benefit all members of the community.
6. Improving the markets (and products) should be done in a way that benefits the consumers and the producers alike so the prosperity of all members of the production to consumption system increases.

2. Vision of the Policy

To realize the economic, social and environmental potential of the bamboo resource of Tripura, develop it into one of major economic sectors of the State, and provide employment and income generating activities for the tribals and rural poor. This vision will be implemented on a sustainable economic development basis so that market and ownership systems not only halt the process of further degradation of bamboo resources, but lead to an increase in the quantity and quality of bamboo resources, to meet the present and prospective requirements of bamboo users including the environmental needs of the State.

3. Goals & Objectives

The main goals of the policy which stem from the vision are :

- Development and implementation of a sustainable community based production model with concomitant benefits for forest conservation
- Development and implementation of an economic development program using bamboo for spurring industrial development
- Enhancing employment and income generating opportunities for tribals and rural poor using bamboo as the prime resource.

The basic targeted objectives that would govern the State Bamboo Policy are the following :

- Scientific assessment of the plantation inventory by species to assess the effort involved.
- Conserving the bio-diversity of resource base.

- Enhancing the productivity and production base of the resource to meet the expected increase in demand up to a 10% annual increase of the sustainable yield from the year 2001 level.
- Enabling training, tools and other mechanical productivity enhancers, consolidation, distribution and marketing channels.
- Developing value addition in handicrafts through improved processing, product diversification, design development and enhanced shelf life, to produce quality products at par with international standards and to increase the trade in home and export market by 100% in next 5 (five) years.
- Establishing bamboo industrial products as an economic and successful new industrial sub-sector. This includes developing Small Scale Industries (SSIs) and also medium-scale operations based on bamboo such as Bamboo Mat Boards (BMBs), Bamboo laminates, Bamboo ply, Bamboo flooring and Bamboo shoot processing, among others, to be identified by the INBAR-Tripura Bamboo Mission. Smaller industries for production of chopsticks, agarbattis and baskets would be promoted at the community level.
- Developing the necessary market mechanism with support towards promotion and marketing of finished products.
- Popularizing bamboo as a cost effective and earthquake resistant building material for housing in the State, which lies in one of the high seismic zones of the country.
- Arranging financial resources as may be necessary to achieve the above objectives.
- Setting up of monitoring facilities and systems for fine tuning the devised plans and ensuring their effectiveness.

4. Approach

The approach of the policy in achieving the above mentioned objectives would be based on the following :

- Community and private sector participation in bamboo development
- Support to activities focussed on conservation of bamboo resource
- Plant propagation
- Enhancement of the production base

- Management Information System (MIS), inventory and database development
- Promotion of handicrafts
- Industrial utilisation and entrepreneurship development
- Bamboo utilisation in building material and low cost housing
- Development of marketing and trading plan and systems

5. Facilitation process

The role of the government in achieving the above objectives would be that of a facilitator and promoter of activities in each of the areas outlined in the approach. The strategic direction and thrust would be provided by the government while the community and the private sector would be the implementers of the strategy. To this end the government has already initiated the process of setting up of institutional mechanisms, detailed later.

6. Strategy

6.1 Community participation

1. Bamboo provides subsistence and livelihood security to tribals and it fits in to socio-economic milieu of tribal culture in the State. The knowledge and skill required for resource development and value addition are part of their tradition. These communities with scientific assistance and training support would be involved in development of the sector to revive their traditional knowledge and supporting and integrating it with modern techniques to ensure economic upliftment.
2. Community based development approach for the sector would be adopted through active participation and involvement of local communities under Joint Forest Management (JFM), under cluster co-operatives of artisans, and other mechanisms to ensure sustainable return to these communities. This will help achieve goals as a sense of participation and ownership will improve productivity. This has found success in various parts of the world where the productivity has shown marked improvement and the communities contribute to the larger cause of economic development and the environment in the process.
3. Institutions of local self governance in ADC and non-ADC areas would be involved in promotion and development of bamboo at grass root level, and to ensure participation of masses in sectoral development programmes.

6.2 Conservation of the resource

1. Claim of bamboo dependent local communities would be honoured and their access to the resource ensured through implementation of suitably designed arrangements. The lack of sense of participation and ownership, and also the poverty of these communities is an important factor in causing their indifference towards resource degradation. Enhanced income generation of these communities through cultivation/extraction/value addition of bamboo, would be considered as an activity aimed at conservation and would be promoted. Where the need is felt, an additional income source/arrangement would be considered to tide over the phase of gestation before plantations come to maturity.
2. Existing management practices related to end-use would be updated and down-streamed to the community by infusing appropriate scientific inputs.
3. To ensure ex-situ conservation of the bamboo resource, gene banks of different cohorts of species would be developed within next two years, which may also be used for propagation, multiplication and cultivation needs in future.
4. A bambusetum, which would contain a live collection of different bamboo species, would also be established within next two years, to enable local artisans, bamboo growers and farmers to get first hand information about morphological features, aesthetic properties and growth characteristics of these plants. Information systems would be put into place for all to be aware of this facility and encourage usage.
5. Immediate corrective steps would be taken to tackle ongoing bamboo flowering of Muli (*Melocanna baccifera*) and other species in different areas. These steps would include: covering maximum area under plantation programme, preferably with superior species having wider uses; protection against fire and grazing to ensure establishment of profuse regeneration which follows such flowering; harvesting/removal of flowered culms up to 70% to reduce fire hazards; documentation and cohort mapping including ex-situ conservation of different cohorts; and rodent pest management in affected areas.

6.3 Plant propagation

1. The shortage of bamboo planting material, a major constraint for large-scale bamboo plantation, would be addressed.
 - a) Existing use of rhizome as planting material is not only costly but in most of the clump forming bamboos, it leads to relocation rather than development of the resource. In view of this, and where alternatives are available, the use of rhizome for field planting would be phased out in next five years.
 - b) Facilities would be developed during 2001-2003, for raising the required planting stock of identified species of bamboo through suitable macro-proliferation (if seed/seedlings are available) or a combination of rooting of culm/branch cutting and macro-proliferation techniques.

- c) Plant tissue culture technique for mass clonal propagation viz, micro-propagation of bamboo, has certain advantages in terms of very high multiplication rates, plant production throughout the year, possibilities to induce early culm formation/improved yield, and easy handling and transportation of plantlets. Accordingly micro-propagation facility for identified bamboo species would be developed over the next three years in collaboration with appropriate technical agencies.

6.4 Development of the resource

1. To meet the prospective requirements of non-clump forming bamboos, productivity of existing Muli (*Melocanna baccifera*) bamboo forests would be enhanced through cost effective method of Aided Natural Regeneration (ANR), which includes protection from fire, grazing and substitute sowing of seeds on steep slopes following gregarious /sporadic flowering. An area of 50,000 ha would be covered under ANR in next five years through community based and managed afforestation programs with government support.
2. To meet requirements of other clump/non-clump forming bamboos, production base would be enhanced by taking up artificial regeneration over 10,000 ha of degraded forests and 5,000 ha of un-arable tilla land in private holdings, in five years. The species targeted for artificial regeneration are Barak (*Bambusa balcooa*), Bari (*Bambusa polymorpha*), Mritinga (*Bambusa tulda*), Muli (*Melocanna baccifera*), Poara (*Bambusa teres*), Dolu (*Schizostachyum dullooa*), Makal (*Bamboo pallida*), Kanak Kaich (*Bambusa affinis*), Lanthi bans (*Dendrocalamus strictus*), which are primarily being used in value addition and creation of income generation activities in the State. *Guadua angustifolia* would also be introduced from South America. To encourage bamboo plantation in private holdings, the favourable economic return of bamboo plantation vis-à-vis other crops would be publicized and appropriate technical and financial support would be provided to the cultivators.
3. To ensure achievement of targets as mentioned above, the responsibility for bamboo resource development would be taken up by different departments with technical and material support of Forest Department (Annex 2).

6.5 Inventory and data collection

1. Detailed inventory of bamboo resource inside forests and outside forest areas would be carried out by Forest Department every 5 (five) years, by involving an appropriate technical organization having skill and manpower.
2. Regular survey of private handicraft sector at two years interval would be carried out by Directorate of Handloom Handicrafts and Sericulture to update the database relating to details of artisans, product range, technology adopted, raw material requirement and capacity of production.

6.7 Handicrafts

1. The handicrafts sector requirements would be linked in a coordinated manner to the community plantation and usage plan. Existing requirement of semi-processed and treated raw material of handicrafts sector is presently being met through manual processing of whole bamboo members by artisans. In the process, productivity and quality of products are adversely affected. Integrated linkages will be provided to bring technical and technological solutions, and facilities to the producers doorstep. Micro-Common Facility Centers (CFCs) set up on a modified Build-Operate-Transfer basis, with the government providing funding for setting up these units by cooperatives or corporate units, would be promoted to enhance quality and durability of handicrafts items and also to facilitate reduction of wastes, drudgery and physical risks.
2. Facilities for bamboo quality verification and testing would be developed at all such CFCs along with appropriate processing and treatment facilities for value addition. A system of certification would be put in place to promote sustained improved quality that meets buyer needs.
3. Local talent for product design, development and diversification would be promoted by providing regular technical inputs from market and design institutes such as National Institute of Design (NID), Ahmedabad, the Cane and Bamboo Technology Center (CBTC), Guwahati, as well as agencies and designers abroad. An extension/exchange based program would be structured for ongoing inputs into the design process involving artisans. This would be channeled through an agency which would then train the trainers and link them to production outputs.
4. A focused category (product family) specific strategy and business plan would be developed for each cluster which would be supported with required training, raw material and specific jigs, fixtures and tools. Channels would be set up to reach the technologies and designs developed externally to the artisan communities. This role may be performed by an external agency which has to work to getting new designs and techniques to survive as repetition of content will dilute its offering.
5. Market research which is targeted towards working backwards from the needs of the markets would be initiated. Assistance from Export Promotion Council for Handicrafts (EPCH) and other organizations would be taken in this regard.
6. Industrial Training Institutes (ITIs) of the State would be included as part of a program to provide technical manpower required for the sector. Specialist courses would be offered addressing the needs emerging from use of bamboo material and tools for various industrial and mechanical handicraft processes.
7. Interactive workshops, buyer-seller meets, preparation/updation of catalogues and showcasing of products and capabilities would be promoted and supported. Support from organizations such as National Informatics Center (NIC) would be sought whose Community Information Centre programs will help increase the reach of learning material through the web. Doordarshan would be leveraged to provide online video based training

content on a scheduled basis. Content could be sourced from organizations such as INBAR and local translations carried out.

6.8 Industrial Use

1. Small and Medium-Scale Industries in emerging areas of Bamboo Mat Boards (BMBs), Bamboo laminates, Bamboo ply, Bamboo tiles, Bamboo furniture and Bamboo shoot processing, etc., would be promoted through entrepreneurship development and by providing appropriate incentives and linkages with appropriate agencies such as the Indian Plywood Industries Research and Training Institute (IPIRTI), Bangalore, Building Material and Technology Promotion Council (BMTPC), New Delhi, and the Central Food Technology Research Institute (CFTRI), Mysore. TIFAC, an organization of the Department of Science & Technology, Govt. of India, would be involved in setting up of some ventures providing soft funding for technology implementation. Assistance from TIFAC would also be taken for a Bamboo Technology Park to be established in Agartala.
2. Project profiles would be prepared based on extensive market study to enable support in setting up enterprises. The information from the ongoing INBAR market and investment analysis survey will be useful in this context. Where required, global technology and machinery sourcing would be planned for, through the assistance of an organization such as INBAR.
3. Appropriate funding mechanisms would be established under the aegis of North East Development and Financial Institution (NEDFI), which has a mandate to perform this task in the North East. If the terms of the offer are not suited to an entrepreneur, additional support plans would be drawn up which should work on performance basis rather than on grant basis.
4. A conducive industrial climate needs to be established to give the new industries being set up, an even chance to survive. Initially the Government may provide some commitments from its side to enable them to hold their end of the effort.
5. Partnerships on an inter-state or even international basis need to be considered for mutual benefit. Opening of borders with Bangladesh in a limited way would be one of the steps to start with.
6. Given the advantage of natural gas availability, adequate steps would be taken to ensure availability of the same and to an extent possible the same would be considered the prime fuel for industrial usage.
7. Bamboo utilization in bulk sectoral uses of Agarbatti sticks, fishing rods and umbrella handles, and hitherto unexplored applications, would be promoted through market linkages and appropriate incentives. Mechanisation processes would be introduced and movement up the value chain would be taken up on a priority basis.

6.9 Building Material

1. The present use of bamboo as building material in rural housing is beset with problems of low durability, low fire resistance, poor design and lack of technical details and skill. Use of bamboo in rural housing would be promoted through appropriate standardization of species grouping and preservation techniques/ processes for different structural elements to make it a fire resistant, durable and tough building material under local conditions.
2. International Network of Bamboo and Rattan (INBAR) has been commissioned by the Govt. of India (Min. of SSI) through UNDP for a project on low-cost bamboo based housing, and Tripura has been chosen as the pilot location for the North East. An autonomous professionally run institution would be set up under the joint auspices of Tripura, INBAR and UNIDO-CBTC, dedicated to the study of this sector, as Tripura stands to gain from the use of bamboo on an ongoing basis for purposes of housing. Support in this regard would also be sought from the Ministry of Small Scale Industries.
3. Improved designs would be developed along with technical specifications and skills in collaboration with Indian Plywood Industries Research and Training Institute (IPIRTI), Bangalore, Building Material and Technology Promotion Council (BMTPC), the Housing and Urban Development Corporation (HUDCO), and International Network of Bamboo and Rattan (INBAR).
4. Cost estimates and schedule of rates would be developed and bamboo housing would be promoted through District Rural Development Agencies (DRDAs), Rural Development (RD) Department and Local Nirmiti Kendras. Various schemes, Indira Awas Yojana (IAY) for one, sponsored by the Government of India (GOI) would be borne in mind while planning for objectives under this sector. If aggressive targets need to be set beyond those outlined under the scheme by the GOI, the State Government would arrange for additional resources for the same.
5. A scheme for renovation would be drawn up as the IAY has been running for a long term and soon a requirement for renovation would come up. Bamboo offering cheaper options will get maximization of value for this effort, if included by the Government under its plans.
6. The Government would actively consider the use of bamboo for its own requirements and programs. This will not only set a good example to the people but will also build confidence in the minds of the people as to bamboo's potential and efficacy.

6.10 Marketing

1. Existing regulations relating to trade and movement of bamboo would be reviewed to ensure income generation to growers and extractors to stimulate bamboo growing as an economic activity in the State.
2. The issue of illegal movement of bamboo across the border would be addressed and a long-term plan would be drawn up to build up utilization within the State. This will help keep the prices of bamboo at realistic levels rather than building inflationary pressures on

- it. Controlled and regulated trade of bamboo with Bangladesh would be started to ensure appropriate benefits to cultivators and extractors.
3. Export oriented units of bamboo products would be promoted by providing appropriate marketing linkage, information and support.
 4. Chains of distribution would be collapsed to ensure fairer returns to the producers.

6.11 Funding and institutional strengthening

Based on the projected development of bamboo sector in the State in next five years, it is estimated that an amount of Rs.200.00 crores would be required for the same. An integrated project on holistic perspective would be prepared through the International Network for Bamboo and Rattan (INBAR) and necessary funding would be arranged from external donor agencies, Government of India and from internal resources of the State.

A medium-term arrangement would be entered into with INBAR to provide necessary technical backstopping, institutional and managerial support, to implement the integrated project. Mechanisms to source and deploy the funds on a task basis rather than on a budget-expenditure basis will be put into place. Detailed monitoring with guidelines and systems will be put into place in a manner that at any point of time, progress on all fronts can be monitored effectively.

An autonomous institution would be set up to build up the capacity of the State to carry forward the development of the sector over the long-term with the assistance of International Network for Bamboo and Rattan (INBAR).

6.12 Monitoring and regulation

A State level Advisory Committee of the Bamboo Sector has been formed under the Chairmanship of the Chief Secretary. The committee would monitor the development of the sector and, would regulate and ensure accountability as well as proper functioning of agencies involved in development of the sector. The committee would meet at least twice in a year to review the status of development of bamboo sector in the State.

Annex-1

Resource base

i) Species of bamboo found in Tripura

Barak (*Bambusa balcooa*), Bari (*Bambusa polymorpha*), Mritinga (*Bambusa tulda*), Muli (*Melocanna baccifera*), Kali (*Bambusa nutans*), Poara (*Bambusa teres*), Rupai (*Dendrocalamus longispathus*), Dolu (*Schizostachyum dullooa*), Makal (*Bamboo pallida*), Pecha (*Dendrocalamus hamiltonii*), Kailyai (*Gigantochloa rostrata*), Kanak Kaich (*Bambusa affinis*), Lanthi bans (*Dendrocalamus strictus*), Tetua (*Bambusa spp.*), Ish (*Bambusa spp.*), Jai

(*Bambusa spp.*), Bombash (*Bambusa spp.*), Sairil/Wadu bamboo (*Melocalamus compactiflorus*), Bosai (*Bambusa spp.*).

ii) Area under bamboo resource

Taking Bamboo, Bamboo with Miscellaneous and Shifting Cultivation stratum, the bamboo resource base extends over 2397 km² of forests(as per State Forestry Action Plan) and 109 km² in small holdings of farmers outside the forests.

iii) Productivity of the resource

The average productivity of the resource for forests and farm areas is estimated to be 0.73 MT/ha/annum, which is higher than all India average of 0.51 MT/ha/annum but compares very poorly with productivity level of 3.79 MT/ha/annum in China.

iv) Yield and utilization

The present level of extraction of 184.26 million numbers/annum is much beyond sustainable yield of 142.60 million numbers/annum, meaning thereby that forced supply to cater the existing demand, is being maintained either by reducing the rotation of the crop or by extending the degradation to non-degraded areas by way of over-exploitation of the crop, thereby resulting in further degradation of the resource. The present utilization of aforesaid extracted bamboo is as mentioned below:

Housing	134.69 Million nos.
Supply to paper mill	16.51 Million nos.
Handicrafts	3.20 Million nos.
Agricultural implements	1.47 Million nos.
Other use	28.39 Million nos.
Total	184.26 Million nos.

Annex 2

The department wise target for next five years would be as mentioned.

(Area in ha.)

Departments	ANR inside forests	Artificial Regeneration in degraded forests		Artificial regeneration in private holdings	Total
		Pure	Mixed with teak		
Forest	50,000	5,000	5,000	500	60,500
R.D.	-			1500	1,500
A.D.C.	-			500	500
Panchayat/PRIs	-			2500	2,500
Total	50,000			5000	65,000