National Policy Consultation on

Bamboo as Change Agent for a Better Country

PROCEEDINGS

12 February 2015, New Delhi

MP State Bamboo Mission &
MP State Bamboo & Bamboo Crafts
Development Board

MP STATE BAMBOO MISSION

National Policy Consultation on

Bamboo as Change Agent for a Better Country

Under the Chairmanship of Hon Minister of Road Transport and Highways and Shipping,

Shri Nitin Jairam Gadkari

in the august presence of Hon Ministers of

- Tribal Affairs (**Shri Jaul Oram**)
- Agriculture (**Shri Radha Mohan Singh**)
- Science & Technology, Earth Sciences (**Dr Harsh Vardhan**)
- Environment, Forest & Climate Change (**Shri Prakash Javadekar**)
- Commerce & Industries (**Ms Nirmala Sitharaman**)
- Micro Small & Medium Enterprises (**Mr Giriraj Singh**)
- Rural Development (**Shri Sudarshan Bhagat**)

12 February 2015
India International Centre, New Delhi

Shri Nitin Gadkari,
Hon'ble Minister,
Road Transport and Highways

सत्यमेव जयते

मंत्री सड़क परिवहन राजमार्ग एवं पोत परिवहन
भारत सरकार,
परिवहन भवन, नई दिल्ली-110 001
MINISTER OF ROAD TRANSPORT
HIGHWAYS & SHIPPING
GOVERNMENT OF INDIA
PARIVAHAN BHAVAN, NEW DELHI-110 001

FOREWORD

I am happy to participate in the National Policy Consultation on 'Bamboo as a Change Agent for a Better Country'. Eradication of poverty is the biggest challenge that the government is grappling with. The challenge can be addressed by creation of jobs in rural areas. Being intrinsically linked to rural communities, bamboo has enormous potential to transform the country's rural economy. Even by conservative estimates, with its myriad uses, the bamboo sector in India has potential to create and sustain at least 50 million jobs.

Bamboo is a fast-growing, high-yielding and eco-friendly renewable resource with around 2000 documented uses ranging from construction material, food source to textiles and fuel wood. Bamboo is a viable and a greener alternative to petrol and diesel. Its use as a bio fuel can create many livelihood opportunities in rural areas.

The consultation should contribute significantly towards creation of a comprehensive report comprising information on potential of bamboo industry and government policies with respect to bamboo. The report should help government remove policy bottlenecks and create institutional mechanisms to unlock the true potential of this valuable resource. We must see to it that the report is presented to the honourable PM and a Bamboo Sub Group is constituted under Niti Ayog.

I would like to extend thanks and best wishes to the bamboo experts who took time to explain diverse uses of bamboo, its usefulness to the masses. I would also like to urge the delegates from various organisations working on bamboo product development to take forward this consultation to a successful accomplishment.

(Shri Nitin Gadkari)

सत्यमेव जयते

मंत्री
जनजातीय कार्य मंत्रालय
भारत सरकार
शास्त्री भवन, नई दिल्ली-110001
MINISTER OF TRIBAL AFFAIRS
GOVERNMENT OF INDIA
SHASTRI BHAWAN, NEW DELHI-110001

FOREWORD

Shri Jaul Oram
Tribal Affairs

Forests have a vital role in social and economic development of any country and in maintaining its ecological balance. Forests make for major storehouses of biological diversity which are utilized by people as a viable and renewable resource for ensuring livelihood of rural and urban populace. Bamboo, a woody member of the grass family, is the major species found in abundance in the forests of India. It provides livelihood security to a large tribal population across the country, besides supplementing their nutritional requirements. Rural people use it for construction, handicrafts, furniture and cottage industry.

With tremendous technological research and innovation treated bamboo is not only aesthetically highly acceptable today but has also proved to be a major alternative source of raw-material for timber and wood. Forest-dwelling tribes should be skilled to manufacture aesthetically appealing utility items using bamboo.

Harnessing the true potential of bamboo would help millions of forest-dwelling tribes achieve economic freedom. I am sure the discussions at the National Policy Consultation on 'Bamboo as a Change Agent for a Better Country' will lead to enabling policies that would immensely benefit the rural population.

(Shri Jaul Oram)

सत्यमेव जयते

मंत्री
विज्ञान और प्रौद्योगिकी एवं पृथ्वी विज्ञान
भारत सरकार
नई दिल्ली-110001
MINISTER
SCIENCE & TECHNOLOGY AND EARTH SCIENCES
GOVERNMENT OF INDIA
NEW DELHI - 110001

FOREWORD

Dr Harsh Vardhan
Minister of Science & Technology, Earth Sciences

The global scientific and technological revolution has equipped the mankind to harness the nature's resources at a pace which outstrips the natural process of rejuvenation. Although the technological revolution has given us comforts and enriched our lives, the costs of these developments in terms of environmental pollution, climate change, etc. have been enormous. These concerns compel the scientific community and policy makers to rethink about the developmental priorities and develop new technologies and products which are environmental-friendly and sustainable. Bamboo is known to have characteristics which make it an ideal raw material for a number of high-value industrial products. Being an environmental friendly and naturally regenerating fast growing resource, bamboo is now catching the attention of the scientists and technologists around the world. It is high time that we in India also make serious efforts to harness the full potential of Bamboo.

I am sure the discussions at the National Policy Consultation on 'Bamboo as a Change Agent for a Better Country' will lead to new understanding and innovations for development of innovative and relevant technologies and sharing of existing knowledge for improved production and sustainable utilization of bamboo globally. I would like to thank all the participants for their expert inputs. With proper ToT, Bamboo can bring about revolution in both rural and urban India.

The schemes and interventions of the Ministry regarding the transfer of technology and their application will strengthen the utilization of bamboo in various sectors, specially the bamboo based advanced infrastructure in the rural areas, like rural housing, bamboo toilets etc.

(Dr Harsh Vardhan)

सत्यमेव जयते

D.O. ...324....MOS (RD) 2015
राज्य मंत्री
भारत सरकार
MINISTER OF STATE
FOR RURAL DEVELOPMENT
GOVERNMENT OF INDIA

FOREWORD

Shri Sudarshan Bhagat
Minister of State, Rural Development

I am happy to meet you through this message. The deliberations at the National Policy Consultation on 'Bamboo as a Change Agent for a Better Country' provided key insights into and viable solutions to the challenges faced by the bamboo economy.

Bamboo is a precious gift of nature for the country in general and the North Eastern Region in particular since it holds two thirds of the country's bamboo reserves. Transformation of this fast-regenerating and plentiful natural resource from 'green grass' to 'green gold' through proper management and systematic value-addition, is crucial not only for employment generation and poverty alleviation but also for maintenance of ecology and environment.

I would congratulate the organizers of this consultation for successfully bringing together relevant stakeholders and creating a rich platform for better understanding of the bamboo economy in the country. As bamboo has significant role in the rural development sector, the schemes and programs of my Ministry can reinforce the mandate of bamboo based development in the country.

(Shri Sudarshan Bhagat)

सत्यमेव जयते

स्वच्छ भारत
एक कदम स्वच्छता की ओर

राज्य मंत्री
सूक्ष्म, लघु और मध्यम उद्यम
भारत सरकार
नई दिल्ली - 110011

MINISTER OF STATE
FOR
MICRO, SMALL & MEDIUM ENTERPRISES
GOVERNMENT OF INDIA
NEW DELHI-110011

FOREWORD

Mr Giriraj Singh
Minister of State, Micro Small & Medium Enterprises

India is a huge repository of bamboo trees. It meets nutritional and livelihood needs of millions of rural and tribal people. Bamboo has also been reinvented in the context of its modern uses and applications. Bamboo has nearly 1500 documented uses. Its uses range from bio-fuel, construction material, textile material to food source, paper, etc. Next only to China, India has the richest Bamboo genetic resources in 136 species, including 11 exotic species out of which 58 species belong to 10 genera and are found in the North Eastern Region. The total forest area under Bamboo is 8.96 million hectares. This is about 12.8% of total Forest Area of our country.

Bamboo-based enterprises usually fall under the MSME sector. Growth of the MSME sector is a natural corollary of growth of the bamboo industry. Thus, I have keen interest in bamboo economy.

Bamboo development has to be market and technology driven. Conducive policies and innovations are imperative for bamboo sector to attain optimal growth within a span of about 10 years. Initiatives under Make in India should be fashioned to facilitate bamboo-based development. Bamboo toilets should be built under Swachch Bharat Mission.

I am excited to be a part of the National Policy Consultation on 'Bamboo as a Change Agent for a Better Country'. The consultations offered innovative solutions to various challenges that adversely affect the bamboo economy. I would like to extend a vote of thanks to all the participants for taking time and helping take the government's mission of bamboo-based rural development forward.

(Mr Giriraj Singh)

PROLOGUE

It is now well acknowledged that Bamboo has got huge potential to positively impact sustainability in a holistic manner. In India, it fulfills several crucial needs of the society. The wide gap that exists between the demand and supply of bamboo owing to the growing National and International markets identifies the huge opportunity available for development of bamboo resources, both on public and private lands and consequential improvement in the economic condition of the bamboo-dependent people. Therefore, highest possible priority should be given to build this resource, as India has not been able to strike into these markets despite being the second-largest bamboo producer in the world after China.

The MP State Bamboo Mission in its short period of existence has accomplished tremendous achievement, starting from Resource augmentation, capacity building, collaborations and convergence, certification, entrepreneurship to marketing and promotion in a manner which facilitate inclusive development in the State.

On the advice of the Hon Minister of Transport & Highways, Shri Nitin Gadkariji, the National Policy Consultation on "Bamboo as a Change Agent for a Better Country" was organized in Delhi on 12th February 2015 in the presence of esteemed dignitaries, including the Hon Ministers of Road Transport and Highways, Tribal Affairs, Agriculture, Science & Technology, Environment, Forest & Climate Change, Commerce & Industries, Micro Small Medium Enterprises and their officials. The Hon Ministers have acknowledged the event as a major historical landmark.

There were intense technical deliberations and interactions among bamboo stakeholders during the event which have resulted in concrete resolutions too. I am very glad to share the outcome of the workshop in the form of present proceedings. I understand that the proceedings presents a gamut of information regarding the issues pertaining to the potentials and problems of Bamboo sector that will help all concerned authorities to make sound decisions in the future development of bamboo sector in India.

The consultation proceedings highlight the tremendous works on bamboo that are being carried out in different parts of the country. There is a need to create a platform and organize the scattered information concerning bamboo sector and we hope this effort is well treasured and recognized.

We are grateful to the Hon ministers and their teams to spare time and provide valuable inputs in the consultation, and make the whole event a success. I congratulate and thank the expert resource persons, the organizing committee, staff, bamboo stakeholders and all bamboo lovers for their great support.

We hope that the present document will play a pivotal role in promoting further the development of the bamboo sector, so that bamboo in the forests and in the hands of people paves a big reform for a greener tomorrow. Let’s hope we grab this potential. I implore you all to extend cooperation for this noble effort.

(AK Bhattacharya)
Mission Director, MP State Bamboo Mission &
CEO, MP State Bamboo & Bamboo Crafts Development Board

CONTENT

BACKDROP

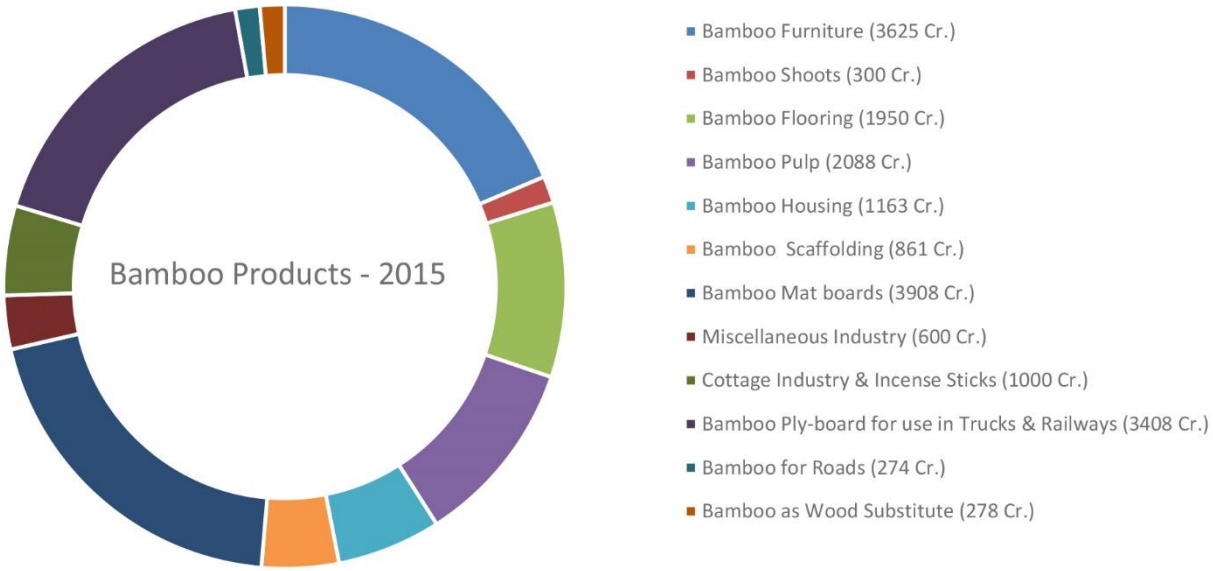
The national policy consultation meet was organised to discuss potential of bamboo as change agent and relevant policy concerns. The consultation was attended by eight Honourable Ministers of Government of India: Road Transport and Highways and Shipping, **Shri Nitin Jairam Gadkari;** Tribal Affairs, **Shri Jaul Oram**; Agriculture, **Shri Radha Mohan Singh**; Science & Technology, Earth Sciences, **Dr Harsh Vardhan**; Environment, Forest & Climate Change, **Shri Prakash Javadekar**; Commerce & Industries, **Ms Nirmala Sitharaman**; Micro Small & Medium Enterprises, **Mr Giriraj Singh;** and Rural Development, **Shri Sudarshan Bhagat**. 16 Experts made presentations on various segments of bamboo explaining its diverse use, benefits to the masses, technological interventions and policy support required. The consultation was also attended by 38 delegates from various organisations working on bamboo and bamboo product development. Annexures 1 and 2 present the detailed schedule and the list of delegates who participated in the consultation.

BREAKING THE ICE

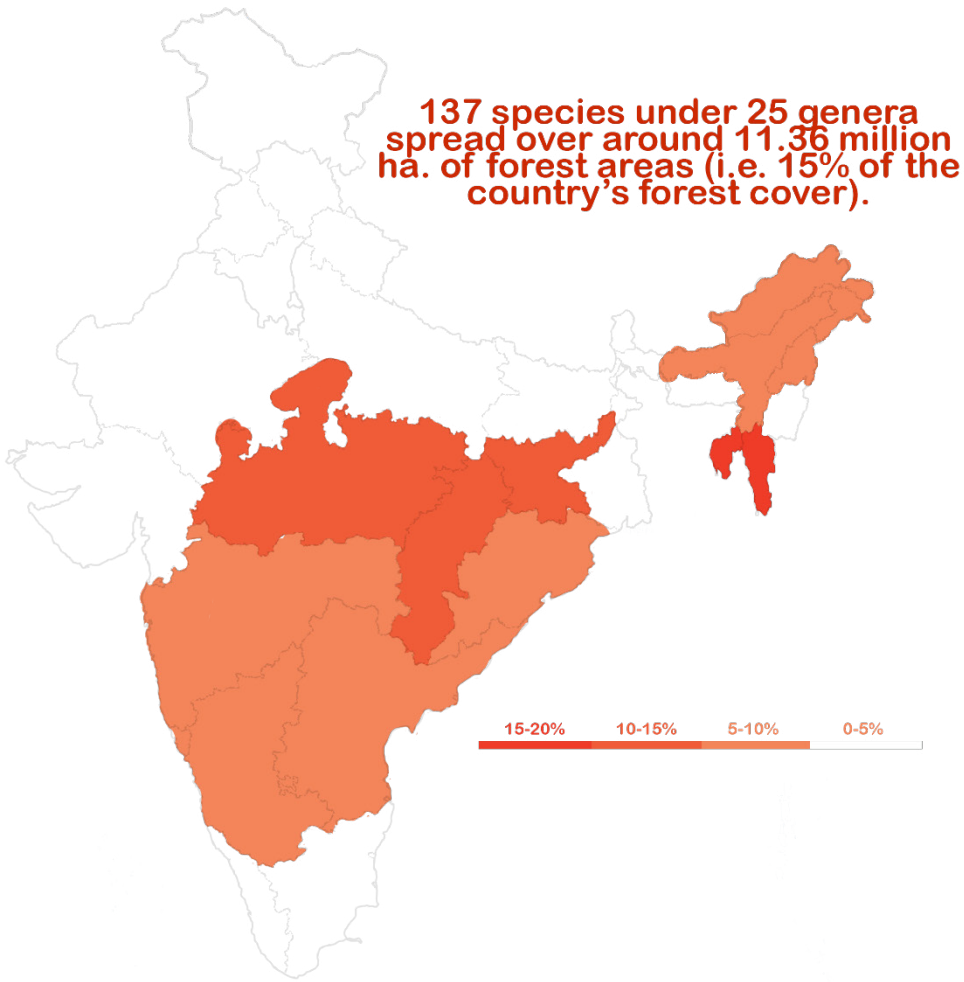
The consultation meet started with welcome and felicitation of honourable ministers. The opening remark was given by Dr Ajoy Bhattacharya, Mission Director of Madhya Pradesh State Bamboo Mission. Welcoming the delegates Dr. Bhattacharya said, "12th February 2015 will be marked as a golden day in the history of bamboo when the significant people have assembled to discuss bamboo for the betterment of the country. The bamboo experts and the enthusiasts have volunteered to take bamboo forward for a better country. Through this consultation we would attempt to submit the action points for the attention of federal government to strengthen bamboo sector in the country."

Dr. Bhattacharya highlighted the following points in his presentation:

1. Current estimate of the market for bamboo products: Rs 50,000 crore (approximately US $ 10 Billion):



2. Bamboo as a change agent has been globally accepted. Today, the role of bamboo is identified not only from the point of view of sustainable development pillars such as Economy, Ecology and Social development but it also plays a key role in our lifestyle and fulfilling the energy needs .
3. India is the second richest country in terms of Bamboo genetic diversity with a total of 137 species under 25 genera spread over around 11.36 million ha. of forest areas (i.e. 15% of the country's forest cover).
4. The action points suggested:
    a. Consider Bamboo as an icon of sustainability and perfect and ideal entity for blue economy in planning process.
    b. Convergence - Bamboo being under Multiple ministries, need to establish an umbrella organization - *National Bamboo Development Authority/ Board.*
    c. Declare bamboo as a national plant and as a plantation crop.
    d. National Bamboo Development Policy.



e. Uniform policy for tax exemption and subsidies on Bamboo, Bamboo Products, and Bamboo Machinery, considering bamboo as green material.
f. Adopt bamboo as the key species for the sustainable development solutions dealing with climate change initiatives.
g. Use bamboo as the key species for the Green India Mission.
h. Establish bamboo as the paradigm for the "Make in India" initiative.
i. Construct bamboo toilets on large scale under Swacchhata Abhiyan.
j. Use bamboo for "Clean Ganga" program for riverine management.
k. Use bamboo as a breakthrough for the triple "S" phenomenon – skill, scale and speed.
l. Use bamboo as the air purifier through urban and road side plantations *(Obama brought 80 air purifiers with him).*
m. Use bamboo for the office utility items and furniture in Govt offices and schools as far as possible.
n. Use bamboo for Govt infrastructure, like Indira Awas Yojna.
o. Include Bamboo as building material in SoRs and Tendering process.
p. Organise a World Bamboo Summit in Delhi to strengthen international bamboo trade.

Annexure 3 presents the resume of the deliberation of Dr AK Bhattacharya.

EXPERTS' DELIBERATIONS

A group of 16 experts from bamboo development sector made presentations emphasising on various aspects of bamboo growth. The group of experts represented academia, researcher, policy experts, corporate, policy experts, designers, scientists, civil society and artisans etc. Here are the key highlights from the presentations by the experts.

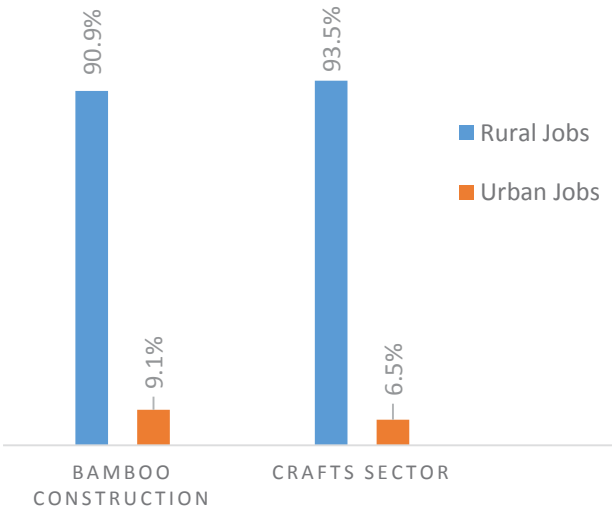
"Within about 20-30 years the total productivity (in China) *has gone up several folds and right now the average productivity is 20+ tons whereas in our case we will find it less than even 1 ton or 1.5-2 tons."*

Dr I V Ramanuja Rao, Senior Advisor, International Network for Bamboo & Rattan (INBAR)

Mr Rao in his presentation emphasised on creating large scale livelihood opportunities using bamboo. Mr Rao emphasised on giving ownership of bamboo to communities to increase livelihood. Explaining how China has managed its bamboo resource in forest, Mr Rao said, *"Bamboo in China used to be public and productivity was very low. Then they gave it to cooperatives/societies, not just Joint Forest Management Committees. Then also the productivity did not go up. Then they parcelled out the forest land. The title remained with the forest department/government. It was given in proportion to the number of adults in every household. They were asked to manage. Within about 20-30 years the total productivity has gone up several folds and right now the average productivity is 20+ tons whereas in our case we will find it less than even 1 ton or 1.5-2 tons."*

Here are the key highlights from his presentation:

1. Bamboo is both a Grass and a Tree. It neither fits in Agriculture nor in Forestry.



2. So bamboo needs tending. But foresters are not gardeners, nor are they farmers. They are also too few. Rural households should manage bamboo forest areas, not JFMCs.
3. Bamboo commodities in quantity – input material for quality products.
4. The more we **mainstream bamboo as a material**, the less would be the effort in greening the economy. That would also avoid deforestation.
5. Institutional markets, school furniture, school buildings, IAY housing, and others should be promoted.
6. Bamboo **construction** creates **90.9%** rural jobs and **9.1%** urban jobs! This compares well with the **crafts** sector, where **93.5%** rural and **6.5%** urban jobs were created.
7. Panel production by rural communities, 1-2 square metres/HH/day. 10,000 HH can produce 10,000 sqm/day, all above the poverty line.
8. Food crops are perishable and susceptible to weather. Bamboo as energy crop is not susceptible to weather.
9. We can stop farmer suicides with bamboo. Bamboo survives drought, fire and floods. Round the year income.
10. Bamboo rehabilitated tens of thousands of hectares of used brickfields - won $1 million Alcan Prize for Sustainable Development (2007).
11. The 68 million ha of degraded land and 52 million ha of wastelands in India (total 120 mill ha) can similarly benefit. 1% of 120 mill ha can benefit 1.2 million household. Income: $0.46-$3.23/day at lowest yield of 10 tons/ha.

" If I grow and cut bamboo in my farm, I can't transport it. Availability of quality bamboo is another area that needs to be looked into. "

Ar Sunil Joshi, Secretary, VEDHA

Mr Joshi, while highlighting the all pervasive and benevolent characters of bamboo, emphasised upon the potential of growth in bamboo sector and policy bottlenecks hampering the growth of bamboo sector. Mr Joshi said, *"The Indian Forest Act has been a roadblock. If I grow and cut bamboo in my farm, I can't transport it. Availability of quality bamboo is another area that needs to be looked into. It is necessary that bamboo be looked as a subject of technology education for MSME development and government patronage thereto as green industrial alternative. Bamboo is under 16 different Ministries or 16 different Departments. For bamboo industry to prosper, bamboo needs to be brought under a single department."*

Here are the key excerpts from his presentation:

Bottleneck in bamboo development:

a. Forest Act / TP regime
b. Non-availability of quality bamboo
c. Lack of Backward & Forward linkages
d. Lack of Tech. Institutional / Govt. patronage
e. Absence of Central Empowered Body for Bamboo
f. Lack of processing units in India
g. Hardly any major furniture manufacturing units
h. Most NE bamboo enterprises sick or NPA

Opportunities:

a. Huge demand-supply gap
b. MSME development
c. Growing awareness towards green products
d. Skill India - development at all levels - Farm to Factory
e. Creating agro-bamboo-industrial-economy
f. Empowerment / Capacity building of rural youth
g. Moving sustainable development
h. Offering livelihood/Ecological/Economic/ Food Security

Suggestions:

a. Establish National Bamboo Development Authority
b. Reservations for bamboo applications in Govt Dept.
c. Adopt TP free regime for bamboo in all states
d. Initiate research & education in bamboo technology
e. Promote technology driven bamboo industries
f. Development of network of warehouses
g. Adoption of facilitating bamboo policies by all states
h. Seek SHG/Rural participation in bamboo plantation

"Our structures cost slightly higher than traditional cement concrete structures. So we are expecting that the buyers should get benefit now. "

Mr Sanjeev Karpe, MD, KONBAC

Mr Karpe brought the corporate aspect from bamboo house manufacturer. He mentioned how successfully KONBAC has been able to create high end bamboo structures and also identified limitations that hold the sector. He said, *"Our turnover in the last 3 years was Rs 15.4 crore. We have impacted more than 9000 villagers. 4000 artisans are getting a reliable livelihood. We have shown this as a replicable project. After doing a project in Sindhdurga, we got an opportunity to replicate in Lavasa with a corporate, then we got an opportunity to do it for the Gujarat government. With all these achievements we have some limitations as well. We need more technology, more design and we need reach to a certain higher scale. Our structures cost slightly higher than traditional cement concrete structures. So we are expecting that the buyers should get benefit now. They should get some type of subsidy - it can be in FSI, in reducing property tax or in getting low interest rate."*

Here are the key highlights from his presentation:

1. The well developed International Bamboo Construction Industry is focused on the high-value structures. The nascent Indian industry is confined to temporary or low-value structures.
2. Consolidated turnover (2011-2014) of KONBAC, Native KONBAC and associated not-for-profit and for-profit organizations: INR 55.7 mill.
3. Treated Bamboo structure is costlier than conventional cement concrete structure due to various factors such as existing technology, joinery, available skills in the market.
4. Bamboo structures are still less durable as compared to cement concrete structures, hence composite structures need to be created requiring R&D and involvement of stakeholders.
5. Market acceptability is low for bamboo construction due to age old perception about bamboo confining it to poor-man's timber. This wrong perception needs to be corrected.
6. Bamboo industry can progress when:
   a. Indian customers start accepting it as a mainstream material in construction. For this, an incentive for the initial 5 years is required in form of subsidies, tax benefits, increased FSI etc for customers who adopt Bamboo structures.
   b. More opportunities of seeing the different bamboo structures is available in each state, hence the central government should promote this material for new buildings not only for construction but also for the different furniture options.
   c. A form of grant be made available for R&D in building modern technologies in bamboo construction.
   d. Separate fund should be earmarked for result-based capacity building of different artisans / workers to take forward this material in a big way

"We conduct training programme with all these new products like, training artisans in the rural sector how to make these new products and we also develop a course modules and teaching aids for bamboo sector like for teaching in ITIs what kind of textbooks and inputs required."

Mr CS Susanth, Sr. Faculty National Institute of Design, Bangalore

Mr. Susanth in his presentation focused on the quality of design that Centre for Bamboo Initiatives of NID does. He mentioned that the focus in last many years was more concentrated on handmade and semi industrial approach since most of our development work focused on training rural people. Now we need to get more advanced industrial approach because then only utilization of bamboo can be increased which will also replace steel, plastic and wood. Therefore, it can replace many non-eco-friendly materials in the market.

He said, *"Design is an integrated part of the bamboo development, which helps the rural and industrial sectors. We explore lots of application of bamboo, and we explore new joineries and combinations, which help to develop new products and furniture. We conduct training programme with all these new products like, training artisans in the rural sector how to make these new products and we also develop course modules and teaching aids for bamboo sector like for teaching in ITIs what kind of textbooks and inputs are required. So it helps bring quality to the product through a systematic production method."*

Here are the key highlights from his presentation:

1. Design is an integrated part of bamboo development in rural or industrial sectors.
2. It brings more applications to the material which can create a market demand or it can work as per a market demand.
3. It adds more value to the raw material which can help to improve the rural economy.
4. It helps to bring quality to a product through systematic production method.
5. It fills the gap between the raw material and the market through defined application
6. Bamboo needs to go more industrial and for this we need to have proper education system as proper design course at industry level, engineering level or design level.
7. This can address many issues like need to improve the technology part which is focused to the bamboo sector. This needs a much defined high investment.
8. Bamboo has to be used as lifestyle product because now lifestyle is changing and you need to compete with the market with modern material.
9. There has to be research and proper systematic development. Species specific approach should be adopted.
10. It has to be designed in India and made in India so that it should not just replicate what other country is doing.

"Bamboo has some unique characteristics, which make it very special and strong. So bamboo is a very sensitive material. "

Ms Fatima Martin Alvaro, Bamboo Architect Consultant for Madhya Pradesh State Bamboo Mission

Ms Fatima gave an overview of the possibilities of the bamboo architecture in her presentation. She said, *"We should think of bamboo from the architectural point of view as a completely new material. We tend to think of bamboo as a way to replace wood or metal in our architecture but we should think of bamboo architecture. Bamboo has some unique characteristics, which make it very special and strong. So bamboo is a very sensitive material. It can last from two months till centuries. Bamboo should be thought of as a green metal much more than wood due to its internal characteristics. In India there is an amazing traditional knowledge of how to do large scale structures in bamboo."*

Here are the key highlights of her presentation:

1. These are some examples of colonial architecture in South America, which are 400 years old.
2. If we make all infrastructures with metal, we would require a big investment of energy. However, it can also be done with bamboo.
3. A building recorded from Sumeria civilization was done with bamboo.
4. The structure around Euphrates River shows how people understand bamboo as material and are able to maintain the traditions.
5. In tribal areas of Ethiopia, they can reach 50 metres high with techniques of their weaving.
6. There are many techniques to preserve the bamboo.
7. Bamboo is known as the wood for the poor people but we also have to realize that bamboo is also for rich people.
8. If we are able to apply bamboo for certain institutional buildings or other kind of standards we will open a very big market.
9. In Indonesia, very large scale structures are constructed in two months.
10. Bamboo doesn't only grow quickly, it can also be applied so quickly, it can break all the standards of the traditional architecture.
11. There are bamboo bridges in Columbia and Indonesia. Similarly, there can be Bamboo Bridge in India too.
12. We don't have to look at China, or Indonesia or at any other place, just by rescuing the traditional knowledge and bringing it to a scientific edge we can get unique Indian bamboo architecture.

"There is a huge gap between industrial and handicraft products. Right now bamboo products are becoming low cost mass market products. "

Ms Rebecca Ruebens, Founder & Principal Designer, Rhizome

Ms Rebecca in her presentation emphasised on sustainable and inclusive development by design in the bamboo sector. She identified that there is a huge interest in bamboo globally as an eco-friendly material. She said, *"Bamboo is used for high tech furniture, even electronic items like laptop cases and there is a host of wonderful products made from industrially processed bamboo. There is a huge gap between industrial and handicraft products. Right now bamboo products are becoming low cost mass market products. On the other side, bamboo is being championed as really expensive, cutting edge, futuristic material. Having traditional value chain, a craftsman gets money at every step - growing, manufacture, transportation, and sale but in technology intensive value chains or industrial value chains the craftsman grows, cuts and may be transports. Designers get money for innovation, money for processing goes to the owners of means of production like factory owners, money for marketing goes to a brand etc. Industry value chain is contributing to sustainable and inclusive development which bamboo sector is capable of doing."*

Here are the key highlights of the presentation:

1. Bamboo has eco-friendly potential to be leveraged as a vehicle for sustainable and inclusive development. The concept of sustainability started as a green movement. Subsequently people realised the societal needs have to be catered to as well. So alongside environment, economics came in. The social issues came in. Now people give a lot of emphasis to culture.
2. Everyone is on board. Consumers - because it is personal, Companies - because it is affecting the way they do business. Mainstream investors, bankers and economists are looking at sustainability because this is affecting their financial decisions. Politicians are also reacting.
3. Governments are tracking down regulatory frameworks like never before. Sustainability has got a lot of traction and this needs to be tapped into. We should leverage it as a market by not just looking at the ecological definition of sustainability.
4. We should be proactive and look at all the facets of sustainability. There is an opportunity to mainstream sustainability through crafted bamboo products which are culturally, ecologically, socially and commercially sustainable.
5. So look beyond designing products to designing sustainability. Design sustainability in production to consumption systems. Design a product which calls for a sustainable material. Design a product which says consume me sustainably.
6. Craft economy of communities engaged in bamboo is unsustainable throughout India. So handicraft need to be mainstream products with standardization, cost optimization, transport-friendly etc..
7. There are lot of women working in bamboo sector. It's extremely gender friendly and women get the same wages as men.
8. So the action points are:
   a. Mainstream bamboo and craft in design and technical education alongside traditional materials like wood, metal etc.

b. Promotion and visibility of sustainable and inclusive bamboo products in public spaces – bus-stops, metro-stations, museums, road dividers and traffic circles.
c. Promotion of sustainable and inclusive bamboo products in institutional markets, beginning from the government – Indira Awas Yojna, furniture, schools, hospitals etc.
d. Promote bamboo related CSR projects that look beyond growing bamboo to simultaneous inclusive and sustainable development through community development
e. Awareness creation among all existing and potential stakeholders – including Forest Department Officials and entire forest extension system, NGOs, Corporate, communities, Ecotourism - regarding bamboo processing options and their benefits vis-a-vis local communities.

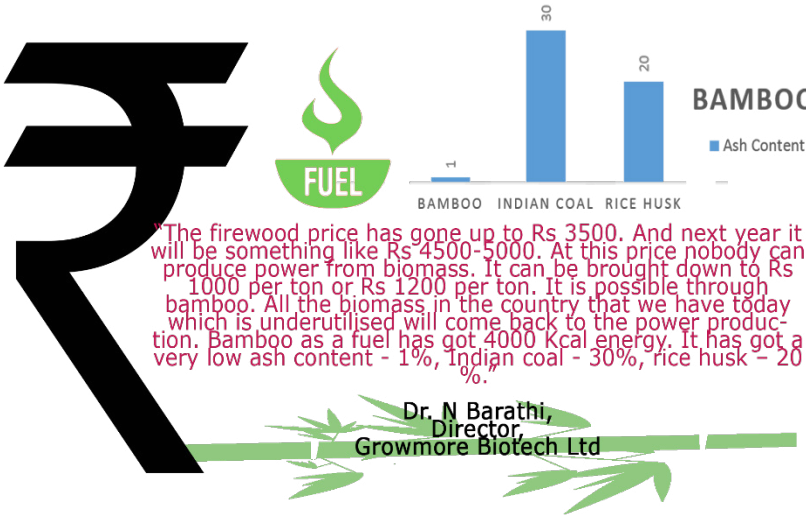
Dr N Barathi, Director, Growmore Biotech Ltd.

Dr Barathi emphasised on environmental, ecological, energy and sustainability aspects of bamboo sector. He said, *"The firewood price has gone up to Rs 3500/ ton. And next year it will be something like Rs 4500-5000/ton. At this price nobody can produce power from biomass. It can be brought down to Rs 1000 per ton or Rs 1200 per ton. It is possible through bamboo. All the biomass in the country that we have today which is underutilised will come back to the power production. Bamboo as a fuel has got 4000 Kcal energy. It has got a very low ash content - 1%, Indian coal - 30%, rice husk – 20 %. Every year like sugarcane one can keep on harvesting Bamboo for energy. One can cultivate bamboo which is missing today and by cultivating, planting once, one doesn't need to replant them at all for 100 years. And the low tar in the biomass will make the boiler very efficient to work. One can also make textile out of bamboo. Very attractive thing is that it is Rs 1200 per ton of biomass right now.*

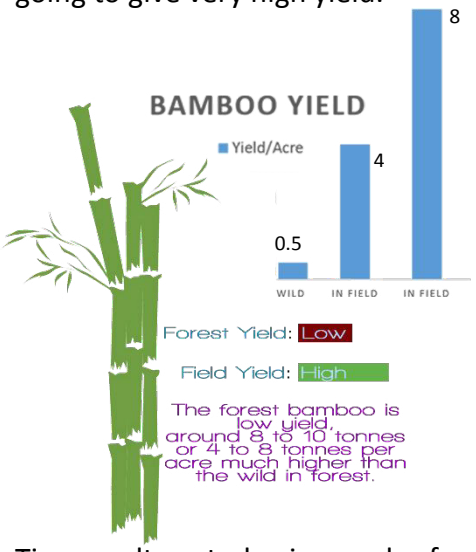
Here are the key highlight from his presentation:

1. The forest bamboo is low yield, its getting only half a ton per acre per year and that is called wild bamboo in the forest but if you remove this and plant in a field you would be able to get around 8 to 10 tonnes per acre much higher than the wild in forest.
2. We can cultivate it like sugar cane that will take to 40 tonnes per acre but the science has not gone there.

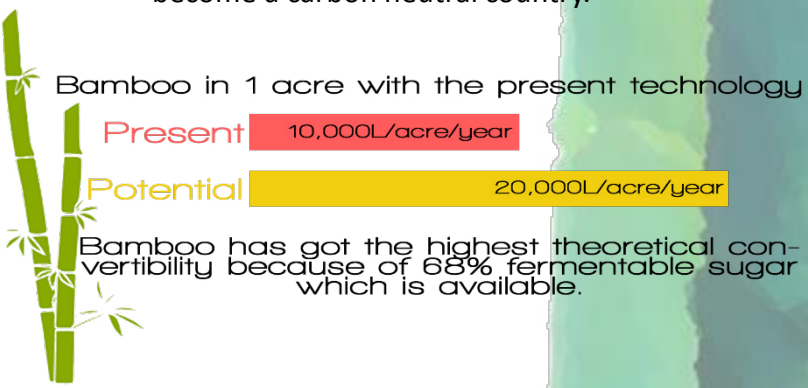
"All the biomass in the country that we have today which is underutilised will come back to the power production. Bamboo as a fuel has got 4000 Kcal energy. "



3. Bamboo grows one to one and a half feet a day. We convert it into a different products and one of the excellent products is, energy. It could be electricity, ethanol, oil etc.
4. We have around 1600 species but we should identify what is suitable. We should have the right clone. Farm grown bamboo has thick wall. Wild bamboo has thin wall but the thicker wall is very important as its going to give very high yield.



5. Tissue culture today is popular for banana, sugar cane, rose, carnation and gerbera. Now bamboo tissue culture has been standardized in lab. We can make clones every day and that will lead to greenhouse.
6. Next is agriculture practice called agronomy. Quantity of water, fertilizer, spacing and pesticide treatment etc. are required to achieve high density plantation.
7. People have started planting bamboo. It needs further additional support from the govt. to take it to the next level from 0.5 tonnes to 40 tonnes to more than 100 tonnes per acre. It can bring prosperity to the people, farmer, country, the environment, everybody.
8. 200 Acres will generate 1 mega-watt every hour. 24 MW every day. 8000 MW hours a year. That is because it is able to produce 8000 tonnes of biomass. 1 Kilo bamboo is sufficient to produce 1 kilo current. 1 Kilo bamboo can be produced at only 1 rupee. Another 2 rupees for inter generation, 4 rupees is the total production cost.
9. The bamboo also produces one of the excellent charcoals and when you sell it back you get another 1 lakh rupee back. The cost of product is only Rs 2.50 per unit of current and this is the cheapest and the money goes to our farmer every time.
10. 1250 Acres of beema bamboo plantation is coming up in Durban for energy as national demonstration project which will be expanded nation-wide.
11. Pyrolysis gas can be converted into oil. 1 acre can produce 10,000 litre of oil per year. Jatropha is only 500 litres per acre per year.
12. Bamboo in 1 acre with the present technology is 10000L/acre/year and the potential is 20,000 litre/acre/year. Bamboo has got the highest theoretical convertibility because of 68% fermentable sugar which is available.
13. If 50% ethanol to be mixed with oil then we need around 11000 acres only which is only 4440 Kms. This opens up lakhs of acres of bamboo to come and this is the cheapest on which ethanol can be produced.
14. The cost of ethanol to meet the requirement is something like 22-25 Rs per litre. If we are able to produce 60,000 tonnes/year as a capacity for which the cellulose is available in large scale from bamboo.
15. The bamboo is an excellent carbon farming. India can become a carbon neutral country. To offset all the CO2, we need only 4 bamboo plants/person per life time since one plant is able to sequester close to 400kg of CO2. If our govt decides to make everybody plant 1 tree a year, then in 4 years the country will become a carbon neutral country.



"The whole world is shifting towards a cellulose based ethanol economy. Why can't we use sugarcane/bamboo for this?"

Mr Samir Somaiya, Chairman, Somaiya Properties & Somaiya Group, Mumbai

Mr Somaiya brought corporate perspective into the discussion. He said in his brief talk, *"If we create an ecotourism project completely from bamboo, it will be very good and highly environmental. It is local, sustainable, quick, beautiful and cost- effective. We plan to set up a vocational centre to employ hands-down knowledge in handicrafts and create livelihoods. If you can grow your own bamboo and manufacture your own products - furniture, bio-pesticides, bio-fertilisers - then you can create sustainable communities/ecosystems. The whole world is shifting towards a cellulose based ethanol economy. Why can't we use sugarcane/bamboo for this? We have been inspired by Ministry of Science and Technology and have been working on the same for 7-8 years. We have come to point where we can create fabulous bio-refineries to make different products."*

"Bamboo sector is not much explored and unlike many sectors there is space for everyone in Bamboo sector. "

Mr K S Sabarinadhan, Tata Trusts

Mr. Sabarinadhan brought the non government organisation's perspective into the discussion. He emphasised on the role of community and voluntary organisations. Addressing the audience he said, *"Bamboo sector is not much explored and unlike many sectors there is space for everyone in Bamboo sector. 2000 Tons of Agarbatti sticks every month are required today. 90% of this requirement is met with import from Vietnam. 100 tons of Agarbatti sticks are now being made through Gadhchirauli Agarbatti Project. Gadhchirauli Agarbatti Project of Maharashtra is one example to understand the potential of bamboo and its impact. There is value and source for everyone. It is much value addition sector than many others."*

Here are the key highlights from his presentation:

1. New govt's plans of constructing 100 smart cities can boomerang the infrastructure and realty sector. To ensure sustainability in such large scale construction, green materials must play a key role.
2. The local govt. in Gujurat directed the use of bamboo for at least 25% percent of the desk and other furniture requirements of public elementary and secondary schools and prioritizing the use of bamboo in furniture, fixtures and other construction requirements of government facilities (2010).
3. India in spite of having the largest natural cover of bamboo is a net importer in bamboo. The reason being that the exports are low value added (handicrafts primarily) whereas imports are high value added (such as flooring, panel board etc). Thus it is even more relevant to focus on manufacturing high value added items in India.

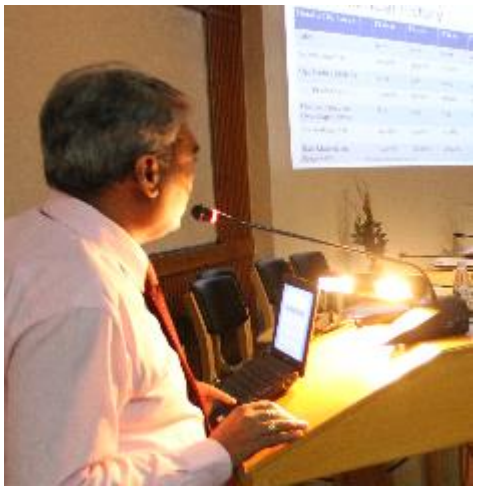
" If the Central act is amended, we would not have to make requests or issue advisories to states. And states can amend their state laws accordingly. "

Dr J V Sharma, Senior Fellow, TERI

Dr. Sharma made presentation on policy and regulatory bottlenecks. He said, *"Transit permits from Forest Departments is difficult and therefore transportation of bamboo is a problem. Ministry of Agriculture has issued some guidelines. Similar guidelines were issued in 2004. It has been ten years. Yet, barring one odd no state has implemented the guidelines. Even if a state or two had implemented, it would be futile because transportation takes place from one state to another. Thus, it is important to amend Section 41 of the Indian Forest Act, 1927, not just for bamboo but for other species as well. This has two benefits. If the Central act is amended, one need not make requests or issue advisories to states. And states can amend their state laws accordingly. Secondly, farmers would not be harassed as much. It is important to note that Section 2 of the Indian Forest Act - which defines it as a tree - has been amended."*

Here are the key highlights of his talk:

1. Forest Rights Act defines bamboo as a Minor Forest Produce. Transit rules will be applicable unless Section 41 of the Indian Forest Act is amended which is of utmost importance.
2. Bamboo in our forests is not scientifically managed. There is no dearth of knowledge or technology. There are inadequate funds for silviculture operations.
3. National Forest Policy, 1988 stipulates that 33% of land in the country should be forest and tree cover. Private entrepreneurs are prohibited to carry out plantation/forestry activities under this policy. So this policy needs to be changed.
4. We have not been able to convert degrading forests into dense forests. Ministry of Environment has many a times tried to rope in private players through PPP model but national forest policy has been detrimental to the initiatives. So the policy needs to be changed.
5. Forest Rights Act vests the community forest rights with the Gram Sabhas. So Joint Forest Communities/Institutions should be synchronised with the governance provisions in Forest Rights Act. Unless this is done, forest governance is going to be problematic.
6. Institutional forest governance and amendment to the IFA is necessary to facilitate bamboo development and also development of other forestry species.



"It is very important for an industry to be bankable and government support can facilitate bankability of industries."

Mr Chandrashekhar Chincholkar, Director, Proactive Management Consultant

Mr. Chincholkar contributed from investment consultant perspective to businesses based on bamboo. Addressing the gathering, he said, *"Commercial aspect is very important because a project should be sustainable. I have analysed the bamboo and furniture industry for 4 years. Sales growth has varied from 20% to 47%. But the most important accounting figure is the operating profit which is profit before interest depreciation and tax. It was 40% in 1 year. When the turnover was INR 65 lakh, the operating profit was 17%. Excess of income or expenditure which is net profit level, it is around 9.78%. It is very important for an industry to be bankable and government support can facilitate bankability of industries."*

Here are the key highlights from his resentation:

1. Raw materials to sales ratio varies from 35% to 69%. So if we sell for Rs 100 and the cost for raw material is Rs 70, then value additions amounts to Rs 30. If government supports us and we price the raw material appropriately, value addition to the industry can be significant.
2. The ratio of sales to assets ranges from 3.72 to 5.43 in the best of financial year. If government provides infrastructure and the entrepreneur invests only in plant and machinery then the ratio of sales to his investment can go up significantly which is a beneficial thing for the industry.
3. Sales to artisan's salary ratio has been in the range of 19 times, 9.8 times, 12 times and 9.49 times. The industrial parameters are very important because it is important to create bankable and profitable projects.
4. Core sales to plant and machinery ratio is very important because for banks assessment of industry's profitability is very important. This will mean an effective ratio of plant and machinery to sales of 6.5 times. This ratio can go upto 8-10 times in next two years.
5. The parameters are very important because this is where industries fail. Their sales turnover is not in tune with their investment. As sales turnover goes up, value addition improves and thereby profitability increases. Higher quantity Sales will lead to possible lowering of Raw Material to Sales Ratio in the coming years & Higher Value Addition.
6. Rate Contract by Central & State Governments can lead to consistency of Sales in the Coming years and better profitability and better working ratios.
7. China's bamboo industry is worth more than 10 billion dollars, and India's bamboo furniture industry is 3500 crore, whereas land cultivation in India is two and half times that of China. So if cultivation practices and crop yields improve, industry size can widen. Government support can actually lead to better sales realisation, better profitability, better employment opportunities, job creation, and enterprise development, foreign exchange earnings and sustainable development for bamboo. India needs more than 20 million houses in urban areas & 40 million houses in rural areas as per latest budget and possible exploitation of full value chain for bamboo.

"We in India are trying to alter/widen our perspective. Bamboo offers itself as a useful example in this pursuit. "

Mr Ashok Kaliyamurthy, CEO, WonderGrass

Mr Ashok emphasised on bamboo as the medium to develop rural infrastructure and job opportunities. He said, *"There is a beautiful book named 'Venu Bharti'. I'd like to read an excerpt from the book. One person asks why despite being so useful bamboo ain't much in use? The other says because it ain't widely available where the white men live. We in India are trying to alter/widen our perspective. Bamboo offers itself as a useful example in this pursuit. Infrastructure development and employment generation are two pressing issues at the moment. All the infrastructural needs in rural areas are met with materials from the cities. The technology comes from the cities and the profits accrue to the cities. This means if we grant Rs 12,000 for creation of a toilet in a rural area, Rs 11,000 from it goes back to urban areas. Only Rs 1000 remains with the village, where the toilet will be used. So this leakage of economic benefit from steel, cement, rivers can be stopped through bamboo because according to Bureau of Indian Standards bamboo can be used for standard constructions which can last for 25-30 years."*

Here are the key highlights from his presentation:

1. If bamboo toilets are made in bulk, they cost up to Rs 14,000 per toilet and have a life of 25-30 years. Government officials feel Bamboo isn't useful in producing 1 lakh toilets.
2. Bamboo toilets can be manufactured in a village and transported to other villages. So the economic benefit will retain with the rural areas.
3. Member of Parliament should manufacture 5 toilets in their *adarsh gram* villages, assess viability and collate feedback.
4. At present, Vidarbha region is in need of 25 lakh toilets. We could begin by using bamboo to meet 10 % of the target - to manufacture 2.5 lakh toilets and give employment to 25,000 families in an year. All the bamboo to be used can be grown in 3-5 years and will last 30-50 years. So by using a resource that is available in the backyard we can meet a pressing infrastructural need and create employment at the same time.
5. The other infrastructural need bamboo can meet is government infrastructure such as worker housing. Construction workers live in tin shanties which get excessively heated in summers. This can be easily replaced with modular, reusable worker houses made from Bamboo. This has been tried out in Gujarat and plan to try it out in MP.
6. At present, 6 lakh construction workers need housing on site. If it can be mandated in the tender process that workers can't be made to stay in tin sheets, bamboo can then used for worker housing and also be reused. Also in disaster relief where temporary lodgings need to be erected in short span of time. This comes in a flat-pack and can be easily set up.
7. Bank grants loans to buy just machinery from it. Loan is also required for sales and marketing. We need a line of credit for sales and marketing, and design and project execution.

"So many products are made, but very small items like kitchen wares, even the handles of the doors, they are still made out of steel. Those items made of steel and plastic can be replaced by bamboo."

Dr J P Modak, Emeritus Professor, Dean (R&D), Priyadarshi College of Engineering, Nagpur

Dr Modak in his presentation brought the perspective of research and development for taping bamboo technology. He said, *"In the context of development of raw bamboo for the utilization of a common man in society from varied angles, what we propose is that there is a necessity for generation of a human resource and also to give an emphasis on research and development for further chemically exploit raw bamboo to strengthen it and have large number of industrial applications. For example, though so many products are made, but very small items like kitchen wares, even the handles of the doors, they are still made out of steel. Those items made of steel and plastic can be replaced by bamboo."*

Here are the key highlights from his presentation:

1. In view of foregoing demand, it is desirable to establish an industry worth several thousand crores in India for manufacturing bamboo products based on present technical knowhow. It is necessary to build up appropriate human resource which is obviously very big in number to begin with at craftsmen level.
2. From the point of generation of human resource, we have to set up large number of ITIs which offer two years course for developing good craftsmen. The small industries at present are worried about the replacement for their current workforce when it retires.
3. Skills for craftsmen are usually known craftsmen skills for processing raw bamboo i.e. cross cutting, external/internal knot removal, then spiriting, sliver making, strips making. For this we need to develop the machinery that we already have for wood processing to respond to machining properties of bamboo.
4. It is necessary to establish bamboo machining properties - resistance bamboo offers to cutting tool/drilling machine. Now usually these wood processing machines are electric motor powered. Electric motors can be replaced to the capacity of 1-10 horse powers. That is by having a human powered fluvial motor powered energised machine system.
5. As the industry evolves, we will need diploma holders who have undergone 2-3 years of diploma course. Subsequent to that we will have to develop bachelors, masters and research level courses.
6. To enhance the research capacity, government should establish an exclusive dedicated small research centre of CSIR for developing bamboo technology with botanical, chemistry, machining processing, design, testing, laboratories and marketing cell.

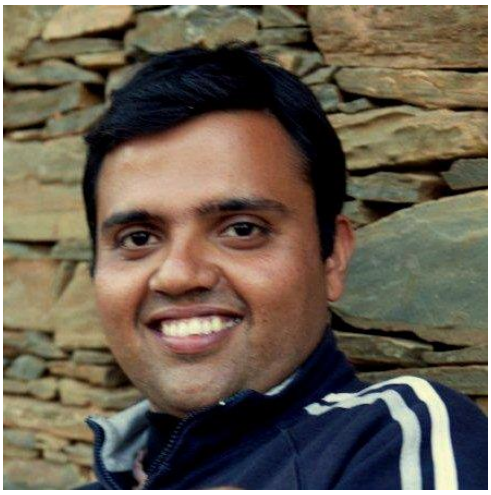
"Bamboo is defined as tree in the Indian Forest Act. The moment you define bamboo as tree, the entire regime of transit, the entire regime of forest produce, the entire regime of trade, of forest laws comes into the picture. "

Mr Sanjay Upadhyay, Advocate, Hon Supreme Court

Mr Upadhyay brought the law perspective into the discussion of bamboo application. He emphasised on conflicting law that makes the bamboo sector ambiguous. He said, *"Bamboo is defined as tree in the Indian Forest Act. The moment you define bamboo as tree, the entire regime of transit, the entire regime of forest produce, the entire regime of trade, of forest laws comes into the picture, and as Mr. Javadekar ji said 90% of the bamboo is in forest areas, so it is a huge bottleneck as far as the definition itself is concerned. The moment you define it as a tree there is a problem. Therefore, there is a very simple method of changing that definition into what is already now defined under a new law which is the Forests Rights Act. Now the problem is the Forests Rights Act is under the Ministry of Tribal Affairs and there is absolutely no communication between Indian Forest Act on one hand which defines forest as tree and minor forest produce which is defined under the Forest Rights Act which is under the Ministry of Tribal Affairs."*

Here are the key highlights from his presentation:

1. Ministry of Panchayati Raj which defines and gives the ownership of minor forest produce to the Gram Sabha which is done under the provisions of the Panchayat (Extension to Scheduled Areas) Act. With Ministry of Environment and Forest and Ministry of Tribal Affair, three ministries are talking about the same resource with a completely different regime but the resource is same and the people are same.
2. Various transit rules serve as an obstacle. There is absolutely no uniformity in the transit rules which is a huge bottleneck.
3. Forest Department wants to set up Joint Forest Management Committee, Tribal Welfare Department wants to set up Forest Protection Committee under Rule 4(e) of the Forest Rights Act, Biodiversity Law prescribes setting up of a Biodiversity Management Committee. In so far as the arrangement of Panchayati Raj is concerned, it is an issue in the institutional sense. But again there is no institutional collaboration at the field level.
4. Many people have commented upon the advisories issued under Tree Felling Rules. Nothing has happened in 10 years because an advisory has no legal standing. Tree Felling Rules need to be amended. Policies/ legal framework on community forests made by Madhya Pradesh should be replicated nation-wide to protect farm forestry and agro-forestry on farmlands, and to cover regions outside of forests.
5. When we export, the laws of importing countries also need to be conformed to. You need to prove that you have used legally sourced wood. The documentation for the same should be solid. We do not understand how Lacey Act of US or Forest Law and Foreigners Governance Act of Europe affect workers in Rajasthan or Kerala. The international laws that regulate trade, with respect to legally sourced wood, should be kept in mind.



" How to monetise the in situ creativity art and products available with bamboo artisans across the country."

Mr Swapan Mehra, CEO, IORA Ecological Solutions

Mr Mehra brought the community participation perspective in environment protection and ecological development. He said, *"We have been working with the MP Bamboo Mission on developing a financial product to address some of the problems that have been highlighted in some of the presentations today, which is how to monetise the in situ creativity art and products available with bamboo artisans across the country."*

Here are the key highlights from his presentation:

1. There is a need for some financial innovation to provide credit to artisans and to create a marketing front end.
2. We have created a financial guarantee product which MP Bamboo Mission is piloting and we have also set up an ecosystem of partnerships with large private corporations like eBay, Flipkart, supporting the retail of these bamboo products.
3. We have floated a RFP (Request for Proposals) to empanel entrepreneurs and marketing firms who would like to partner with the artisans supported through the Guaranteed Product of the MPSBM.
4. The objective is that entrepreneurs and marketing firms can give upfront financing to these artisans as advance payments based on which they can create their products. But their investment (i.e., that of entrepreneurs and marketing firms) is guaranteed by the MPSBM.
5. So in case there is a default by the artisan the MPSBM provides a guarantee against any default. If the investor or the buyer walks away from buying the product MPSBM guarantees the residual payment to the artisan.

MINISTERIAL DELIBERATIONS

"If we have a mission for eradication of poverty, we have to increase the employment potential, we have to develop skills. "

Shri Nitin Gadkari, Hon'ble Minister, Road Transport and Highways of India

Mr Gadkari gave very encouraging talk at the occasion recognising potential of bamboo and promising government's support to unleash the potential of bamboo. Addressing the inquisitive audience he said, *"Eradication of poverty is the biggest challenge that the government has to address. If we have a mission for eradication of poverty, we have to increase the employment potential, we have to develop skills. Farmers and tribal in rural areas need to be prioritised. Bamboo is intrinsically linked to tribal communities. It will be worthwhile to prepare a comprehensive report in 2-3 months which comprises information on the potential of bamboo industry, bamboo mission, government policies with respect to bamboo, and people involved. Also a task force on bamboo based development in the country be constituted. The report will be presented to Hon PM, and a Bamboo Sub Group will be constituted under Niti Aayog. At present, the ash which we use to clean utensils costs Rs 18/kg, and rice/wheat costs Rs 13/14 per kg. So ash costs more than rice and wheat. It has become very difficult for people in rural areas to survive."*

Here are the key highlights from his talk:

1. We are working towards diversifying agriculture towards energy and power sector. Bamboo's caloric value is 4000 which reflects huge potential. Bamboo can be employed for generating green power. It will create many livelihood opportunities in rural areas. And we will have an alternative to petrol, diesel and gas. Petrol and diesel pollutes the environment. 95% of bio fuel emission is carbon monoxide.
2. Generation of ethanol is not a problem anymore. Norms for bio fuel, biodiesel, and ethanol have been changed and granted all sorts of permissions. Setting up of green ports and biodiesel plants are recommended where machines and trucks should run on bio fuel. If we plant bamboos, pollution will be combated and will do good to society.
3. We should do research on the number of bamboo species in India. We should scale up its plantation on tissue culture. We should use wastelands and unused lands to plant bamboos. This will create many livelihoods.
4. We need to improve on designs to create bigger markets. We need to augment production capacity by using better technology. This will also reduce production cost. Bamboo has immense scope for innovation and creation of livelihoods.
5. There are 12 industries in Nagpur that manufacture stoves using biomass pellets. Around 1,000 restaurants have been delivered these stoves. These do not release carbon dioxide. These employ around 15,000 people. My target is to give employment to 1 lakh people in five years. I feel use of bamboo in construction, furniture, bio-fuels, etc. can help meet the target.
6. China makes even pickles and clothes of bamboo and here in India the resource is untapped. Bamboo can give employment to at least 50 lakh people in rural areas.
7. Niti Aayog is planning to set up a special think tank for handicrafts and handlooms. Designing is as important as productivity. Design sells. If we produce good quality, aesthetic handicraft products and deliver them on time, people will queue up to buy them.

"A farmer who grows bamboo faces problems because of forest officers in the states. Instructions have been given to the states to facilitate the bamboo sector but most of the states have not been following the instructions."

Shri Radha Mohan Singh, Hon'ble Minister, Agriculture

Shri Singh spoke about the efforts of Agriculture Ministry through National Bamboo Mission. Speaking to the audience, he said, *"Government started the Bamboo Mission in the year 2006-07. From 2006 up till now, it has spent Rs 800 crore. 66% of the amount was spent in north east states and 33% was spent in other states. Our forest research institute (ICFRE) is also doing research and has spent Rs 8 crore on it. A farmer who grows bamboo faces problems because of forest officers in the states. Instructions have been given to the states to facilitate the bamboo sector but most of the states have not been following the instructions."*

Here are the key highlights from his talk:

1. Under this mission 1,417 nurseries have been established and training has been given to 50,000 farmers and 60,883 workers.
2. Under National Gardening Mission, with a view to promote bamboo, Bamboo Poly House Manual has been created. Government has started making poly houses and has also planned to make pack houses. States support us for Gardening Mission and we have made arrangements for pack houses.
3. Research is underway on the quality of bamboo seeding material and final touch is going to be given for choosing Best Clone at Thelapur. Three laboratories are going to be started for developing quality bamboo seeding material where tissue culture will be developed. Mission Directors and Mission Officers of all states will be appointed at common facility centres.
4. Agriculture Department has also prepared guidelines to help farmers. 90% of our forests have bamboo reserves that are dying up. Farmers previously engaged in bamboo have shifted to fish farming. Bamboo farming in the villages has gone down due to poor quality and less use of bamboo in making houses.
5. Farmers will not prosper by growing only paddy, wheat and grains because employment opportunities and cash income is very poor. If bamboo industries are set up and people engage in bamboo farming on a large scale, people in rural areas will prosper.

"Our Ministry and even other ministries earlier became not savers of environment but put roadblocks in real care of environment. What's the problem in bamboo being transported from one place to another? "

Shri Prakash Javadekar, Minister of Environment and Forest, Climate Change

Mr Javadekar mentioned about the changes he is trying to bring in the Ministry to make it efficient and effective. He recognised the potential of bamboo and promised to offer all the support required from his Ministry. He mentioned that there is a need to address the issues related to bamboo development in India at the central level. 90% Bamboo is with the Ministry of Environment and Forests but Bamboo Mission is under Ministry of Agriculture and the Ministry won't let go of the charge. Similarly, wildlife protection is usually under animal husbandry which is within the purview of Ministry of Agriculture but it falls under the Ministry of Environment and Forests. However, he is willing to trade off these responsibilities so that there is one Ministry to look after bamboo for its holistic development which will include proper production and quality production.

Addressing the audience he said, *"I am really happy on this occasion and fortunately our Prime Minister, Shri Narendra Modi, the Agriculture Minister and all other Ministers also want to promote bamboo. So now is the time for action and now is where you can expect and you can suggest and your suggestions will be on board. We have already issued advisories to states for simplifying transit rules because this is unnecessary. Our Ministry and even other Ministries earlier became not savers of environment but put roadblocks in real care of environment. What's the problem in bamboo being transported from one place to another? No restriction on Transit should happen. Bamboo should be privately cultivated, private cultivation should be protected and sustained. You don't need promotion forever. It's just promotion for five years for a farmer and then it works on its own. Bamboo plantation should be developed outside forests. This has to be promoted for first few years because the initial years are not profitable. You need promotion for a certain period then you come out with the final real stabilized bamboo economy. We need to focus on research and development, both in quality of bamboo and of bamboo productions and then there has to be production units. So it's a whole lot of industry and bamboo will really give a new dimension to Indian economy."*

RESOLUTIONS

Through the consultation, Hon Minister, Shri Gadkariji resolved following action points and it was resolved that the concerned Ministries will prepare the road maps for the role of the concerned Ministry for the "Bamboo based Development in the Country". Dr AK Bhattacharya of MP State Bamboo Mission, and Mr Sunil Joshi of VEDHA of Nagpur were entrusted with the task to facilitate the process.

Agreeing with the action points proposed by the experts as presented in the lead presentation by the MD, MPSBM, following action points were prioritised through the consultation -

- Inclusion of 'Bamboo Development Task Force' in the *Niti Aayog.*
- Constitute a committee to prepare a white paper based on the review of the efforts made in the sector so far by all the concerned Ministries.
- Create National Bamboo Development Authority for Convergence of and synergy among all the Departments / Organisations dealing with bamboo.
- Formulate a National Bamboo Development Policy.
- Organise a "World Bamboo Summit" in Delhi to strengthen international cooperation in Bamboo Sector.

The Thank you note at the end of the meet was delivered by Mr Sunil Joshi of VEDHA, Nagpur.

SCHEDULE

National Policy Consultation on

Bamboo as Change Agent for a Better Country

Under the Chairmanship of Hon Minister of Road Transport and Highways, Shipping, **Shri Nitin Gadkariji**

4.00 pm – Welcome of Hon Minister and other Dignitaries

4.05 – 4.25 - Breaking the ice – Potential, Issues and Action Points

(AK Bhattacharya, MD, MPSBM)

4.25 – 4.35 – Bamboo in Rural Livelihoods

(IV Ramanujarao, INBAR)

4.35 – 4.45 – Bamboo in Furniture

(Sunil Joshi, VEDHA)

4.45 – 4.55 – Bamboo in Construction

(Sanjeev Karpe, KONBAC)

4.55 – 5.05 – Bamboo in Design

(C S Susanth, NID)

5.05 – 5.15 – Bamboo in Architecture

(Fatima Martin, Spain, MPSBM)

5.15 – 5.25 – Bamboo in Community Development

(Rebecca Reubens, Entrepreneur, NID)

5.25 – 5.35 – Bamboo for Energy

(N Barathi, Growmore Biotech, Tamil Nadu)

5.35 – 5.45 – Bamboo – Corporate Perspective

(Samir Somaiya, CMD, Somaiya Group, Mumbai)

5.55 – 6.05 – Bamboo – NGO Perspective –

(K S Sabarinadhan, Tata Trusts)

5.05 – 6.15 – Experts' Comments (5 minutes each)

(JV Sharma, TERI; Chandrashekhar Chincholkar; Ashok Kaliyamurthy, Wondergrass; J P Modak; Sanjay Upadhyay, Hon Supreme Court; Swapan Mehra, IORA)

6.15 – 6.30 – Comments by Hon Ministers of

- Tribal Affairs (Shri Jaul Oram)
- Agriculture (Shri Radha Mohan Singh)
- Science & Technology, Earth Sciences (Dr Harsh Vardhan)
- Environment, Forest & Climate Change (Shri Prakash Javadekar)
- Commerce & Industries (Ms Nirmala Sitharaman)
- Micro Small & Medium Enterprises (Mr Giriraj Singh)
- Rural Development (Shri Sudarshan Bhagat)

6.30 – 6.45 – Concluding Remarks

(Hon Minister, Shri Nitin Jairam Gadkari)

6.45 – 6.50 – Vote of Thanks

(Sunil Joshi)

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Deliberation by
Dr AK Bhattacharya, MD & CEO, MP State Bamboo Mission

Hon Ministers, Dignitaries, and the bamboo lovers… 12th February 2015 will be marked as a golden day in the history of Bamboo, when the significant people, who matter, have assembled to discuss bamboo for the betterment of the country. It has strongly emerged that Bamboo has clear and proven potential to change the country.

- We are grateful to Hon Nitin Gadkariji for this initiative to coordinate for the cause of bamboo at the federal level. The bamboo experts and enthusiasts have volunteered to take bamboo forward for a better country. Through this consultation, we would attempt to submit the action points for the attention of the Federal Govt to strengthen bamboo sector in the country. I will request the expert speakers to focus on the action points in the stipulated time.

- India's bamboo exports are less than that of Philippines and Vietnam. China's domestic bamboo economy in 2012 was Rs 117,000 crore. It holds 90% of the world export market of Rs 36,000 crore. The assessment of the Planning Commission reflects tremendous potential of the bamboo market in India.

- There is conspicuous scope and need to improve the quality and design of the bamboo products and infrastructure as compared to those of other countries. Here are few examples.

- The extensive bamboo potential area in the country and the comparative chart of China and India in Bamboo sector indicate that there is tremendous scope and opportunity of bamboo based development in our country. The slide enunciates the efforts made in the past in the bamboo sector by various organisations and Ministries.

- Bamboo as a change agent has been globally accepted. Today, the role of bamboo is identified not only from the point of view of sustainable development pillars such as Economy, Ecology and Social development but it also plays a key role in our lifestyle and fulfilling the energy needs .

- Bamboo as the **Economic Change Agent** - The Current estimate of the market for bamboo products is around Rs 50,000 crore. Bamboo is seen as an agent crucial to economic growth in developing countries like India, Vietnam, Indonesia, etc. Bamboo based industries have a tremendous employment generation and poverty alleviation potential. About nine million people are engaged in Bamboo sector in India.

- Bamboo as the **Ecological Change Agent –** Bamboo has versatile ecological

properties, like higher carbon sequestration, reducing CO_2 level, higher oxygen release, preventing soil erosion, removing metals and other toxic substances from soils and water, protecting against ultraviolet rays etc. Growing more bamboo is a sure way towards a greener and cleaner future

- Bamboo has proved to be an effective **Social Change Agent**. Bamboo based interventions have been instrumental for causing a social change in the country. The past programs with bamboo artisans in India have shown progress in the social sectors, like education, medical, housing, and skill improvement. Bamboo is ideal for the approach of "of the people, for the people, by the people".

- Bamboo as a **Gender Equality Change Agent** has transformed women from head-loaders to entrepreneurs. Economic upliftment and repayment capacity of women in bamboo handicraft units has shown rising trends. The structural change through bamboo based interventions enables women to secure economic gains on sustainable basis.

- **Bamboo as Energy Change Agent -** Bamboo is also a source of energy. Gasifiers can produce electricity using bamboo as fuel. These can be used for thermal applications replacing furnace and diesel oil. Charcoal and its processed form in powder and briquettes can also be manufactured. It is superior to other sources of charcoal in terms of calorific value. Bamboo charcoal is also a raw material for activated carbon.

- **Bamboo as Lifestyle Change Agent -** Bamboo Applications have found a way to every aspect of today's modern lifestyle. From food to clothes to fashion, interiors to exteriors, toys to play sites, houses to resorts, chops sticks to pen-drives, cosmetics and accessories, Bamboo is everywhere. Utilizing bamboo in everyday life is a way to be greener and more responsible in a trendy way.

- Bamboo Missions of Madhya Pradesh and other States have made significant efforts to achieve the goal of bamboo based entrepreneurship and development through three major interventions – resource augmentation in and outside forests, entrepreneurship development, and marketing and promotion.

- The key issues that need to be addressed to institutionalise the bamboo based development in the country include an effective institutional framework, enabling legislative changes, transfer of advanced technology, appropriate business development, incentives in taxes and subsidies etc.

- Based on the key issues and the consultation with the stakeholders, some action points are being submitted for the consideration of the Hon Chair and the Dignitaries for the intervention of the Federal Government.

Annexure 4

OUTCOMES OF PREVIOUS CONSULTATIONS ON BAMBOO

A compilation of Recommendations and Action Points of the International, National and State level bamboo themed seminars and Workshops

CONTENTS

I.

International Bamboo Workshop : Bamboos- Current Research

Date : November 14-18 , 1988,
Published by : Kerala F4orest Research Institute, India, and International Development Research Centre, Canada
Place: Cochin, India

Research Recommendations

The forum having recognized the work that has been accomplished in the last decade through the efforts of international agencies such as the IDRC, national agencies and other donors, drew attention to the following areas in which research needs to be continued or initiated. The wide range of research fields indicated is a reflection of the actual current need for research on the bamboos. The increase in the fields of research and overall interest in bamboo is also evident from the number of papers submitted to the Workshop. From a small number in 1980 to 52 in 1985 and to 69 in 1988 in successive Workshops represents a significant increase both in research interests and in the diversity of problems being investigated. Under each area of research, specific topics are given which the delegates felt required the attention of all concerned.

1. Propagation of bamboos

Development of methods for collection, storage and exchange of bamboo seeds; increasing the efficiency of conventional vegetative propagation better containers, etc.; use of tissue culture methods for the mass propagation of bamboos.

2. Conservation of the bamboo resource and its improvement

Collection of gene-pools in germplasm banks both in the regional and national contexts; germplasm exchange: the use of plant tissue culture methods to facilitate germplasm exchange was emphasized; collection of data on the flowering cycles of bamboo; work on the reproductive physiology of bamboos; research on the induction of flowering by both in vivo and in vitro methods; breeding and all items related to bamboo breeding
for the improvement in quality; generation of variants through tissue culture.

3. Estimation of the present resource base

Documentation of the existing stock through remote sensing and field surveys; development of a field-guide for the identification of the bamboos.

4. Management of bamboo forests

Intensive management of monocultural stands; examination of the question of monoclonal versus polyclonal plantations; effect of spacing on productivity; management practices for maximizing production in a unit area; effect of fertilization on productivity; intercropping of bamboos with other plants; work on the allelopathic characteristics of bamboo.

5. Physiology, ecology and cytology of bamboos

Basic studies such as plant nutrition, plant-soil relationships, growth studies, water use efficiencies, photosynthetic efficiencies; matching of bamboos to soil conditions; effect of flooding on survival of bamboos; cytology of bamboos.

6. Diseases and pests of bamboos
Protection from pests and diseases especially in plantations.

7. Bamboo as a construction/housing material
Investigation into joints with bamboo to facilitate construction; strength properties as affected by specific applications; development of a design code for bamboo; establishment of an engineering database to facilitate the use of bamboo in the construction and building industry; biodeterioration management and alternative architectural strategies.

8. Utilization of bamboos
Continuous product development to ensure that bamboo remains in vogue including engineering products for urban and rural use; documentation and dissemination of cottage industry technologies.

9. Economics of bamboo
Assessment of the employment generation potential of the bamboos; cultural-anthropological impact on product development; market surveys and development of marketing strategies; socioeconomic implications of the depletion of the bamboo resource.

10. Bamboo information system
The BICs should be able to complement each other in compiling and disseminating all available information on the monopodial and sympodial bamboos.

II
Planning Commission Report : National Mission on Bamboo Technology and Trade Development

Published by : Planning Commission, Government of India
Date: April 2003

Bamboo Resource Generation

President of India in his Budget session speech of 2003 has emphasized crop diversification and plantation of Horticultural crops in sugarcane areas with glut situation. Bamboo should be promoted as a horticultural crop for production of bamboo shoot in such areas.

The current requirement of bamboo is about 26 million tons against which about 13 million tons are available. Therefore, to meet the current shortage of the emerging needs it is proposed to cover 6 million hectare under appropriate species of bamboo during the 10th and 11th 5 year plan period. Of this 2 million hectares would be planted in the 10th plan period.

Gregarious flowering of bamboo in. about 30,000 sq. km. area is expected during 2004 to 2007. In order to take advantage of this cyclic phenomenon following steps are to be taken on urgent basis:-

- Preparation of an emergency plan for harvesting and gainful disposal/utilization of bamboo;
- Release of advertisements on regional basis to solicit the support of user Industry timely harvesting, transportation, stocking and use of bamboo; and
- Replanting of flowered area with selected species from different cohorts

National Agricultural Policy stresses on efficient use of resources and conservation of soil and water. It includes promotion of Agroforestry as a main thrust area. Bamboo based agro-forestry should be promoted and the technology should be standardized for adoption.

Bamboo should also be promoted as alternative to tobacco cultivation. Under shifting cultivation bamboo needs to be promoted as a cash crop.

The following species of bamboo with wide adaptability and uses need to be promoted. Production technology in respect of these species are to be perfected:
Bambusa bambos

- *B. vulgaris*
- *B. nutans*
- *B. tulda*
- *B. polymorpha*
- *Dendrocalamus asper*

- *D. hamiltonii*
- *D. strictus*
- *Ochlandra travancorica*

Multi-locational bamboo cultivars trials should be conducted to identify suitable material for plantation programme. Development and dissemination of plantation technologies would the responsibility of IPIRTI, ICFRE, ICAR and CSIR institutions and DBT focussinq the following areas:-
Agrotechnology
Mass production of planting material
Demonstration of plantation methods
Silvicultural practices and
Pre and post harvest treatment
Role of NGOs would be of key performers in the above activities.

Research needs

At present no suitable bamboo genotype is available for cultivation in saline and coastal lands. Therefore the research for selection of bamboo species suitable for such lands need to be undertaken.
It is necessary to develop bamboo based Agroforestry system based on species suitable/available in a particular area. The other areas of research include :
Selection of elite clones;
Most appropriate techniques for multiplication;
Production techniques;
New products

Industrial Application of Bamboo

Bamboo produce nutrition rich bamboo shoots. Young bamboo shoots need to be developed as a food and nutritional security item and as income generating venture in rural areas. Most bamboo species produce edible species like *Dendrocalamus asper* has been identified as a most suitable species for this purpose.
Structurally, bamboo can find application in three main types of structures: scaffolding, housing and roads. For removing tension-induced buckling composite steel and bamboo scaffolding has to be developed. Bamboo houses are durable as also cheap and can be the most appropriate for earth quake prone areas. Use of bamboo needs to be promoted in housing schemes like Indira Awas Yojana.

Handicrafts

In the development of new market product the role of design is crucial. Design project should draw their terms of reference from market survey and studies which should be preceded to project formulation. Bamboo handicrafts development needs:-
Introduction of new designs through trained designers who are close to the needed markets;
supply of quality raw material at economic cost;
Certification for the quality and standard of products;
Certification related to sustainable harvesting of bamboos as Fair Trade socio-economic

practices;
Distribution linkages to reach the product to the customer at a cost-effective price
Setting up of a mechanism to ·gather feedback from market place; and
Financing options to increase the production and marketing

Given the export requirement of bamboo products, it is essential that identified species of bamboo is harvested at proper maturity stage and post harvest treatment is administered to avoid discoloration and resultant poor quality products.

It is recommend that institutes/training centers in good number be established on different locations in the country for knowledge transfer, technology transfer and skill transfer, amongst traditional communities in plantation, management, harvesting, production, quality control and design.

The role of training should be to achieve following objectives:-

- Awareness generation;
- Propagation of improved cultivation inputs and methods;
- Introduction of improved value added conversion methods;
- Development of markets by promoting bamboo's potential benefits to the prospective users.

Bamboo requires to be promoted in different product segments to realize its potential both as environmentally preferred material/product and agent for employment generation and revenue earning. It is therefore, proposed that the product strategy must spearhead all other activities. The process will require establishment of specialized manufacturing centers at different scales of product output. CBTC, Guwahati, may be supported for various bamboo development efforts in the North Eastern Region.

Paper and Pulp

The current annual consumption of Bamboo by paper mills in India is approximately one million ton which is about 7.4 percent of the total availability of bamboo. Non-availability of bamboo is the main reason for this low consumption which offers scope for increased utilization of bamboo by paper mills which are running at 41 percent of their installed capacity. It is suggested that paper mills may enter into arrangements with JFM committees as also with bamboo growers outside forest areas to ensure sustained supply of bamboos from the proposed new plantations within and outside forest areas.

Technology

Technology support for bamboo resource development as also process and product development is urgently needed. Quick multiplication of elite clones, plantation management techniques, improved harvesting practices and preservation are necessary for sustained supply of quality raw material and market oriented product development.

Technologies developed by IPIRTI for BMBs, BMVC, BMCS, BMMA and Bamboo laminates are required to be popularized for their wider adoption.

TIFAC and llT-B have developed process for producing activated carbon from bamboos. The process need to be perfected and standardized for commercial exploitation.

Processing technologies for bamboo shoots namely
i) preserved bamboo shoots,
ii) boiled shoots,
iii) dried bamboo shoots and,
iv) canned bamboo shoots need to be popularized for value addition and income and employment generation in the rural sector.

Standards and Codes

Considering the current knowledge level and emerging application areas, BIS would review the standards and codes for the range already issued, with the assistance of IPIRTI, CPWD, HUDCO, CBRI and TIFAC. New performance standards and codes may be developed by BIS for
i) bamboo based activated carbon,
ii) bamboo mat corrugated sheet,
iii) bamboo composite boards/laminates and reconstituted wood,
iv) bamboo based flooring tiles and
v) processed bamboo shoots with inputs from IIT B, participating industry and TIFAC/NMBA/ BMTPC.

From the development perspective it is also extremely important that codes of practice be established for low cost housing, bamboo grid and mesh reinforcement for roads, embankments, checkdams and other structures.

From external market perspective the international standard and acceptability are also to be kept in mind while developing the Indian standards It is critical that users perspective be incorporated and such agencies are associated with the process.

Testing and certification facilities which are inadequate presently would need to be surveyed, promoted, augmented and in certain cases supported.

Machine and Tools

There is a lack of suitable machinery and tools for efficient handling of bamboo. Imported machinery and tools are not very effective as Indian bamboos contain more silica. Therefore it is necessary to develop our own Machinery and Tools. CIO can take the lead in designing of such machinery and tools of desired type and quality.

Restart of Closed Mills

About 2.5 million people became unemployed due to closure of forest based industries. Non availability of material also resulted in import of timber, pulp and paper. The restart of closed mills with availability of bamboo can rehabilitate the workers and can also reduce import.

Small Scale Industries

Bulk of user industry fall into the category of small scale industry like sawmills, plywood etc. These industries can be developed with the availability of raw material at various locations which can be organized through NGOs.

Awareness Creation

In all educational material including textbooks, write-up on bamboo can be included. Special programmes can be started on TV and other electronic and print media. Officers training programme can also include material on bamboos.

Marketing and Trade

The marketing needs are going to be varied. On one hand there are handicrafts that need to find export markets and widen the existing domestic market by emphasizing consumers items rather than just niche market products, and on the other, pre-fabricated houses to be inducted into the Government low cost housing plants.
Some specific initiative that will go into making a success of the marketing efforts would cover:-

Conducting a regional marketing study;
Preparation of marketing plan;
Reviewing possibilities of long-term marketing contracts;
Establishment of markets;
Establishment of product information and catalogue e-services; and
Establishment of payment and price information e-services.
Funding Support

Shelf of projects should be prepared for bamboo development to attract institutional as also external funding support. Bamboo based activities being viable can be posed to financing institution whose support would be supplemental to budgetary funding.

Policy Intervention

The bamboo sector should be recognized as Plantation and Horticultural crop without any restriction on its movement and felling for bonafide commercial use.

A review of the existing excise rules and import policies is necessary to give a boost to bamboo as a farm forestry activity. Decision may be expedited to impose 5 per cent duty on import of pulp.

Implementation of Mission's Programme

It is recommended that under the aegis of Planning Commission startup workshops may be organised at different locations to orient and seek necessary support from various stake holders in implementation of the missions activity in right perspective. This will need to be done in the beginning of implementation phase.

Conclusion

- The integrated Bamboo Development Programme under the National Mission on Bamboo Technology and Development will:
- create gainful employment to 8.6 million persons;
- enable 5.01 million families to escape poverty on sustainable basis;

- promote food and nutritional security by popularizing consumption of bamboo shoots particularly among women and children to remove micro nutrient deficiency and eradicate anemia.
- promote ecological security as a major component of Greening India Programme and restoration of degraded lands;
- provide livelihood, and economic security to rural artisans, industrial workers, in reopened and expended Paper Mills, Plywood & Saw Mills, and modernized handicrafts sector by employment generation.
- promote upgradation of skills of craftsperson by institutional training.
- expose Bamboo sector to research, technology, improved management and specialization with a view to raising yields from existing plantation and future plantation, which must be industry or craft specific for optimum value addition; and
- lay down the foundation of a modern bamboo economy based on science & technology, people's participation, industrial application and strong linkage with market capable of meeting global competition.
- From an orphan crop, Bamboo could emerge as 'Green gold for India - its people and the natural habitat'.

III
Outcome Report : VII World Bamboo Congress

Organizer : World bamboo Organization
Date : February 2004
Venue : New Delhi, India

Outcomes and Recommendations

Millennium Development Goals stress environment, conditions of slum dwellers, health and education. Bamboo-based development can improve the environment by substituting for deforestation and by providing good inexpensive houses, schools and clinics.

Employment opportunities for rural and peri-urban poor will remain a priority. Bamboo-based development can provide a wide range of employment opportunities at all levels of skill and capital involvement and is particularly suitable for community-based micro-credit financed activities.

The use of bamboo should be encouraged in watershed management, soil and water conservation, rehabilitation of degraded land and rural development.

Bamboo can offer innumerable opportunities for environmental improvement by sequestration of carbon, lowering light intensity and offering protection against ultraviolet rays, yielding more oxygen than equivalent stand of trees and working as a natural environmental cleansing system.

Bamboo shoots are rich in fiber, protein and minerals. The process product developed from bamboo shoots can provide food and nutritional security to 2 billion people living in Africa, Asia and Latin America.

Bamboo bio-mass is a potential alternative source for bio-energy and opportunity to pioneer another industrial usage through gasification to produce electricity.

Bamboo a versatile material, has found uses in manufacturing pulp and paper, panel products, construction material, high strength fiber composites and an array of modern new generation bamboo products.

The potential of bamboo as an economic resource capable for generating employment for rural poor and skilled and semi-skilled in plantation and in semi industrial and industrial ventures should be fully exploited.

The world will probably face a shortage of wood-base fibre in the future. Bamboo can substitute for wood-base fibre in the future. Bamboo can substitute for wood in nearly all its uses and can help avoid future shortages and hardships.

TECHNOLOGY

Technology support is a felt need for development of bamboo in terms of resource enhancement and also in the utilization for product development. The issues of research and extension, standards and quality, education, training demonstration, machines and tools have to be addressed. The technology support required include following: -

Identification of appropriate species;
Species site matching and plantation/agro-forestry techniques;
Establishing synergy between micro and macro propagation techniques;
Technology for seasoning and preservation;
Developing designs, product development and product specific technology;
Developing tools, machinery for enhancing production on an economical scale;
Manufacture of bamboo Charcoal and activated carbon;
Bamboo extracts and vinegar etc.

STANDARDS AND CODES

Quality, certification and coding is necessary for wider acceptance of the bamboo products and appropriate institutional mechanism needs to be developed wherever felt necessary.

POLICY

Broad policy initiatives are needed for development of bamboo sector. They will include the following: -

To place bamboo as a key species in development agenda as it can clean and green the earth within a short period and with its multiple uses/employment generation capacity.

To encourage bamboo plantations on all types of lands, as an economic activity.

To promote development of new products and designs and markets as well as standards and quality for new product.

To recognize bamboo as an agriculture/horticultural produce and allow unrestricted movement of bamboo and its processing and marketing by removing all legal constraints.

CONCLUSION

International agencies like IFAD, IDRC, INBAR, UNDP, UNIDO and E.U. should continue to finance research and development programmes on bamboo and strengthen networking around the globe on bamboo.

Networking in harvesting the knowledge of bamboo through awareness raising and information management should continue for enhancing international, national and regional cooperation amongst different sections of bamboo users, policy makers, market, bamboo researchers, artisans and industries through a clear focus on new technologies, global market with a policy of information transparencies.

International Centre for Research in Agro-forestry (ICRAF) should launch an initiative to promote bamboo as useful agro-forestry species for ensuring ecological, economic, food and livelihood security.

IV
International Conference : Improvement of Bamboo Productivity and Marketing for Sustainable Livelihood

Organized by: National Bamboo Mission, Department of Agriculture and Cooperation; Ministry of Agriculture, Government of India.

Date : 15th- 17th April 2008

An International Conference on Improvement of Bamboo Productivity and Marketing for Sustainable Livelihood was held from 15-17 April, 2008 at New Delhi, the capital city of India. It was organized by the National Bamboo Mission, Department of Agriculture & Cooperation, Ministry of Agriculture, Government of India. The Conference was ably coordinated by the Cane and Bamboo Technology Centre, Guwahati, Assam and supported among others by the World Bamboo Organization, the International Network for Bamboo and Rattan, Central and State Ministries and organizations.

The Conference was carried out through six technical sessions, a plenary and concluding session, a business session and a poster session covering all aspects with an emphasis on the three themes of the topic i.e., Productivity, Marketing and Sustainable Livelihoods. An exhibition of various bamboo crafts and value added new generation products by the private entrepreneurs, besides, various on-going projects of various organizations was also held simultaneously at the NASC Complex, PUSA where the Technical Sessions were organized.

The Conference was attended by over 500 national and international participants representing government, non-government, international agencies, private enterprise and educational and research institution and farmers.

Recommendations

Technical Session 1: **Mass production and certification of quality planting stock**

Recognizing that the non-availability of quality planting stock of desired species of bamboo is the major constraint in improving productivity and quality of bamboo, it is recommended that:

i) NBM should take necessary initiative in collaboration with States, for establishment of clonal banks and clonal nurseries in different agro-climatic zone in India.

ii) NBM should support a bamboo breeding program in India.

iii) Guidelines and provision should be made for certification of nurseries and planting stock.

iv) States in collaboration with R&D organization should develop and implement program for genetic improvement of bamboos.

v) Planting material could be a limiting factor for the development of bamboos. Tissue culture has potential but ways to be found out to make them affordable via text credits, etc.

vi) Presently bamboo is not eligible for carbon credit. Government of India jointly with International Network for Bamboo and Rattan (INBAR), pursue vigorously to make bamboo eligible so that it will be attractive for the Bankers, farmers and others.

vii) To strengthen and generate human resource in bamboo sector there is urgency to establish a National Bamboo on Institute.

Technical Session 2 : **Post-harvest management and storage**

Realizing that there are significant losses and damage to raw material due to inappropriate management

and storage of harvested bamboo, the house recommends that:
i) Standard harvest schedules and methods should be developed for priority species of bamboo.
ii) Standard techniques should be developed for treatment of harvested bamboo for its protection during transport and storage period.
iii) Appropriate methods should be developed for seasoning of bamboo and bamboo products to avoid possible defects which may deteriorate the quality of raw bamboo as well as products.
iv) Eco-friendly, cost effective preservatives and efficient bamboo treatment techniques should be developed.

Technical Session 3: **New Generation value-added products**
Realization that low return from bamboo plantation and bamboo product detract cultivators and entrepreneurs to invest in bamboo sector, the house recommends that:
i) More emphasis should be laid on development of value-added products and the necessary technologies.
ii) Inventory of high value products, technologies, production houses and R&D institutions should be prepare and the information should be made available in web.

Technical Session 4: **Investment potential and marketing**
Realizing that difficulties faced by cultivators and artisans in marketing their product is the major hurdle in the way of growth of bamboo sector in India, it is recommended that:
i) Market facilities should be created for disposal of bamboo and bamboo products in key bamboo areas.
ii) Daily market news bulletin should be displayed on bamboo web.
iii) Farmers, artisans and entrepreneurs should made aware of availability and price of quality planting stock, new products, product designs and technologies through interactive web and TV programme.
iv) Public sector banks and financial institutions should be sensitized for extending easy loan facility to farmers and entrepreneurs.

Technical Session 5 :**Cultivation and Stand Management**
Realizing that unscientific cultivation and stand management practices have lead to very poor productivity and quality in bamboo, it is recommended that:
i) Package of practices should be developed for improved productivity and quality of desired species of bamboo for different agro-climatic zone.
ii) Suitable Agroforestry models and practices should be developed for cultivation of bamboo together with agricultural/horticultural crops.
iii) Necessary training should be imparted to farmers for scientific bamboo cultivation and stand management.

Technical Session 6:**Policy Issues**
Realizing that forest laws regulating harvest and transport of trees are the major impediment to the growth of bamboo sector in India, it is recommended that:
i) State governments should relax rules for harvest and transport of bamboo within and between different States to facilitate private cultivation and trade of bamboo.

V
International Seminar : Bamboo for Livelihood and Community Development

Organised by : World Bamboo Organisation, and Nagaland Bamboo Development Agency
Date: September 16- 17, 2010 & The World Bamboo Day on September 18, 2010
Venue: Kisama Heritage Village, Kohima, Nagaland, India

Resolutions made in Kohima Declaration

I. General Declaration

1. Bamboo for a Green, Clean and Healthy Mother Planet

We emphasise the unique potential and significance of bamboo in mitigation of the gravest challenges of the twenty-first century, being deforestation and global warming; and call upon all stakeholders to act locally and globally in harmony to generate awareness and to bring in effective policy shift, financial back up and infrastructure support to create an environment conducive to holistic development of bamboo sector to secure a green, clean and healthy mother planet.

2. Participatory Approach in Planning and Review of Implementation

We urge the Governments of bamboo growing nations to set up appropriate mechanism to associate elite academic bodies and institutes of technology; eminent scientists and professionals; representatives from industries, civil society and community organisations – national and international - in framing strategy and action plan for development of bamboo sector and review of implementation thereof with free on time access to documentation of these activities on official websites.

3. Development Grassroots Upward for Equity and Sustainability

We recognize the vast yet untapped potential of bamboo to improve quality of life and to generate prosperity even in rural areas of the developing world by pursuing judicious integration of traditional as well as modern industrial applications with the strategic approach for development from grassroots upward for equity and sustainability.

4. Convergence of Activities to Promote Micro-Enterprises & Employment

We call upon all stakeholders in the bamboo sector – local and global – to recognise the importance of convergence of their diverse activities to retain focus on building village level micro-enterprises close to resource base and to enhance livelihood and employment generation as primary objectives.

5. Technology & Management Model for Enhanced Productivity & Coverage

We express deep concern on the tardy progress in many bamboo growing nations in enhancing productivity and in augmenting area coverage; and we call upon these governments to closely follow success stories elsewhere in the world to adopt, adapt or to develop new technology and management models suited to each target species in keeping with its agro-climatic conditions, ownership status, etc.

We appeal further to those governments to put in place appropriate policy and legal framework as well as access to institutional finance and other cost opportunities to encourage development of

private farming as well as industrial plantations. We emphasize further to promote participatory forestry with bamboo as a priority species, subject to agro-climatic limitations, in government forestland with 100% right on bamboo harvest to the forest community in the capacity of management partner of the government based on appropriate MoU.

6. Innovation & Product Development Initially Targeting a few Exportable Products

We reiterate the urgency for the bamboo growing countries, lagging behind in technology and commerce, on concerted action on species specific innovation, product development and adaptation both for traditional as well as industrial products with the strategy to invest time and resources initially to produce only a few high value products targeting major export markets to build skills and expertise needed to compete globally.

7. Financial Feasibility Study of Bamboo based Enterprises

We emphasize the imperative need to promote professionalism in banks and other funding institutions in financial feasibility study of bamboo based enterprises to ensure support and clearance to viable projects; and urge the concerned authorities for appropriate capacity building to that end.

8. Access to Global Carbon Credit to Benefit Bamboo Growers & Entrepreneurs

We note that bamboo sequesters CO2 much faster than other forest and plantation crops and that it meets the requirements for Clean Development Mechanism (CDM) under the Kyoto Protocol such as socio-economic and environmental criteria for sustainability, cost benefit analysis, etc.; and urge the bamboo growing nations for initiating steps for entry into global carbon credit mechanism to benefit bamboo farmers and enterprises and to attract investments.

9. UN Millennium Development Goals

We recognize the enormous potential of bamboo as a resource and as an enterprise to contribute directly and significantly to achieve three out of the eight millennium goals - to eradicate extreme poverty from bamboo growing areas; to ensure environmental sustainability through increased carbon sequestration and by substituting tropical timber; and to develop global partnership for development of the bamboo sector for sustainable benefit to the world community.

II. India Specific Declaration

1. Revocation of Statutory Regulations on Harvest and Transit of Bamboo

We reiterate the need for the bamboo growing States in India to utilise their powers under the Forest Act to withdraw statutory regulations on transit of bamboo to stimulate growth in the sector with enthusiastic participation of farmers, traders and industries in keeping with the mandate of the National Bamboo Mission of India; while continuing persuasion with the Ministry of Environment & Forests, Government of India to effectively and permanently mitigate the hurdles arising out of regulation on harvest and transit of bamboo in forest and non-forestland by an amendment of the Indian Forest Act to delete the provisions treating bamboo as a 'tree'.

2. Export Promotion Capital Goods (EPCG) Scheme

We recognise the multiple constraints in the bamboo sector in India for resource generation and sustained supply; technology deficit and lack of trained manpower; and the perceived need for a more responsive policy and legal framework vis-à-vis enormous potential of bamboo to improve livelihood of rural masses and its comparability with other cash crops. We, therefore, strongly recommend treating bamboo at par with 'agricultural products' for the purpose of concession on Custom Duty under the EPCG Scheme; and to grant a total moratorium on export obligations under ECPG Scheme for ten years from the date of issue of notification introducing the proposed moratorium.

3. Safeguard duty on import of bamboo products from China

We note with concern that import of bamboo products from several South East Asian countries has surged in the past few years causing injury to the nascent Indian bamboo industry, and urge the Government of India, therefore, to impose 30% safeguard duty on import of bamboo products.

4. Exemption from Value Added Tax

We call upon the concerned authorities to grant exemption for ten years to industrial bamboo products and handicrafts from Value added Tax in consideration of the fact that this is an emerging sector of immense potential for economic emancipation, especially of the rural poor, of the bamboo growing states of India; the potential of the sector in employment and wealth generation through plantations and rural enterprises; multiplicity of challenges the sector faces at this nascent stage due to scarcity of appropriate technology and trained personnel, policy and legal framework not yet adequately responsive for development of the sector.

5. Commodity Body for Bamboo

We emphasise the importance for declaration of bamboo as a commodity at par with tea, coffee, rubber, spices, coconut, etc. and the need for constituting an Indian Commodity Body for Bamboo in view of the immense potentials of the sector to provide Single Window Solution, from resource generation to value addition and certification to marketing for the sector; and to facilitate international cooperation by networking with the International Commodity Body for Bamboo and other global technology or funding agencies for the benefit of the sector in India. We further suggest that it would be prudent and effective if a worthy professional institution already active in the sector takes on the role; and considering the pioneering role, competent technical back-up, rich experience in project formulation and implementation, consultancy, networking; and the advantage of its location in the North East, the Cane and Bamboo Technology Centre (CBTC), Guwahati fits the bill; and we recommend CBTC be designated as the Indian Commodity Body for Bamboo in India.

6. Bamboo Value Addition Park

We note that bamboo value addition units – handicrafts and industrial - utilse raw material in diverse forms beginning from bamboo culms to intermediate products like sticks, slivers, strips, bamboo mats, treated poles, etc. We appreciate under the circumstances the importance of establishment of integrated chains of selected bamboo based units together in an appropriate locality to internalize, to the extent feasible, backward and forward linkages within the system for targeted cooperative action for mutual benefit; and we, therefore, appeal to the Government of India to provide 100% grant-in aid to bamboo growing states to create sound basic infrastructure for Bamboo Value Addition Parks with top grade road network, water supply and effective drainage, electric network substation and other common facilities of warehouse, training centre-cum-conference-hall, communication hub, fire station, security, etc. to encourage and facilitate prospective entrepreneurs to venture into the yet largely unchartered territory of bamboo based industries

7. Campaign for Bamboo

We emphasise the vital need for bamboo as an appropriate vehicle for both grassroots and industrial development; its ameliorating environmental attributes; unique potential in mitigation of the challenges of deforestation and global warming; the beauty and utility value of bamboo products; and the pride that one is entitled to for his or her service to the cause of environment

and ecology by using products made of bamboo instead of wood; and call upon the Government of India to organize well planned long term orchestrated campaign through electronic and print media to create awareness, support and participation of citizens for the development of the bamboo sector.

8. 2020 Vision to Bring Smile to Billion Faces

We recognize the enormous potential of bamboo as a resource and as an enterprise to enhance quality of life and prosperity in the relatively under developed bamboo growing regions of India and impress upon the Government of India and the State Governments and all other authorities and stakeholders in the bamboo sector to remain committed to the 2020 Vision to make India a prosperous, happy and secure nation, where the rural and urban divide is reduced to a thin line; and wherefrom poverty is eliminated bringing smile to billion faces.

VI
National Workshop : Investing in Green Gold

Organizer : Madhya Pradesh State Bamboo Mission
Date : 24th January 2014
Venue : Academy of Administration, Bhopal

Recommendations of the House and Action Points

There is a need to adopt vocational training for bamboo crafts and bamboo courses in institutes like ITI. For this, recommendations should be given to the state governments.
Like Kerela, bamboo corporation missions should be established for inculcating best bamboo management practices in MP and other states.

As tremendous works on bamboo are being carried out in different parts of the country, there is a need to create a platform or system for facilitating regular interaction of experts, scientists, entrepreneurs and resource persons in order to organize the scattered information concerning bamboo sector.
Secondly, Research and Development activities should be prioritized in the Bamboo sector.

As M& E is at very nascent stage, with the advent of more models , there is a need to evolve a complete system or model for M& E in bamboo sector. Presently, evaluation is being focused and monitoring is not taking place. Thus it's the time where both Monitoring and Evaluation should be equally focused and performed with the help of a suitable model.

Bamboo Management in forest areas
There is a need for certified planting stock in order to ensure the quality of the product. It is necessary to recognize the role of community in the management of nursery and the requirement based planting material, keeping in mind the end user of the product.
It is prerequisite to ensure right kind of bamboo for the right farmer. Monoculture was the another issue which should be avoided by allowing natural associates to grow.
There is an increasing need to create massive awareness and increase ownership by the community.
The selection of species should be done taking into consideration the agro climatic zones.

Bamboo Management in private areas

Demonstration plots, of around 1- 3 hectares, may be taken up at different place to generate awareness amongst the farmers and help them in producing better products leading to higher price and benefits.
The role of clear felling in bamboo management may be examined from farmers' points of view.
There should be segregation of different types of bamboos at depots. Products can be segregated according to market requirements in the depot and the final products can be used for furniture makings, incense sticks and biomass industry.
Support price should be based on the species, diameter and length of the pole

Bamboo nursery and quality planting stock, Monitoring and evaluation practices in bamboo sector

Bamboo resources in the state can be broadly divided in 5 zones monitored under different management objectives for bamboo production and restocking of the clumps

Bamboo regions	Management objective	Expected produce
Bamboo in Semi - Moist region	High production through intensive management	80,000 culms per hectare
Bamboo in Dry Teak forest	High production through management	60,000 culms per hectare
Bamboo in E. Vindhyan Region	Sustainable production and restocking	40,000 culms per hectare
Bamboo in W. Vindhyan region	Sustainable production and restocking	20,000 culms per hectare
Bamboo in Miscellaneous forest	Sustainable production and restocking	20, 000 culms per hectare

As per the order of APCCF, MP, 2004, Management of bamboo for restocking of degraded bamboo forest, quality of planting material for plantations and sustainable production needs to be ensured. Along with that, soil working needs to be ensured twice in rainy season (August, September) and thrice in dry season (February, June, October)
Nursery of bamboo should only be raised through certified seeds essentially.
There is a need to introduce silviculture intervention for removing congestion in degraded bamboo forest.
Genetic improvement of the existing species and introduction of new species for different agro climatic zone can be done. Germplasm bank of bamboo at State level should be maintained.
Identifying the end-uses in different region and ensuring management of bamboo to cater the demands of the local market.

Skill Development, Capacity Building and Product Management

Need to ensure proper intense research, Product designing and Product manufacturing.
Introduction of Certified diploma courses and refresher courses in colleges and institutes.
Regular Skill development for Private entrepreneurs especially in newer bamboo application and technology.
Development of aggressive marketing practices like IT, Media, social networking sites, creation of consumer awareness, buyer- seller meet, demonstrations, etc.

VII
National Seminar : Bamboo Productivity in Forest and Non – Forest Areas

Organizer : Bamboo Technical Support Group (Indian Council of Forestry Research and Education)
Date : 30th & 31st January 2014
Venue : Forest Research Institute, New Forest, Dehradun

Recommendations and Action Points

General concern about low productivity and lack of robust productivity norms in respect of bamboo.
Issues identified:
Need to develop and produce quality planting material
extension of farmer friendly propagation technologies for producing sufficient planting stock,
proper management of plantations,
development and use of the proper silvicultural practices,
age of harvesting,
Seasoning treatment, etc. to improve productivity for enhancing the economy of the stakeholders
The role of bamboo in carbon sequestration, land reclamation, soil and water conservation, etc. was highlighted.

Details of the important issues and recommendations are enumerated below:

Need for Improving Bamboo Productivity Database Management Practices

The prevailing poor data management and reporting practices were highlighted as one of the reasons for reported low bamboo productivity in the country. The available bamboo productivity data in the country was based largely on the inferences drawn from the bamboo sale data maintained by the state forest departments. The removals by right holders, forming significant part of the annual bamboo production, were generally not included in these records. Lack of reliable comprehensive productivity data was adversely impacting the resource strengthening initiatives in the country.

An immediate need for putting in place a comprehensive and reliable system of data management based on actual removals of bamboo from forests, both by right holders for domestic consumption and by the forest departments for commercial purposes was highlighted in the Seminar.

The initiative by the National Bamboo Mission in developing a national bamboo database was appreciated by all and it was recommended that the National Bamboo Mission should make efforts to develop the proposed dynamic national bamboo database at the earliest and also chalk out a parallel program to build capacity of the designated state nodes in data updation and management.

Need for High Quality Germplasm

Non-uniformity of bamboo germplasm that was available for plantation programs was highlighted as one of the main issues coming in the way of enhancing bamboo productivity. It was pointed out that main source of bamboo propagation remained seed, with no mechanisms to certify the productivity

credentials of its source. It was strongly recommended to initiate comprehensive programs for
(a) screening and developing genetically superior germplasm in respect of commercially important bamboo species,
(b) making available the superior germplasm on mass scale through macro and micro propagation methods, and
(c) extend farmers friendly propagation technologies through training programs, on-field demonstrations and establishment of clonal nurseries at farmer's field.

The initiative by the National Bamboo Mission in developing nursery stock certification protocols was appreciated with the recommendation to finalize the same and make these operational at the earliest.

Need for Rehabilitation of Bamboo Flowered Forests

The poor rehabilitation of many bamboo areas in the country post-flowering came out as an important area of concern. Many of the flowered bamboo areas were reported to have come under weed infestation and the stocking of rehabilitated areas was reported to have drastically reduced, affecting the local artisans the most.

The State Forest Departments and the National Bamboo Mission were called upon to initiate and implement focused programs to develop and rehabilitate the bamboo-flowered areas.

Need for Encouraging Scientific Bamboo Farming

The bamboo as an agro-forestry crop was reported to have good potential for enhancing bamboo production in the country. Benefits of high density plantations to meet energy requirements were also highlighted. It was recommended to develop sound and replicable protocols and promote scientific farming of different bamboo species, including for high density plantations, across different agro-ecological zones in the country. These protocols would need to be based on right species selection, assurance of quality planting material, improved management practices including irrigation, fertilization, pest management, and harvesting regimes.

Need for Modifying the Present Practice of Calculating Bamboo Yield

The existing practice of calculating bamboo yield 'by area', as was being presently followed in the Working Plans, usually tended to include many areas with very low frequency of bamboo clumps, pulling the average productivity figures/ hectare down. It was mainly due to this reason that the average bamboo productivity figures in the country were worked out to be less than one metric ton/ hectare/ year, whereas bamboo productivity of more than 10 metric ton/ hectare/ year for plantations was reported by many authors in the Seminar. It was recommended that a more reliable data in respect of bamboo productivity, especially for plantations, was required.
Calculating bamboo yield 'by number of clumps' instead of 'by area' was suggested to be one of the options to have more realistic productivity data.

Need for Uniformity in Units of Bamboo Trade

The different states in the country were following different measurement units to record bamboo harvest and trade data, viz. metric tons /notional tons/ air-dried metric tons/ cubic meters/ numbers (score), etc. This practice was making it difficult to collate data at the national level and encourage bamboo trade across different states. A need for putting in place a uniform system (measurement unit) for recording bamboo harvest and sale data was highlighted with recommendation that the National Bamboo Mission should initiate a comprehensive study on the issue and suggest improvements in the

system.

Need for Strengthening Programs for Capacity Building of Bamboo Crafts-persons

Bamboo is generally viewed as a group of plants having vast potential for improving socio-economic condition in rural areas in the country through its use in craft. There was, however, a need to create capacity of the people to develop high value bamboo articles. It was recommended that wide ranging national programs to build capacity of the rural artisans in bamboo craft be
initiated towards developing bamboo based cottage industry in the country and enhancing cash incomes of rural artisans.

Need for Enabling Policies and Regulatory Regimes

The existing policies and regulatory regimes related to cultivation, transport and trade of bamboo from forests and from even homesteads as well as the ones related to import of bamboo and its products came out as major stumbling blocks in promoting bamboo cultivation in the country. The farmers rued that they were finding it difficult to transport bamboo harvested from their fields in view of the Forest Department's regulations. It was recommended that a thorough review of the existing policies and regulatory regimes at the state and at the national level be taken up and enabling policy and regulatory regime structure developed to promote bamboo in the country. Some of such policies and regulatory regimes are:

- Comprehensive review of the regulatory regime related to harvest and trade of bamboos from forests and private lands with the state and across states.
- Review of provisions under Land Ceiling Acts and Income Tax laws to allow for relaxation under these Acts to attract private investment for bamboo plantations.
- Rationalization of Import Duties to encourage growth of bamboo sector in the country.

Bamboo for Rehabilitation of difficult Sites

Bamboo, with its intricate rhizome system, has
come to be accepted as having good potential to stabilize and rehabilitate difficult sites, and promising results of afforestation of degraded lands and ravines were shared in the seminar. It was recommended to initiate large scale programs for restoration of degraded sites, soil and water conservation, stabilization of gullies, reducing run-off across the country.

Promotion of Hill Bamboos

Hill bamboos, playing a very significant role in the rural socioeconomics and in hill ecology, came up in the seminar as a largely neglected group of bamboos. The National Bamboo Mission was called upon to initiate programs with focus on this group of bamboos and promote actions to strengthen their resource base through afforestation and agro-forestry.

VIII
Bamboo Global Summit 2014

Organizer : World Bamboo Organization
Date : 21-22 April 2014
Venue : *Saigon*, HMC City, Vietnam

Countries
Taiwan, Peru, Colombia, India, Malaysia, Cambodia, Thailand, Australia, China, USA, Congo, Vietnam, Belgium, Sweden, Indonesia, Madagascar, Mexico, Bangladesh

Saigon Declaration

We, the representatives of international bodies, academia, science and technological institutes, entrepreneurs, individuals, NGOs, and numerous other stake-holders having interest in preservation, growing and economic utilization of bamboos assembled in Ho Chi Mein City, Vietnam from the 21th to 22nd April , 2014 to take stock of the international trade, technology, and business developments in the bamboo sector and renew our commitment for promotion of bamboo as the vehicle for poverty alleviation of some of the poorest of the poor communities inhabiting the regions where bamboo is in abundance.

Recognizing bamboo as the most important fast-growing, renewable, non-timber forest products with a broad global distribution across parts of Africa, Asia, the Pacific, Latin America and the Caribbean;

Emphasizing the vital role bamboo in promoting inclusive and green development-environmentally sustainable economic progress that benefits the commons;
Realizing that the world is going through an ecological and financial crisis and facing significant challenges such as climate change, resource and energy constraints, and poverty and food insecurity;

Recognizing that improved management and utilization of bamboo resources can contribute to poverty alleviation, environmental sustainability and partnerships for global sustainable development, and that enhanced international cooperation, particularly South-South cooperation is needed to address these challenges;

Recalling that countries committed to promoting a green economy in the context of sustainable development and poverty alleviation, and establishing an institutional framework for sustainable development, including a set of new global sustainable development goals;

Noting that the mission of WBO and INBAR to improve the well-being of the producers and users of bamboo within the context of a sustainable bamboo resource base;

RESOLVE the following -

- Adopt bamboo as a global species with the following holistic and integrated vision in the respective countries -

"Bamboo for global harmony, ecology and economy'

- Promote bamboo in the respective countries for the cause of the socio-economic development of the commons, specially the bamboo dependent communities by setting individual goals, policies and strategic action plans to promote bamboo based solutions to poverty, e.g. expand the value chain of bamboo industries and enable the growth and expansion of rural bamboo enterprises to foster green and inclusive development especially, in poor, rural communities;
- Support the improvement of policies and regulations in the respective countries that enables sustainable management and utilization of bamboo resource as a part of inclusive and green development;
- Foster conducive trade promotion policies, effective international networking through advance technologies like e-commerce platforms for better global marketing and forward linkages for bamboo based products in the respective countries;
- Promote the contribution of bamboo to ecological sustainability, particularly climate change, ecosystem services, and biodiversity conservation, for they can be grown and harvested in ways that enhance ecosystem services; prevent deforestation, and sequester significant amounts of carbon, slowing the advance of climate change;
- Intensify capacity building and technical innovation for skill development through collaborative research and technical information sharing, technical conferences and seminars, to advance the application of bamboo technologies for inclusive and green development;
- Strengthen international and regional cooperation on sustainable bamboo management via existing international organizations, through the exchange of knowledge, experience, technologies and resources among partners.
- We reiterate our support to promoting, inter alia through WBO , INBAR, CFC and other bodies , the role of bamboo in poverty alleviation and ecological sustainability by encouraging policy making, international and regional cooperation, and capacity building and technical innovation.

Action Points emerging from the consultation

Promotion of Information and Experience Sharing Platforms

- Develop an open source platform and networks for information sharing
- Develop community platforms
- Educate and involve the younger generation in bamboo
- Promote and continue the research and development activities in bamboo sector

Product development

- Promote industrial design for various bamboo applications
- Adapt existing technologies from the wood industry towards bamboo timber processing

Establishing and Developing Standards

- Produce construction standards/codes in country for bamboo based structures– share national building codes to countries that don't have them.
- Develop ISO standards for treatment of bamboo.
- Develop universal standardisation for nomenclature of various bamboo related terms

Resource Development

- Work towards protection and augmentation of bamboo resources

Profile development of bamboo sector

- Portray bamboo as "sexy"
- Give bamboo a global profile – get big names involved e. g. Branson and Gates
- Promote Bamboo music as a means of interesting people in bamboo.

- Do some projects all together to raise the profile of bamboo
- Develop crowd support

Map/collate bamboo stories around the world

Generate Investment

- Build network of dedicated partner sponsorship organizations/individuals to finance new companies and entrepreneurs in bamboo sector.

Follow up recommendations of the Focus Group Discussions

- The delegates from participating countries were divided into groups for FGDs. The groups deliberated on the issues identified by the group members and suggested kick starts for follow up -

Group 1
Continue to perform Research and Development – a lot left to learn
Develop networks to incorporate apps via knowledge exchange
Promote industrial design in bamboo
Open source democratic knowledge base needed
Group 2
Open source platform
Adapt existing techs from wood industry
Educate young generation about bamboo
Make bamboo 'sexy'
Group 3
Build community platforms for bamboo to promote connectivity
Cross supports for sourcing for everything about bamboo; Make it for daily life
Story mapping around the world
Making something together, not just by talking; Sponsor project for social housing together, bring us all together for bamboo world
Open source platform for "bamboo"
Group 4
Introduce bamboo courses at various levels for different needs in educational institutions
Take steps towards protection and augmentation of bamboo resource
Set reasonable standards for construction
Adopt Scientific approach for bamboo
Group 5
Adopt universal standards for various species
Global profile for support form Branson and Gates to make bamboo 'cool'
Bamboo for a better world
Educate kids from a young age
Group 6
Building standards – make them available to countries that don't have them
Bamboo purchasers should be encouraged to participate in the bamboo conference
More than one room needed in the bamboo conference
Group 7
Build open electronic platform to share knowledge
Develop bb music to educate and involve people
Develop ISO standards for treatment.
Build network of dedicated partner sponsorship organizations/individuals to finance new companies and entrepreneurs.

IX
National Seminar : Bamboo for Better Future

Organizer: Madhya Pradesh Bamboo Mission
Date : 5th – 6th June 2014
Venue: Academy of Administration, Bhopal

Recommendations of the House and Action Points

The environment at the policy level is positive and the resolutions of the conference will be highlighted and honored by the State Government at the highest level. The three most essential elements remain the 3Ms, i.e. Men and their attitude, the right kind of Material, and Money.
A study of Global bamboo felling rules should be considered for selection of appropriate felling practices.
Proper scientific trials should be conducted for end use based bamboo management.
Monitory incentives should not be provided to farmers in piecemeal, rather in one go.
There is a need to engage forest officers in the National Bamboo Mission to formulate realistic policies and standardization of cost norms at National level.

Action Point 1
Introducing Bamboo in Technical education in Architecture and Engineering colleges and Universities and establishing linkages with concerned expert organizations / institutions for education and professional inputs

Action Taken:
In this regard, Memoranda of Understanding (MoU) have been signed by MPSBM with DEI (Dayalbagh Education Institute), SPA (School of Planning and Architecture), and
CGBMT (Centre for Green Building Material and Technology) with the objectives of fostering resource development with the three institutions to promote academic and technological interactions.

Action Proposed:
With the help of such agreement, 'Modular Courses in Bamboo Technology' has been proposed for the traditional bamboo artisans in the State of Madhya Pradesh. These courses will help the artisans to build upon their traditional knowledge and skills so as to utilize bamboo in more innovative ways.

Action Point 2
Establishment of ICT (Information and Communication Technology) centres in the State in order to facilitate awareness, skill development and vocational training programs in the remotest corners of the state to the doorstep of the most disadvantaged.

Action Taken
A study on evaluation of 13 Common Facility Centres (CFCs) of the State is being performed by TFRI, Jabalpur. The study will help in ensuring efficiency and productivity with physical infrastructure for mechanized production set up.

Action Proposed
Strengthening of CFCs already in existence. Training Need assessment has been proposed along with acquisition of necessary machineries/ tools/ infrastructure for smooth functioning of CFCs. In this regard, a Bamboo Producers' Company has also been planned as a pilot project in Jabalpur through confederation of SHGs. An extensive, multipurpose, user-friendly bamboo Web portal has been proposed for implementation by MP Online, catering to the needs of all stakeholders, including the rural artisans.

Action Point 3
Facilitating project formulation and execution of Bamboo Building and infrastructure projects under special category status so that bamboo can enter the vast construction projects of the State. Bamboo- should be included for tender processes. Promotion of iconic buildings of bamboo to showcase and raise interest in its use as a material.

Action Proposed
Initiatives have been proposed for including Bamboo low cost housing under Indira Awaas Yojana. Construction of Bamboo Pavilion has also been planned at Bhopal Haat.

Action Point 4
Inclusion and promotion of bamboo in Govt. infrastructure, especially under Indira Awas Yojna. Schools, hospitals and other community building should be made from bamboo and other locally available materials.

Action Proposed
Formulation of Policy to maximize bamboo use in Govt. infrastructure has been proposed in coming year. Under this policy, government order for maximizing use of bamboo in Govt infrastructure, like furniture for schools, RHs, IHs; buildings for schools etc, will be issued.

Action Point 5
Setting up a capable, effective, State level Bamboo Task Force comprising of key stakeholders with track record in developing the bamboo sector that is centrally involved in policy, action plan and Monitoring and Evaluation to promote sustained development. Formulating a Multi-Sector Stakeholder State Policy and an effective Bamboo Policy with special focus on procurement of bamboo from private farmers /growers, and a minimum support price / buyback arrangement.

Action Taken
In this regard a technical support group has been constituted with representation from government officials, expert scientists and institutes, entrepreneurs, etc.

Action Proposed
A State-level steering committee has been proposed for promoting bamboo-based development in the State, under the chairmanship of the Chief Secretary. An interdepartmental committee has also been proposed to be established for negotiations with international organizations for bamboo projects/proposals. For promoting private plantations, effective public-private partnerships models are being pursued. Formulation of state bamboo development policy has been proposed, which will include a framework of incentives and subsidies, to encourage the establishment of bamboo industries and enterprises.

Action Point 6
Convergence of bamboo schemes of all departments under one canopy of Bamboo Mission for integrated development of bamboo based enterprise and industry in the State.

Action Proposed
Efforts are being made to pursue collaborations with State Departments like Rural Development, Cottage and Village Industries (Hasth Shilp and Haath Kargha Vikas Nigam), Department of Farmers' welfare and Agriculture development etc. and expert institutes like TERI, IPIRTI, IWST, TFRI, NID, SPA, IIT (Delhi), RRL (Regional Research Lab) and DEI (Dayalbagh Education Institute), Agra

Action Point 7
There should be allotment of additional exclusive budget for the promotion of bamboo resource development and bamboo based industry in the State.

Action Proposed
Project proposals for about nearly Rs 26.54 Crore have been submitted to various funding agencies like Planning commission, 14th finance Commission, MSME (Clinic Design Scheme) etc.

Action Point 8
Setting up a Centre for Bamboo Research and Development – A Centre of Excellence -which will also undertake Masters and PhD programmes for promotion of Bamboo based development and enterprise in the State.

Action Proposed
In this regard, Bamboo Entrepreneurship Development Institute has been proposed on the lines of BLTDI Jharkhand, under the UNDP program.

Action Point 9
Proper scientific trials to be conducted for key bamboo species, especially Dendrocalamus strictus, green Bambusa vulgaris, B. balcooa, etc and also constructing demonstration fields (1 – 2 hectare) of local and exotic bamboo species in different agro-climatic conditions for control, irrigated and fertilized growth at district level for adopting a scientific approach to the entire bamboo production-to-consumption system (PCS).

Action Proposed
Demonstrative high tech pilot plantations of selected bamboo species are proposed to be undertaken with tissue culture plants through expert agencies like Growmore Biotech Ltd, Huzur, Tamil Nadu, Ramkrishna Mission, Kolkata. For conducting scientific trials on clear felling, consultancy has been proposed to TFRI, Jabalpur.

Action Point 10
CSR should be used as a tool for promoting bamboo.

Action Proposed:
On this front, efforts are being made to collaborate with industries like BILT for promoting bamboo initiatives in CSR activities.

Action Point 11
Creating awareness among forest officials and entire forest extension system through exposure videos and other mechanisms concerning best management practices in bamboo sector and its management. Marking of bamboo clumps specifying girth, length, age, etc of the clump should be promoted.

Action Proposed:
Nearly 1000 field functionaries have been proposed for availing training in scientific management of bamboo in 2014-15. Apart from imparting training to field functionaries, proper marking will be ensured through regular monitoring and evaluation programs.

Action Point 12
Dedicated Baans Mahotsav to be organized for bamboo.

Action Proposed
In a five year period, Plantation of bamboo in 25000 ha has been proposed.

Action Point 13
Plantations of bamboo should be driven by end-use for various product segments and environmental applications and non availability of seed only. Quantity and quality should be given equal importance in target-driven planting.

Action Proposed:
A study on "Assessment of impacts of the harvesting practices on the regeneration of bamboo" is being carried out by TFRI, which will include analysis of bamboo harvesting based on its end use.

Action Point 14
A household based bamboo management system should be trialled, which has been the backbone of the enormous success in bamboo productivity in China. This would be superior and more effective than department or JFMC based management. The household should benefit from the bamboo harvested. This will help in providing sustainable livelihoods from bamboo.

Actions Proposed
1. In this regard, a bamboo producer company has been proposed as a pilot project with the help of SFAC (Small Farmers' Agri-Business Consortium), which will include formation of SHGs and their confederation.
2. Kisan Baans Yojna has been formulated highlighting the benefits of bamboo plantations for farmers through scientific management, tissue culture labs, high tech nursery, capacity building programs, marketing channels, etc.

Action Point 15
Promoting Certification of bamboo and bamboo products

Actions Proposed
In this regard, ISO certification for the sustainable management of the resource, process, system, chain of custody, and products has been proposed to be undertaken by MPCON Ltd.

X
National Consultation Workshop : Bamboo in Construction Building sustainability

Organizer: Madhya Pradesh Bamboo Mission
Date : 16th July 2014
Venue: Courtyard Marriott, Bhopal

Action Points

- A Bamboo Pavilion will be constructed in MP, which will act as a unique model for demonstration. (Action -MPSBM)
- Property Fair which is organized every year by CREDAI Group, Bhopal will have stalls made up of bamboo this year. (Action -MPSBM & CREDAI)
- A Bamboo Forum at national level will be created involving different stakeholders like scientists, entrepreneurs, experts, designers, architects, Government officials, etc. which will incorporate all bamboo related components. (Action -IIT, Delhi)
- The bamboo growers/ farmers will be encouraged and supported for large scale bamboo plantations to cater to the needs of the sector. (Action -MPSBM)

XI
Consultation Meet : Riparian (River) Management through Bamboo Cultivation

Organizer: Madhya Pradesh Bamboo Mission
Date : 16th September 2014
Venue: MP-MFP Conference Hall, Khel Parisar, Bhopal

Recommendations and Resolutions

Introduction of bamboo under two schemes: hariyali chunri - riparian of all perennial rivers and rejuvenation of rivers. This could be done by introduction of a chapter in the work1ing plan and under taking specific project Before that there should be DPR at state level. The DPR. would get input from specific survey to assess the riparian area and defining the zones for the development,

- In Riparian zone under Working Plan area, bamboo should be the preferred species. There should be an exclusive chapter for the bamboo based riparian zone management. This can be done through revision of working, plan code.
- Riparian Zone should not be rigid In terms. of distance from the rivers/ river bank, however it should be area specific. All those area which impact the river quality should be covered as riparian area.
- Riparian area, should be notified for forest management.
- The DPR should consider all the activates in the zone so that pollutants from different sources to river can be addressed.
- Water resources management should be the integral part of forest management, objectives and prescriptions. The pilot experiments on riparian management should involve experts of soil, plants, environment, etc.
- The agriculture land holders may not be interested in bamboo cultivation. An incentive

mechanism should be developed so that they are motivated.

- Proper institutionalized funding mechanism should be in place to meet the working capital of bamboo cultivation.
- Transfer of technology for scientific bamboo management for farmers on long term basis.
- Institutionalized system for the riparian management project under the networking of concerned departments with a Nodal agency (Forest department) through Bamboo Mission, JFM or participatory approach

Legal:

- Simplification of legal provisions and other norms for motivating bamboo cultivation
- Bamboo plantation in riparian zone should be exempted from Land ceiling Act
- Bamboo plantations in Private lands should be exempted from FCA
- Effective implementation of tenure rights.

- Strengthening of JFMCs & PRIs also for effective implementation of bamboo management in forest area
- Every bamboo plantation should have duly approved site specific bamboo management plan.
- Set up a, multidisciplinary working group for the DPR for Riparian management.
- Restoration of bamboo in its original habitat to promote biodiversity.
- Protect Mhow & Choral Watersheds for Water needs of Indore and similar areas for Bhopal drinking water supply from Narmada and Kolar reservoir
- Promote bamboo as agriculture produce/commodity
- Provision for Payment of ecological services/ opportunity for ecological services, to be ploughed back for riparian management
- Promote Organic: Farming in riparian zone and compensate for such initiatives.
- Assessment of Riparian Zones and quantification of total area tor bamboo cultivation including use of modern toots and techniques
- Watershed would be development unit for riparian management
- MGNREGA scheme will be integrated for the implementation of the project as far as possible.
- Demand side management (forward linkages) of bamboo should be addressed simultaneously including facilitating small bamboo growers.

Workshop Resolutions

- Develop detailed concept plan for Riparian management in. MP (Action-IIFM + Forest dept, TL-3 months}
- Develop state level DPR for Riparian management through bamboo cultivation (Action-IIFM +Forest Dept, TL- 6 months)
- Develop project proposal for Narmada river art Jabalpur (Action- IIFM + Forest Department, TL- 3 months)
- Develop project proposal for Water purification through bamboo for the drinking water source of Bhopal (Hiraani) (Action- IIFM + Forest Dept, TL- 3 months)
- Inclusion of chapter on “Riparian forest management” in State Working Plan Code (Action-MPSBM; TL- One month)

XII
Consultation Workshop : Managing Bamboo in Totality

Organizer: Madhya Pradesh Bamboo Mission
Date : 18th September 2014
Venue: MP-MFP Conference Hall, Khel Parisar, Bhopal

Recommendations and Resolutions

1. Develop a bamboo based socio-economic format which should be included in the working plan.

2. Carry out a detailed assessment of impacts of working on bamboo and validate scientifically the various practices prevalent in the field.

3. Based on the results of assessment, M.P. Bamboo Mission should come out with a Bamboo manual which should serve as a handbook for various stakeholders of bamboo.

4. Clumps should be categorized as per size. Job rate should be tied to the categories of clumps according to their size or degree of congestion or the difficulty of terrain.

5. A paper on bamboo grazing and bamboo management to be made and submitted along with prescriptions.

6. Include Bamboo potential area and bamboo growing stock in the working plan.

7. Scientific Management of Bamboo Clumps in Bhopal- Every Bamboo clump in the city is to be worked scientifically under the supervision of MP Bamboo Mission. A special team will be deputed for this purpose and they will be provided with appropriate equipments for working.

8. Site specific project reports to be submitted for taking up new bamboo areas.

9. Document the initiatives (for bamboo and other species) that have been taken in past and analyze its success or failure. And add them to working plan.

10. Plan and implement special management interventions for gregariously flowered areas

11. Scientific working , felling and soil working should be taken up entirely by production wing . The harvesting (scientific management) of clumps should include all the activities, viz. cutting, cleaning and soil working. The job rates should be computed accordingly.

12. Audit objections on increase of man-days have to be found solution too.

14. A scientific proposal tying job rate to working rather that number of culms or clumps be worked.

15. Technological advancements like artificial demarcation and GPS linking for better management of bamboo should be implemented while carrying out the scientific working.

16. Bamboo Resource survey needs to be carried out over a period of 10 years or so to track the changes and measure the success rate of implemented interventions.

XIII
National Workshop : Enabling Bamboo Policy- From Ideas to Action

Organizer : Centre for Civil Society, in collaboration with the South Asia Bamboo : Foundation, & Kerala State Bamboo Mission, with support from Friedrich Naumann Foundation
Date : 6 December 2014
Venue: Kochi (Kerala)

Recommendations and Action Points

1. There is yawning gap between demand and supply of bamboo—a problem of plenty at source and a problem of scarcity at the consumer level. Remote bamboo-growing areas have no roads. New road construction not permitted in forest areas. Farmers prefer cash crops over bamboo.

Based on this, 'Three Cs' needed to be worked upon in bamboo sector:
a. Contradiction – different agents, department and ministries
b. Coordination – across objectives of different bodies
c. Convergence – in use of funds, human resource and development and other inputs

2. Under the Forest Rights Act, 2006, (FRA) bamboo is designated as non-timber minor forest produce (MFP) thus consolidating forest dwellers' ownership right to collect, process, store and transport bamboo. Yet, transit permit for transportation of bamboo is required. Our recommendation is that there can be a standard National Transit Policy. A separate workshop focusing only the transit passes for bamboo required and the Madhya Pradesh State Bamboo Mission has offered to organise this workshop in Bhopal.

3. The National Mission on Bamboo Applications is now converted into a regional body for North East. It was recommended that this remain a national body. There is inconsistency of federal and state laws and there are many ministries involved.

4. National Bamboo Development Authority under Ministry of Environment and Forest and State Bamboo Development Authority can be constituted under Ministry of Agriculture. A committee, comprising selected participants from the workshop, should be created which will work on drafting the national law on bamboo under the guidance of Mr. C. P. John.

5. Review of the state regulatory mechanism needs to be done state-wise, which can be done by respective state bamboo missions. There needs to be a regulatory mechanism at the federal level in form of a law, rules, schemes, guideline and action plan. This should be done by Ministry of Environment and Forest, and Ministry of Agriculture.

6. Bamboo Development Authority should be created for facilitating bamboo sector instead of board or mission. The need for this Authority is that it will bring flexibility, less bureaucratic functioning and is more successful model from administrative perspective. Ministry of Environment and Forest at federal level should create this National Bamboo Development Authority. Authority can also take responsibility

of corporate social responsibility, promotions and marketing etc. The Authority can partner with other organizations for research and development related work.

7. An association or federation should be created to study the new legislation that has been mentioned during the workshop and lobby for creation for National Bamboo Development Authority. Credible case studies and data is required to make a convincing case for government and planning bodies to make plans for growth of bamboo sector.

XIV

State level Workshop : Bamboo Artisans in Madhya Pradesh - *Problems, Prospects and Solutions*

Organizer: Madhya Pradesh Bamboo Mission
Date : 27th January 2015
Venue: Academy of Administration, Bhopal

Recommendations and Action Points

1. Raw Material Availability

- Bamboo Should be made available to the Bamboo Artisans timely in the required quantity.
- The Bamboo Artisans need to be provided with quality mature green bamboo culms which are best for product development as against the dried bamboo culms provided now.
- The distribution of Bamboo is currently caste based and other artisans find it extremely difficult to procure. It was suggested that Bamboo should be provided to everyone whose livelihoods are based on bamboo irrespective of caste.
- Community or Purpose based Bamboo plantation should be allowed by forest department so that the artisans are able to procure raw material as per the end usage in mind.
- The bamboo clumps should be made available during the peak season of festivals and events to the artisans so that they can market their products in these festive periods where they are in demand.

2. Training and capacity Building

- Technological innovations and advancements should be extended to the grass root level artisans through meticulously designed training and capacity building activities so as to help artisans produce contemporary products whose demand and price will be higher in the market.
- Training and capacity should be made an integral component of the policy document.
- Master Trainers are to be identified and recruited at every CFC from the artisan groups who could provide regular training and skill development to the artisans.

3. Production and Manufacturing facility (Common Facility Center)

- The common Facility center established in various districts of Madhya Pradesh need to be equipped by modern machines and equipments.
- The machineries which are available in the center, its maintenance and user manual is not available. This leads to mis-management of the equipment and eventually it no longer remain operational. The CFC managers and artisans need to be trained in the handling and maintenance part of the installed equipments.

- Stage wise modular training for Artisans for different skills and next level trainings – based on certification system is required for mainstreaming the skills recognition.
- The CFCs should have treatment plant facility as treatment of bamboo is an important step. Traditional Bamboo treatment methods are to be documented, tested and promoted.

4. Credit and Finance

- Specialized loan packages need to be designed for bamboo artisans and other stakeholders/
- entrepreneurs willing to explore the bamboo sector and they should be tied up with the common facility centers.
- Special schemes and incentives need to be developed to ensure credit and financial security for the bamboo artisans.
- The artisans should be made aware of existing list of credit and financial policies.

5. Market and Supply chain Linkage

- An event and festival calendar has to be developed for the bamboo artisans which makes them informed about the various marketing possibilities to sell their bamboo products and schedule their manufacture as per the demand.
- To create a local market, consumption of bamboo based product should be encouraged in Government and other departments
- There should be development of Marketing agents as per cluster
- Developing Entrepreneur for the bamboo based products from the Artisans group should be encouraged with special courses in business management for people willing to enter and invest in the bamboo sector.

6. Policy and other institutional Support

- There are few initiatives like community based Institutions such as SHGs, common interest group (CIG) etc. who work exclusively in the bamboo based enterprises. Special emphasis has to be given towards encouraging them.
- Formal institutions to support artisans at rural and tribal areas specific for bamboo development need to be created.
- The age criteria for registration of bamboo artisans needs to be defined so as not to bring any conflict with child labour law.
- Other mode of registration with MP bamboo mission apart from the online mode should be provided as people in rural and tribal areas are not abreast with online registration process.
- A smart card similar to Artisan card with National recognition is to be made available to all the registered member by MPSBM

XV
National Workshop : Bamboo Policy: Issues, Options and Actions

Organizer: Madhya Pradesh Bamboo Mission
Date : 28th January 2015
Venue: Academy of Administration, Bhopal

Recommendations from the Focus Group Discussions

Regulatory barriers and reforms:

- Include bamboo as construction material in PWD and CPWD schedules of rate and national building code
- Promote purchase of bamboo based products in government purchases, school, Indira Gandhi Awas Yojana and other construction
- Transit permits deregulation to be trialed in pilots, starting with private land and moving into the forest. This should be coupled with depots and supply chain development as well as minimum support price (Rs/ton) should be decided by local registered committee.
- Resolve contradictions between various acts, regarding bamboo as grass or tree, and its status of minor forest products to be resolved through appropriate amendments to the relevant act
- Reduce taxation to the minimum possible for bamboo and bamboo based products
- Enhance import duty on bamboo based products
- Develop a carbon market through appropriate legislations for promoting bamboo
- Develop an act to push bamboo as a zero or low energy consumption products and provide rating based on energy consumption of products, buildings etc
- Recognize bamboo as a traditional material and traditional knowledge system
- Promote bamboo as icon of sustainability and popularize it

Institutional mechanism:

Establish bamboo development authority at the national level under the Ministry of Environment, Forests and Climate Change (MOEF&CC)

- Establish bamboo development authority at the state level
- Use Forests and Environment gram sabha based forest governance village land (Community Forests Reserve)

Major mandates of the state level authority should be to:

- Suggest policy and legal interventions for bamboo development
- Enhance livelihoods opportunities for the artisans and forests dependent communities
- Promote research and development for enhancing productivity and technology advancement
- Recommend strategy for sustainable management of bamboo resources

Commoditizing and popularizing bamboo:

- Establish separate and specialized institutions, especially bamboo development board at the central and state level to work across the entire value chain of bamboo (from plantation to final product development and marketing). The broad will take over the role of mission and give continuity of mission works.

- Promote branding of bamboo and use the brand ambassadors for promoting of bamboo and bamboo based products
- National Bamboo Development Board is needed. (eg. Central scale board)

- Create awareness about bamboo and its importance, focusing on its diverse use, such as food, furniture, construction materials, handicrafts, life style products and jewelry, etc.
- Establish quality assurance system (set quality parameters) and certification system at the production as well as processing level
- Popularize bamboo as the eco-friendly products and substitutes of steel furniture, timber and plastics etc.
- Promote proper and professional packing of bamboo products, especially jewelry and handicrafts
- Organize bamboo festivals, trade fair at various level, from community, urban market centre, state, national and international level
- Publicize about bamboo, its importance and uses in print (newspaper), audio visual (television, radio) and electronic media (internet)
- Develop own website related to the bamboo and use social networks to popularize bamboo
- Promote bamboo as "luxurious and high class society products", especially among the richer segments of the society to create the awareness and demands of the products among the middle class society
- Integrate the use of bamboo and bamboo based products on eco-tourism development initiatives of the tourism department, specially promoting construction of bamboo based facilities such as lodges, huts, and also on bamboo based destination marketing
- Collaborate with builders/developers, architectures for promoting use of bamboo as the construction materials
- Explore potentialities of bamboo to promote as climate smart products, including access to climate finance for bamboo plantation

Research, Marketing and Technology Development:

- Document on research of bamboo and identify knowledge gaps, including priority area of research
- Identify and prioritize research need of the bamboo focusing on plantation, product development and marketing
- Promote public private and civil society collaboration on conducting bamboo based products related research and upscale knowledge
- Generate knowledge through the research and disseminate to the industries and business communities
- Establish small CISR research to focus on only bamboo and technology development
- Document traditional knowledge of the Indian society and promote its use, including research for its advancement
- Promote use of technology for the development of bamboo industry
- Promote use of bamboo products in government organizations, especially furniture, construction and small scale office products etc

- Promote certification of bamboo for marketing and export promotion
- Promote marketing of the bamboo products addressing the need of local peoples, specially integrating with the local cultures
- Develop quality standard of the products, especially focusing on need of the domestic or internal market

OVERALL RECOMMENDATIONS

RECOMMENDATIONS FOR MANAGEMENT OF BAMBOO FORESTS ON GOVT. LAND:

- Amend Indian Forests Act (1927): IFA is the primary legislation on Forests and it wrongly classifies Bamboo as a tree. Bamboo is a scientifically recognized grass. Including it under the list of trees leads to the inaccurate classification of felled Bamboo as 'timber' whether it originates from government or private land. It is hence subject to not only the Central but also the State Forest Laws. The Forest Department enjoys a monopoly over harvest, transit and trade of Bamboo as forest produce. This regulatory framework has throttled a viable Bamboo economy and denied livelihood opportunities to 50 mn people[1] .
- Ministry of Environment and Forests should declare bamboo a grass: To back the legislative amendment and better implementation the MoEF should issue clear directives to its officials as well as for the benefit of the general public regarding the change of status of Bamboo. The onus of proof of a forest offence in case of bamboo originating from government forests should in all cases lie with the Forest Department
- Bamboo to be clearly classified as Non-Timber Forest Produce and regulations in cutting, transport and use of bamboo should be made uniform: Bamboo should be considered a NTFP when collected from govt. forest land. Bamboo from private lands whether forests or plantations should be out of the ambit of forest laws, both Central & State governments. Under a 'New Bamboo Policy' a common system should be devised for regulation of Bamboo from government land with goals of conservation and regeneration being central rather than revenue concerns of the government in accordance with the Forest Policy 1988
- Orientation of People on Tribal Right Act in relation to NTFP harvesting and tenure rights & inclusion of Bamboo forests in Joint Forest Management Programme: Once Bamboo is classified as a NTFP it will come under the Recognition of Forest Rights Act 2006[2] . This Act has to be amended to clearly state that Forest dependent communities can trade in Bamboo collected from government forests without any restriction to ensure that these communities use it not only for subsistence but participate fully in a market economy. With the aim of preventing overuse and unscientific felling the JFM programme should be strengthened with the legal backing of the 2006 Act and scientific input from the Forest Department/ NGOs

1. Estimated no. of people who can be employed when the Bamboo industry realises its expected potential size of Rs 26, 000 Cr by 2015 (Planning Commission estimate, 2003)

2. Forest Dwellers including Scheduled Tribes have the right to 'collect, use and dispose of minor forest produce. The word dispose is not assumed to mean either trade or transit.

- Creation of a Bamboo Board on the lines of Tea/ Coffee Board: The National Mission on Bamboo Applications under the Department of Science & Technology should be converted into an independent Board. The administration will be solely responsible for the task of promoting Bamboo which will ensure better performance as it will be a justification for the existence of the Board itself.

RECOMMENDATIONS TO PROMOTE PRIVATE PLANTATION OF BAMBOO

- Government to declare it a horticulture crop: As a horticulture crop Bamboo will be promoted through the initiative of the government to promote allied sectors in Agriculture. It will also to a large extent remove the stigma of Bamboo being a poor man's timber or an inferior good. Bamboo has the potential to be a cash crop and only when the growers recognize this potential can these opportunities be leveraged.
- Farm grown Bamboo trade & transit rules need to be abolished: With Laws on Private forests in 10 important states where commercially important species are found, and 27 including these 10 where rules are framed in accordance with the Indian Forests Act 1927 merely changing the definition of Bamboo will not be enough. State Forests Laws should explicitly exclude Bamboo.
- Include Bamboo as a plantation crop wherever separate laws exist: While excluding Bamboo from the Forest Acts wherever specific rules with regard to plantation crops exist, Bamboo should be included in that list, in order that it may enjoy a wider commercial appeal. Since it has been shown in various studies that intensive management under plantation conditions greatly improves productivity and profitability and with existing land ceiling and usage restrictions[3] this will not be possible Bamboo should be exempt from them
- Public Investment in relevant areas: Despite even existing opportunities captured by the Demand- Supply gap private players have not been any concerted efforts to take advantage of them. Decades of negligence means little has been done to bring about production patterns and practices which are sustainable and market friendly since state monopoly control has been the norm. The state has to play a facilitating role by roping in Design Institutes, Financial institutions and NGOs in order to fill in the informational deficiencies. This will go a long way in crowding in private investment not just from large companies capable of undertaking R&D activities but also small growers who are not able to do so. Existing depots for distributing Bamboo to poor people should be converted into hubs for disseminating information and training. This should be a continuous process and not a stop gap arrangement.
- North East converted into Special Bamboo Zone: There is immense potential for Bamboo products in the NE region which has abundant bamboo resources which has long been

3. The policy of Food sufficiency restricts changes in land usage where food crops are concerned. While Bamboo shoots have nutritional properties for commercial plantation purposes this change is necessary

recognized as an essential item for sustenance. If both the supply and demand can be augmented a vibrant bamboo economy can flourish here. There are already existing plywood factories and Paper mills which shut down due to the timber felling ban which represent existing capacity and a labour force which is familiar with the use and usefulness of Bamboo. Additionally though the dominant species *Melocanna baccifera* is harvester friendly[4] it is also inflicted by the problem of gregarious flowering on a mass scale not observed anywhere in India. This calls for special and much required attention being paid to this region.

4. This is a non-clump forming variety which is easier to harvest than clump forming which require a special method like the horse- shoe method used in Kerala to ensure young clumps are preserved

XVI
International DSDS Special Event : 'Bamboo as Change Agent: Better Life, Better Future'

Date : 5th February 2015
Organizer: The Forestry and Biodiversity Group of TERI in association with Madhya Pradesh State Bamboo Mission (MPSBM) and the Ministry for Environment, Forests & Climate Change,

Key Findings of the Discussion

1. There is urgent need to have National Bamboo Policy which shall be adopted by the States keeping specificities of the respective state into consideration.

2. The Indian Forest Act,1927 should be amended in the context of Implementing National forest Policy,1988 including relaxing the transit regulation for trees attractive to farm forestry including bamboo.

3. There is need to have amendment in the National Forest Policy,1988 to encourage private entrepreneur for enhancing tree and forest cover through artificial and natural regeneration on degraded forest land.

4. The Central and State Governments should have policy to use bamboo as building material in Indira Awas Yojna and as furniture in Government schools and also include Bamboo as building material in SoRs and Tendering process.

5. The Central and State Governments should have policy for tax exemption and subsidies on Bamboo, Bamboo Products, and Bamboo Machinery, considering bamboo as green material.

6. The Central Government must focus on Research and Development for developing high yielding clones of bamboo.

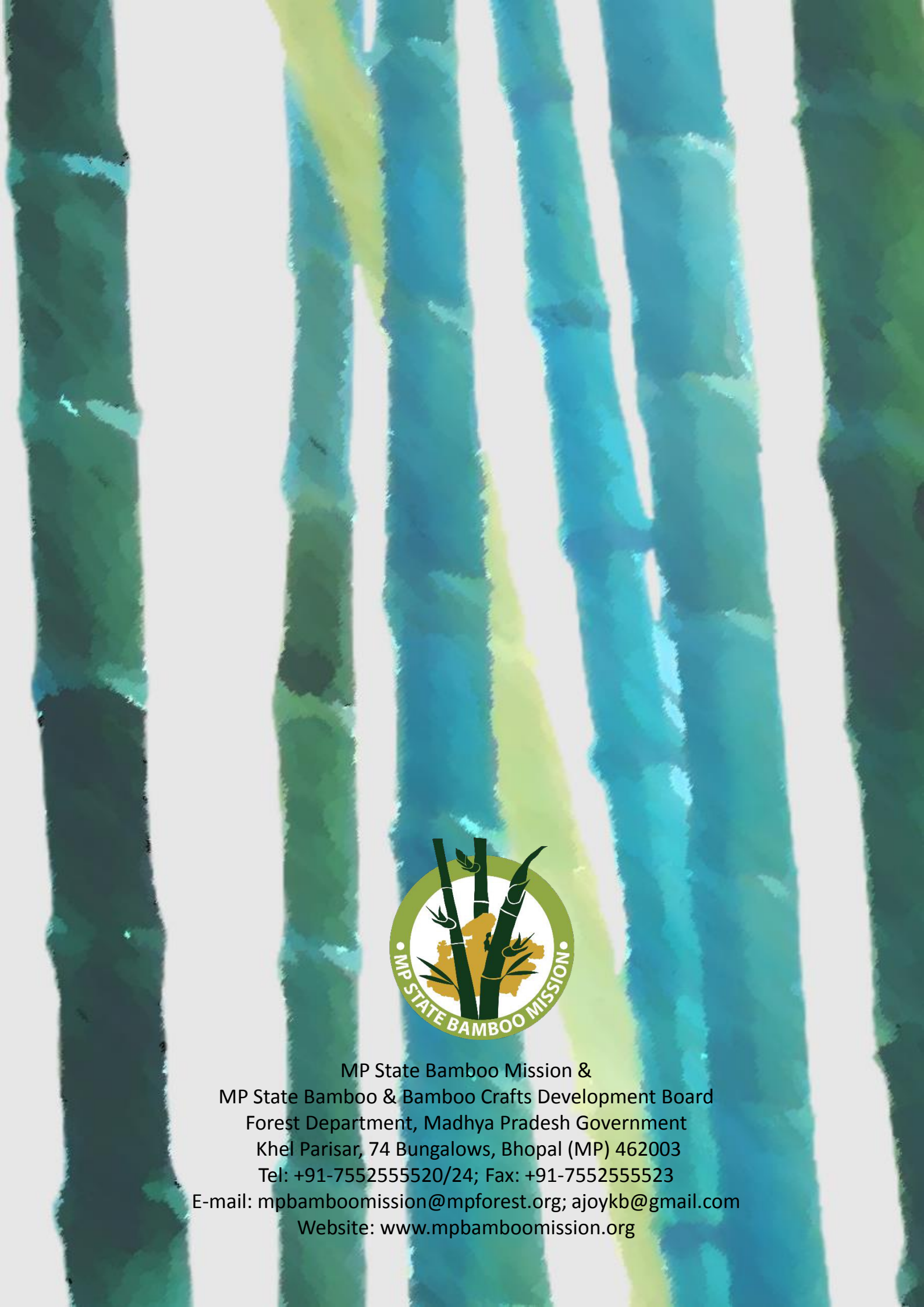
7. Bamboo being under multiple Ministries, need to establish an umbrella organization- National Bamboo Development Authority / Board.

8. JFM Institution should be synchronized with the Forest right Act limiting Forest Department to technical guidance, monitoring and implementing legislation.

National Policy Consultation on

Bamboo as Change Agent for a Better Country

PROCEEDINGS | 12 February 2014, New Delhi



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