



Capacity Building for Entrepreneurship Centered Around Trees Outside Forests

Module 3: Market opportunities of tree-based products

Lecture 4: Bamboo-based products and their market trends

Bamboo



- Bamboo belongs to the grass family Poaceae and sub-family Bambusoideae.
- It has over 1575 species from 111 genera. China has the highest number of bamboo spp. Having 800 spp., followed by India with 160 species .
- India is the second major bamboo producing country with 16 MHa (22.46 %) of a total forest area out of a total of 71.2 MHa (FSI, 2019)
- It has mainly three parts i.e., root (rhizome), culms (pole), and leaves.
- Bamboo is a fast growing and versatile plant , therefore an important forest resources found in the forest as well as the non-forest area in the country. estimated to be 15.69 million hectares.
- With the growing demand for timber, bamboo can be used as a viable substitute for timber in the country.
- The excellent physical, mechanical, and chemical properties along with massive diversity of applications makes it called “Green Gold” and “Poor man’s timber”
- A perfect tool for reducing carbon dioxide levels in the atmosphere. It generates more oxygen than equivalent strands of trees.
- Bamboo is foremost in biomass production, with up to 40 tonnes per hectare per year in terms of culms only in managed stands.
- World’s best natural engineering materials. It has a tensile strength is 28,000 lb per square inch versus 23,000 for mild steel

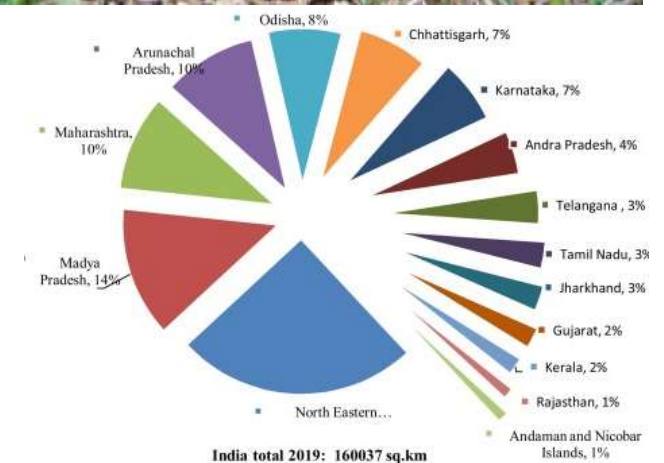


Fig. Bamboo resources in protected forest in various States of India (FSI, 2019)

Bamboo products



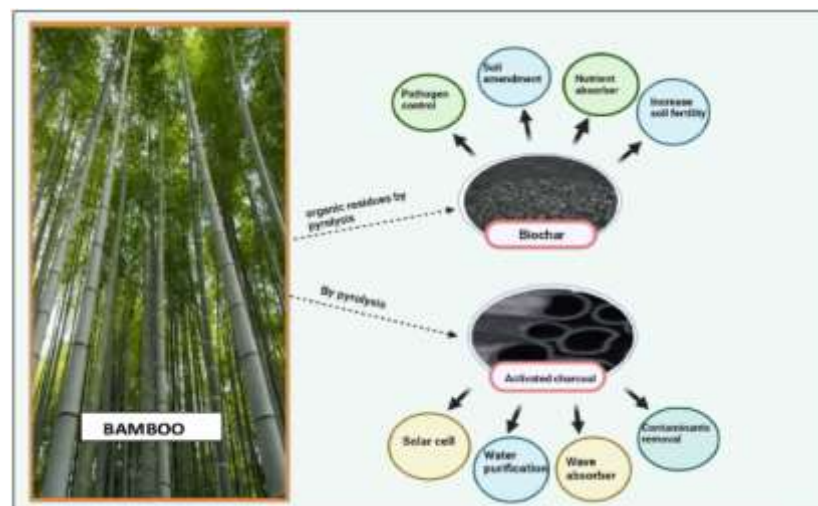
- 1. Wood Substitutes and Composites:** More than 20 different types of panels produced in Asia.
 - Bamboo is also used in pencil, match boxes, match sticks industries. One kg splints equals to 160 matchsticks packets containing 50 sticks each.
 - The annual consumption of wood by matchsticks industry in India is 2.6 million cft.



2. Energy:

Bamboo species	Moisture (%)	Ash (%)	Volatile matter (%)	Fixed carbon (%)	Higher heating value (kJ/kg)
<i>Bambusa deecheyama</i>	14.30	3.70	63.10	18.90	15.700
<i>Dendrocalamus asper</i>	5.80	2.70	71.70	19.80	17.585
<i>Phyllostachys nigra</i>	13.62	0.41	72.27	13.7	19.27
<i>Phylotachys bambosoides</i>	9.54	0.53	75.55	14.38	19.49
<i>Phyllostachys bisetii</i>	21.97	0.9	64.99	12.14	19.51

Table 2. Fuel characteristics of some bamboo species (Scurlock et al., 2000; Sritong et al., 2012)



Innovative Bamboo Bottles

Techniques for making bamboo bottles by using Bamboo Treatment Technologies of ICFRE. Most suitable bamboo species for making bottles are Shil Barak (*Bambusa salarkhanii*) & Barak (*Bambusa balcooa*). One full bamboo is sufficient for making 21 full size bottles and 12 small bottles.



3. Industries: Bamboo are also used in cottage industries such as agarbatti, kite, cracker , ice cream sticks etc. Species such as *B. balcooa*, *B. tulda*, *B. nutans*, *B. pallida*, , *M. baccifera* are used in such industries.

- The current value of bamboo used in agarbatti market is Rs 135 crores. Other like lathis, fishing rods are valued at Rs 186 crores.



4. Food: In Manipur about 2.11 lakh tonnes succulent sticks are consumed annually for Species like *D. asper*, *D. hamiltonii*, *B balcooa*, *B. polymorpha*, *B. blumenna*, *M. baccifera* are used for consumption processing Soibum .

- The present international market for bamboo shoot is vallued at Rs 7500 crores about 35% of total commercial market for bamboo based products.



5. Handicrafts: Bamboo in handicrafts generates about Rs 15 billion a year.

- This includes mats, bags, satchets, tea packaging, purses, floor tiles, board, utensils, etc



6. Building and construction material: Out of 13.47 million tonnes of bamboo, 3.4 million tonnes are currently used for scaffolding alone in India.

- The bamboo grid market size is estimated to grow at 25% per year.
- *B. balcooa*, *B. tulda*, *B. nutans*, *B. pallida*, *B. polymorpha*, *M. baccifera*, *D. strictus*, *D. giganteus*, etc are some common species for constructions .



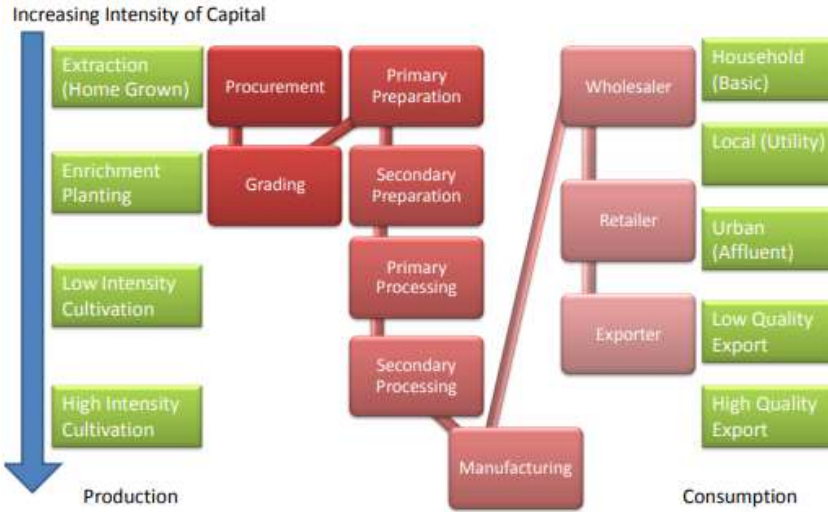
6. Medicines: The juice of pressed bamboo shoots can help with digestion.

- Bamboo sap can be used to treat loss of consciousness associated with phlegm-heat.
- Tabashir, or banslochan, is a siliceous secretion found in the culms of bamboo. It can be used as a cooling tonic and aphrodisiac, and to treat asthma, cough.
- Bamboo leaves are rich in benzoic and hydrocyanic acids.

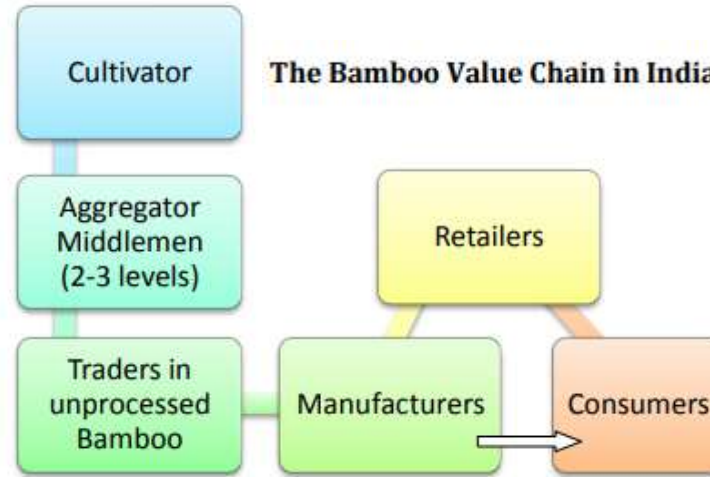




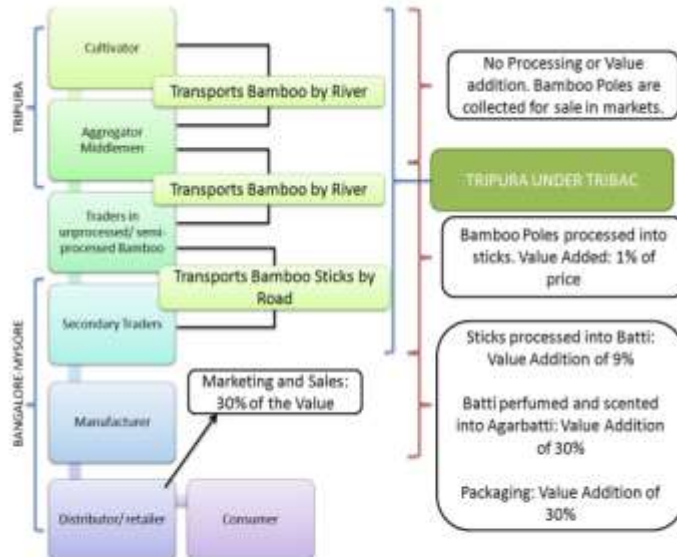
PRODUCTION TO CONSUMPTION SYSTEM



The Bamboo Value Chain in India

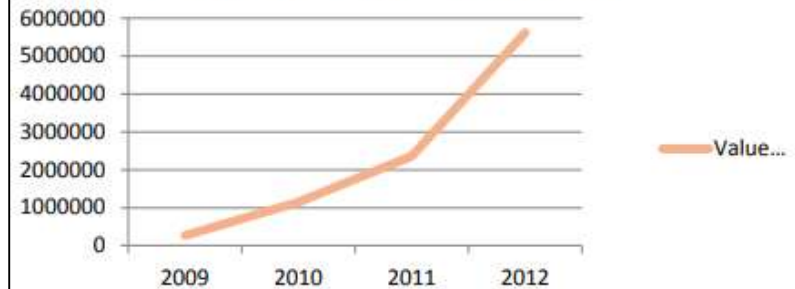


Source: INBAR Working Paper 9: Production to Consumption Systems

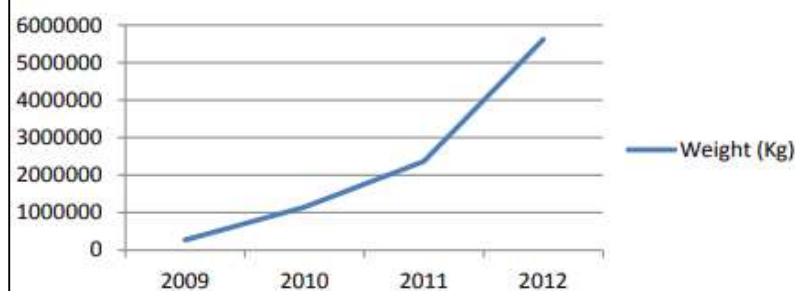


The value chain for *Agarbattis* in Tripura. Note that about 1% of value is added locally; however, under TRIBAC's intervention, this rises to 10% of the final value of the good.

Value of Bamboo Imports into India (USD)



Quantity of Bamboo Imported into India (Kg)



Source: INBAR Trade Database, Accessed July 20th 2013

Agent in the value Chain	Function	Price at which raw material is purchased	Price at which product is sold
Community	Bamboo cultivation	-	Rs 4-5 per kg
Collectors	Aggregation	Rs 4-5 per kg	Rs 4.25-6 per kg
Local Raw Stick Trader	Aggregation, grading, segregation, primary preparation	Rs 4.25-6 per kg	Rs 6-7 per kg
Secondary Raw Stick Trader	Transportation, further aggregation	Rs 6-7 per kg	Rs 13-14 per kg
Manufacturer	Production process 1: Primary processing	Rs 13-14 per kg	Rs 15-16 per kg
Roller Community (through multiple levels of traders)	Rolls <i>agarbatti</i> incense mixture, using <i>jigat</i> and charcoal, along with commissions and transport costs	Rs 15-16 per kg	Rs 28 per kg
Manufacturer	Production Process 2: Packaging, perfuming, etc.	Rs 28 per kg	Rs 60 per kg
Distributor and Retailer	Branding of products, marketing	Rs 60 per kg	Rs 250-400 per kg

An Example of the value Chain: Agarbattis, Tripura



Growth drivers:

- The bamboo market in India is growing and is expected to reach USD 8,349.7 million by 2030. Here are some key factors that are driving the growth of the bamboo market in India:
- **Government initiatives:** The National Bamboo Mission and other government programs promote bamboo cultivation and the use of bamboo in various industries.
- **Sustainability:** Bamboo is a renewable material that can be used to reduce plastic waste.
- **Favorable climate:** India's climate is favorable for bamboo growth, and the country is the world's second-largest producer of bamboo.
- **Rich bamboo forests:** The northeastern states of India, particularly Assam and Manipur, have rich bamboo forests and are hubs for bamboo-based industries.
- **Forest Rights Act of 2006:** This act allows tribal communities and forest dwellers to harvest bamboo, which increases the supply.
- **Private cultivation:** Bamboo cultivation on private farms has increased in recent years.
- **Private manufacturers:** Many private bamboo product manufacturers have been established.

Challenges:

- Lack of Awareness and Market Perception
- Insufficient Infrastructure
- Supply Chain Issues
- Global Competition
- Policy and Regulatory Barriers
- Limited Investment and Funding
- Sustainability Concerns
- Knowledge Gaps and Skill Development

Conclusion

- Bamboo holds immense potential as a sustainable and versatile resource, therefore its utilization is in abundance.
- To fully leverage these opportunities, stakeholders must focus on innovation, quality improvement, and sustainable harvesting practices.
- Establishing efficient value chains, fostering local and global partnerships, and creating awareness about bamboo's benefits can drive its market expansion.
- With strategic planning and commitment to sustainability, the bamboo sector can contribute significantly to socio-economic development while addressing pressing environmental challenges.



State/UTs wise Distribution of Bamboo Area in RFA (km ²)					
Sl. No.	State/UTs	Bamboo bearing area as per ISFR 2023	Bamboo bearing area as per ISFR 2021	Change in area with respect to ISFR 2021	Change % in area with respect to ISFR 2021
1	Andhra Pradesh	6,370	6,104	266	4.36
2	Arunachal Pradesh	18,424	15,739	2,685	17.06
3	Assam	11,246	10,659	587	5.51
4	Bihar	1,109	1,103	6	0.54
5	Chhattisgarh	11,139	10,467	672	6.42
6	Goa	235	288	-53	-18.40
7	Gujarat	3,895	3,547	348	9.81
8	Haryana	42	39	3	7.69
9	Himachal Pradesh	1,154	1,027	127	12.37
10	Jharkhand	3,746	3,717	29	0.78
11	Karnataka	7,334	8,624	-1,290	-14.96
12	Kerala	2,443	2,404	39	1.62
13	Madhya Pradesh	20,421	18,394	2,027	11.02
14	Maharashtra	13,572	13,526	46	0.34
15	Manipur	7,517	8,377	-860	-10.27
16	Meghalaya	5,347	5,007	340	6.79
17	Mizoram	4,772	4,561	211	4.63
18	Nagaland	3,980	3,947	33	0.84
19	Odisha	12,328	11,199	1,129	10.08
20	Punjab	311	280	31	11.07
21	Rajasthan	1,706	1,555	151	9.71
22	Sikkim	1,010	994	16	1.61
23	Tamil Nadu	3,217	4,001	-784	-19.60
24	Telangana	3,801	4,535	-734	-16.19
25	Tripura	4,466	4,201	265	6.31
26	Uttar Pradesh	1,598	1,832	-234	-12.77
27	Uttarakhand	1,307	1,201	106	8.83
28	West Bengal	754	702	52	7.41
29	A & N Islands	1,426	1,413	13	0.92
Total		1,54,670	1,49,443	5,227	3.50

ISFR 2023