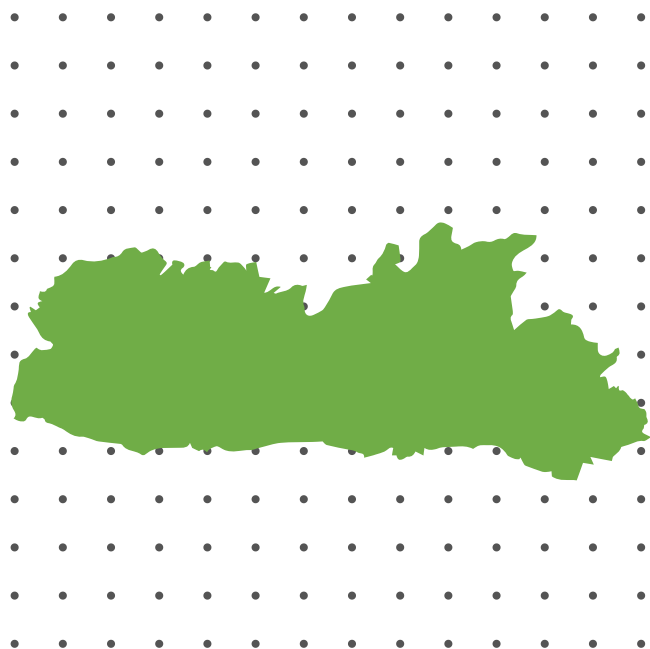


Bamboo Resource Status & Business Opportunities in Meghalaya



Issued by:
Foundation for MSME Clusters

October, 2022

This page has been intentionally left blank

Bamboo Resource Status & Business Opportunities in Meghalaya

Technical Inputs

Mr. Mukesh Gulati, Dr Tamal Sarkar, Mr. Sanjeev Karpe

Published by

Foundation for MSME Clusters

USO House, 2nd Floor, USO Road, 6, Special Institutional Area,
New Delhi 110067

This page has been intentionally left blank

Disclaimer

This publication has been produced under the Action: “Promote Bamboo MSME Clusters for Sustainable Development” with the financial assistance of the European Union and Department of Commerce and Industries, Government of Meghalaya.

The contents of this publication are the sole responsibility of the authors and can in no way be taken to reflect the views of the European Union or Department of Commerce and Industries, Government of Meghalaya, or any of the partners.

Any part of this report can be reproduced, used, or transmitted, in any form or by any means with due acknowledgement.

Abstract

The report is an attempt to present an overview of bamboo production and trade in India and the world, understand the current situation in Meghalaya and explore opportunities to add value to the lives of thousands of people who depend on bamboo for their livelihoods.

This page has been intentionally left blank

Table of Contents

List of Tables	1
List of Figures	1
1. Bamboo – An Overview	2
1.1. Production in India	2
1.2. Production in Meghalaya.....	3
2. Uses of Bamboo	4
2.1. Craft and Lifestyle Products	5
2.2. Furniture	5
2.3. Construction Material and Housing	6
2.4. Utilities.....	6
2.5. Food	6
2.6. Fabric and Fashion	7
2.7. Carbon Sequestration and Renewable Energy	7
3. Bamboo Craft in Meghalaya.....	8
3.1. Bamboo Resources of the State	8
3.1.1 Natural Bamboo Resources	8
3.1.2 Homestead Bamboo Resources	8
3.2. Bamboo Artisans and Clusters	8
3.2.1 Economic Condition of Artisans	8
3.2.2 Seasonality of Bamboo Work.....	8
3.2.3 Bamboo Clusters.....	9
4. Bamboo and Economic Development	10
4.1. India's Share in International Trade	11
4.2. Meghalaya's Share in Exports and National Markets	12
4.3. Key Issues with Bamboo Sector	12
4.4. SWOT Analysis	12
5. Opportunities in the Bamboo Sector	13
5.1. Housing and Construction.....	13
5.2. Boards and Panel.....	13
5.3. Food	13
5.4. Crafts and Utilities	13
5.5. Energy.....	14
5.6. Sanitary Applications.....	14
6. Enterprise Development in Bamboo	14
7. Enabling Institutions in Meghalaya	15
7.1. Meghalaya Bamboo Mission	15
7.2. Forest Development Corporation of Meghalaya	15
7.3. Department of Commerce and Industry, Meghalaya	15

7.4. NABARD	15
7.5. MSLPS	15
7.6. Rural Self Employment Training Institutes (RSETI).....	16
7.7. Foundation for MSME Clusters (FMC).....	16
7.8. Evangelical Social Action Forum (ESAF).....	16
7.9. Tripura Bamboo and Cane Development Center (TRIBAC).....	16
7.10. Khyndai Kyntoit Social and Cultural Organization (KKSCO)	16
KKSCO	16
7.11. North-East Centre for Technology Application & Reach, Shillong.....	17
7.12. Indian Institute of Information Technology (IIT), Mumbai	17
7.13. Timpack Pvt. Ltd., Byrnihat	17
8. Select Bamboo Product Profiles	18
8.1. Bamboo Water Bottle	18
8.1.1 Investment and Expected Returns	18
8.1.2 Market	18
8.2. Bamboo Barbeque Skewers	19
8.2.1 Investment and Expected Returns	19
8.2.2 Market	19
8.3. Bamboo Straw.....	20
8.3.1 Investment and Expected Returns	20
8.3.2 Market	20
8.4. Bamboo Murha.....	21
8.4.1 Investment and Expected Returns	21
8.4.2 Market	21
8.5. Office Utility Products (Woven)	22
8.5.1 Investment and Expected Returns	22
8.5.2 Market	22
8.6. Round Bamboo Furniture.....	23
8.6.1 Investment and Expected Returns	23
8.6.2 Market	23
8.7. Toothpick.....	24
8.7.1 Investment and Expected Returns	24
8.7.2 Market	24
8.8. Contemporary Basket Products	25
8.8.1 Investment and Expected Returns	25
8.8.2 Market	25
8.9. Bamboo Shoots.....	26
8.9.1 Investment and Expected Returns	26
8.9.2 Market	26
8.10. Bamboo Toothbrush.....	27

8.10.1 Investment and Expected Returns	27
8.10.2 Market	27
8.11. Bamboo Cutlery	28
8.11.1 Investment and Expected Returns	28
8.11.2 Market	28
8.12. Incense Sticks	28
8.12.1 Investment and Expected Returns	29
8.12.2 Market	29
9. Bamboo Sector Development Projects – FMC.....	30
9.1. Promote Bamboo MSME Clusters for Sustainable Development	30
9.1.1 About the Project.....	30
9.1.2 Project Partners with FMC	30
9.1.3 Expected Outcomes of the Project	30
9.1.4 Project Coverage	31
9.2. Promoting Integrated Bamboo Based Enterprise Development among SAARC Countries - India Component.....	31
9.2.1 About the Project.....	31
9.2.2 Project Partner with FMC	31
9.2.3 Project Coverage	31
10. FMC’s Role in Meghalaya.....	32
10.1. Micro Challenges faced in the Cluster and Steps taken	32
10.2. Major learnings and Way Forward:.....	32

List of Tables

Table 1.1 Bamboo Production in Meghalaya – Key Statistics	3
Table 3.1 Bamboo Resources in Meghalaya – Major Districts	8
Table 3.2 Seasonality of Bamboo Work among Artisans	9
Table 3.3 Key Bamboo Clusters of Meghalaya.....	9
Table 4.1 Bamboo Trade Statistics – India & China	11

List of Figures

Figure 1.1 Area under Bamboo Coverage.....	2
Figure 1.2 Bamboo Growing Stock.....	3
Figure 1.3 Bamboo Bearing Area of Select States in India.....	4
Figure 2.1 Consumption Distribution of Bamboo and Bamboo Products	4
Figure 2.2: Bamboo Tray, Lamp Shade, and Table Runners (Left to Right)	5
Figure 2.3: Bamboo Coffee Table, Bed-Side Table, and Cabinet (Left to Right)	5
Figure 2.4: Architectural Structures made of Bamboo	6
Figure 2.5: Bamboo Cutlery, Winnowing Tray, and Laundry Basket (Left to Right)	6
Figure 4.1 Value Created by Bamboo Sector	10
Figure 4.2 Employment from Bamboo Sector	10
Figure 8.1: Different Types of Bamboo Bottle	18
Figure 8.2: Different Types of Barbeque Skewers	19
Figure 8.3: Different Types of Barbeque Straw.....	20
Figure 8.4: Different Types of Bamboo Murha	21
Figure 8.5: Paper Bins, Pencil Box, Magazine Holder made of Bamboo (From Left)	22
Figure 8.6: Lounge Chair, Bed-Side Table, Coffee Table made of Bamboo (From Left)	23
Figure 8.7: Toothpicks made of Bamboo	24
Figure 8.8: Bamboo Gift Box & Storage Basket	25
Figure 8.9: Raw Bamboo Shoot, Cleaned Bamboo Shoot, Processed & Packaged Bamboo Shoot	26
Figure 8.10: Different Types of Bamboo Toothbrush	27
Figure 8.11: Disposable Cutlery, Cutlery Travel Set, Premium Cutlery made of Bamboo	28
Figure 8.12: Bamboo Sticks for Producing Incense Sticks, Different Types of Incense Sticks (from left)	29

1. Bamboo – An Overview

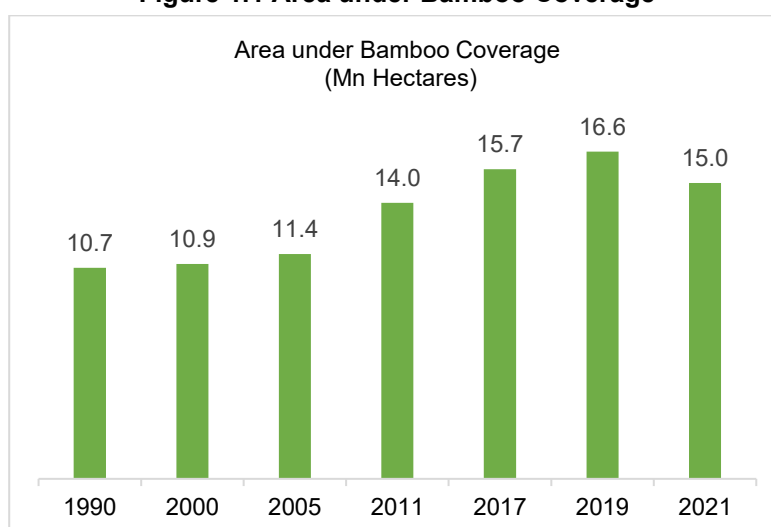
Bamboo is an essential resource in the Indian economy and has been a significant part of the India's culture and way of life, particularly in rural India. Given its many applications and adaptability, it is also frequently referred to as "green gold" and "poor man's timber." It is a member of the Gramineae (Poaceae) family and is widely distributed throughout Asia, Africa, Central America, and South America, but is most prevalent in South, East, and Southeast Asia. There are more than 1,200 species and more than 90 genera of bamboo worldwide. Of them over 500 species are found in China alone and more than a 100 species each are found in Japan, India, Indonesia, Myanmar, and Malaysia.

Bamboo is one of the fastest growing plants and can easily adapt itself to a wide range of climatic and soil conditions. According to FAO, they can be as little as a few centimeters (dwarf bamboo variants) or as tall as 30 meters with a maximum diameter of 30 centimeters. It is one of the most important natural substitutes for the endangered forest hardwoods and partially for energy intensive steel, plastic and other construction materials and lifestyle products. It is a non-timber forest product that matures quickly (in 3-5 years), is adaptable, and expands at a rate of 10–30% per year as opposed to 2-5% for trees, which can take 50 years to mature. Additionally, bamboo has nearly zero waste potential because all its parts can be used to create a wide variety of products.

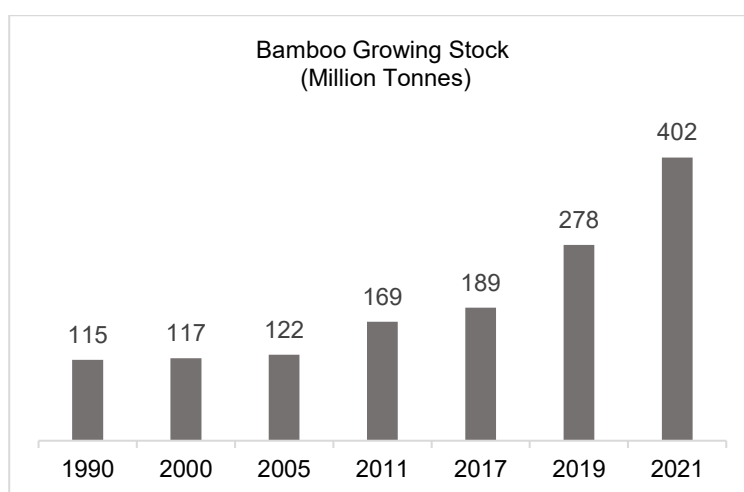
1.1. Production in India

Bamboo grows in all parts of the country, except Kashmir. According to Forest Survey of India, India is home to 125 indigenous and 11 exotic species of bamboo belonging to 23 genera with more than 50% of them growing in Eastern and North-Eastern India in the states of Assam, Meghalaya, Manipur, Mizoram, Nagaland, Tripura, Sikkim, and West Bengal. Arundinaria, Bambusa, Chimonobambusa, Dendrocalamus, Dinochloa, Gigantochloa, and Indocalamus are a few of the major genera found in India (FSI, 2021). *B. bambos*, *B. balcooa*, *B. cacharensis*, *B. polymorpha*, *B. nutans*, *Dendrocalamus asper*, *D. hamiltonii*, *Thyrostachys oliveri*, and *Melocanna baccifera* are a few of the significant commercial bamboo species grown in India (National Bamboo Mission).

Figure 1.1 Area under Bamboo Coverage



Source: Forest Survey of India

Figure 1.2 Bamboo Growing Stock

Source: Forest Survey of India

According to India State of Forest Report 2021, the total area under bamboo in India is estimated at 15.0 million hectares, which is 1.06 million hectares less than the estimate of 2019, showing a decrease of approx. 5%. When combined with FAO data from 1990 to 2005, it reveals an upward trend in both the area under production and the growing stock. The total green weight of bamboo culms is estimated as 402 million tonnes in 2021 of which green sound bamboos contribute 66% and dry sound bamboos contribute the remaining 34%. As compared to the estimate of ISFR 2019, an increase of about 124 million tonnes equivalent green weight of bamboo has been observed.

At a global level, India is one of the largest producers of bamboo. The FAO conducted the last thorough worldwide research on bamboo resources in 2005, and the lack of updated data on this subject restricts cross-country comparisons in the present. According to FAO data, China came in second with about 5.5 million hectares, followed by India with over 11 million hectares, which accounts for nearly half of the world's acreage. However, India's productivity lagged well behind China's.

1.2. Production in Meghalaya

In 2021, Meghalaya ranked 10th in area under bamboo cultivation amongst Indian states at 5.0 Lakh hectares and had a stock of 247.4 Lakh tonnes, which is 6.1% of the total stock of the country. The key statistics of bamboo growing stock in Meghalaya is given in the below table and charts:

Table 1.1 Bamboo Production in Meghalaya – Key Statistics

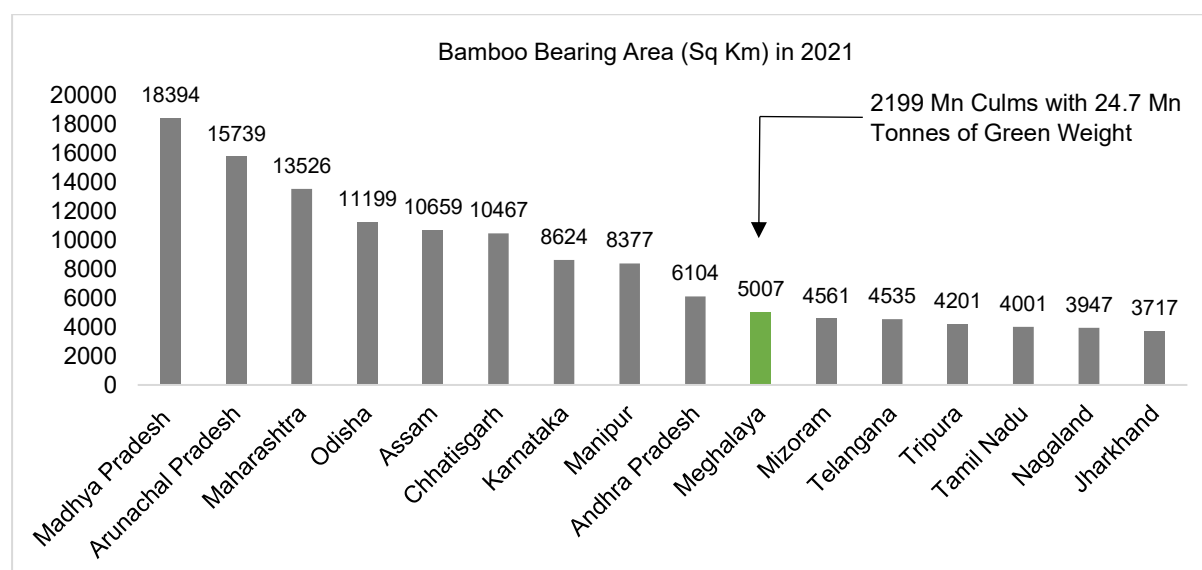
Indicator	Growing Stock	Share of India
Bamboo bearing area within the forest (Sq. Km)	5,007	3.3%
Total number of Culms (million)	2,199	4.1%
Total green weight equivalent of Culms ('000 tonnes)	24,745	6.1%

Source: Forest Survey of India

Despite the high production base, bamboo cultivation has witnessed remarkable progress in Meghalaya. Compared to the 2019 levels, the total bamboo stock in the state in 2021 grew 101% from 123.2 Lakh tonnes to 247.4 Lakh tonnes. The bamboo bearing area decreased by 8 % from 5.4 Lakh

hectares to 5.0 Lakh hectares during the same period. At the density level, this shows a remarkable increase from 1521 bamboo culms per hectare to 2199 culms per hectare, which is a growth of 44.5%.

Figure 1.3 Bamboo Bearing Area of Select States in India



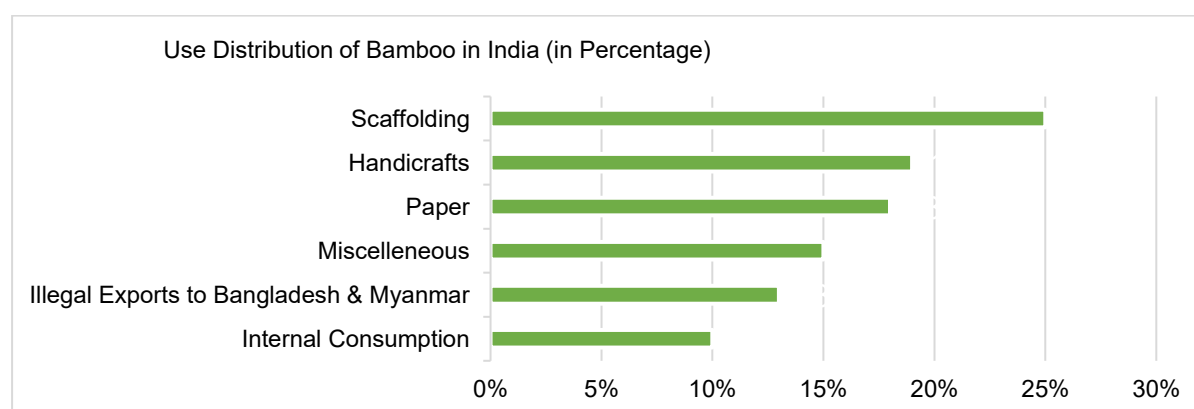
Source: Forest Survey of India

2. Uses of Bamboo

In Meghalaya, bamboo has found its use in agriculture, horticulture, fishery, animal husbandry, religious ceremonies, housing, furniture, and home décor. Local artisans produce bamboo baskets of varied shapes and sizes. The tribals are masters in weaving cane into mats, stools and even umbrellas.

More than 10,000 recorded uses of bamboo have been found worldwide, according to the International Bamboo and Rattan Organization (INBAR), and both use and trade of bamboo are expected to increase rapidly. Utility and craft products, building supplies, laminated panels, boards, and mats, prefabricated homes, pulp and paper, fabrics and clothes, musical instruments, and food are just a few of its widely used applications. 25% of it is used in the housing industry for scaffolding and handicrafts remain to be the second largest area of consumption.

Figure 2.1 Consumption Distribution of Bamboo and Bamboo Products



Source: National Bamboo Mission, Ministry of Agriculture

2.1. Craft and Lifestyle Products

Bamboo is used to create a variety of handicraft and handwoven goods for both ornamental and practical uses. Baskets, lamp shades, trays, and flower vases are few examples. Most bamboo items are within the upholstery category and include table mats, runners, window blinds, curtains, and screens. Bamboo sticks and strips are woven into products of varied width and specification.



Figure 2.2: Bamboo Tray, Lamp Shade, and Table Runners (Left to Right)

2.2. Furniture

Many types of furniture, including tables, chairs, bookcases, and corner tables, are made of cane and bamboo. Bamboo furniture, which is produced in the north-eastern states of India, is widely used both in urban and rural areas of the nation.



Figure 2.3: Bamboo Coffee Table, Bed-Side Table, and Cabinet (Left to Right)

Source: Shutterstock

2.3. Construction Material and Housing

Due to its great compressive strength and low weight, bamboo is a material that is frequently utilised in the building industry. The majority of bamboo is used in India for scaffolding, which supports concrete constructions while they are being built. Additionally, bamboo is utilised inside homes for walls, floors, roofs, and fencing. Homes in some areas are made almost entirely of bamboo. Bridges have also been constructed using it.



Figure 2.4: Architectural Structures made of Bamboo

Source: Shutterstock

2.4. Utilities

Bamboo has long been and continues to be a major source of utility products widely used in day-to-day items. Agarbattis, toothpick can be seen in use all across the country, whereas baskets, supa (winnowing trays) and mats are in universal consumption across the rural areas. Other items include utensils such as plates, trays, spoon, forks, and chopsticks.



Figure 2.5: Bamboo Cutlery, Winnowing Tray, and Laundry Basket (Left to Right)

Source: Shutterstock

2.5. Food

Bamboo shoots are a popular source of food and nutrition in many parts of the world including the North-Eastern and Eastern parts of India as vegetables and pickles. They are rich in vitamins, cellulose, amino acids, and fibre. With the popularity of Asian cuisines, they are also becoming popular globally.

2.6. Fabric and Fashion

Bamboo fibres are used to make yarns and fabrics as they are known for their anti-microbial, hypoallergenic (do not cause skin irritation), breathable and thermo-regulating making it fit to wear in all seasons. Bamboo fibres are soft and are valued for their eco-friendly properties. They are also used in sanitary applications as sanitary towels and absorbent pads.

2.7. Carbon Sequestration and Renewable Energy

According to the International Bamboo and Rattan Organization (INBAR), Bamboo is useful for climate change mitigation due to its carbon sequestration capabilities as it is one of the fastest growing plants in the world. It can absorb nearly 400 tonnes of carbon per hectare. Due to its fast growth, bamboo is considered a good source of renewable energy as charcoal and biomass.

3. Bamboo Craft in Meghalaya

3.1. Bamboo Resources of the State

The state of Meghalaya is endowed with abundant Bamboo resources. Natural occurrence of 36 bamboo species belonging to 14 genera has been reported in the state. The most widely found species include Bambusa, Dendrocalamus, Chimonobambusa, Phyllostachys and Schizostachyum.

3.1.1 Natural Bamboo Resources

According to the Meghalaya Forest Department, 4 districts cover 20.5% of total Bamboo Overlapping Area with the forests in Meghalaya. Districts with high % of areas under bamboo in the forests are Khasi Hills, Garo Hills and Janita Hills.

Table 3.1 Bamboo Resources in Meghalaya – Major Districts

Districts	Forest Area (in Ha.)	Bamboo Over Lapping Area (ha)	% of forest Area
Khasi Hills	580800	173000	30.1%
Garo hills	683000	123300	13.9%
Janita Hills	251600	14000	57.4%
Total	15,15,400	3,10,300	20.5%

Source: Meghalaya Forest Department & FSI'11-Meghalaya

3.1.2 Homestead Bamboo Resources

The cultivation of homestead bamboos is done on culturable wastelands and lands otherwise not suitable for agriculture. In some cases, bamboo plantations have also been done on agriculture lands. The most common species in non-forest areas of Meghalaya are D. Hamiltonii and B. Nutans.

3.2. Bamboo Artisans and Clusters

3.2.1 Economic Condition of Artisans

The bamboo artisans primarily belong to vulnerable communities and have limited ownership and access to resources. They lack access to the market, better production technologies and orientation to market trends. Most of them don't even own land and their financial situation is weak. All this makes even access to finance difficult in the absence of collateral. Those who lend (NBFCs and moneylenders), charge high interest rates as compared to the nationalized banks. The work for these artisans varies across the year due to demand cycles and agriculture season. On average, the monthly income of a bamboo artisan is estimated to be around Rs 3,000 per month.

3.2.2 Seasonality of Bamboo Work

Most of the bamboo artisans are farmers as well and divide their time depending on the seasonality of work in bamboo and agriculture sector, which is as follows:

Table 3.2 Seasonality of Bamboo Work among Artisans

Activity	January	February	March	April	May	June	July	August	September	October	November	December
Bamboo Craft	High					Low			High		Low	
Agriculture	Limited					High			Low		High	

Source: Foundation for MSME Clusters

3.2.3 Bamboo Clusters

In the absence of data from the government sources on the artisans that depend on bamboo craft for their livelihood, it's challenging to assess the accurate number of artisans. However, according to some non-government sources such as Cluster Observatory set up by the Foundation for MSME Clusters (FMC) www.clusterobservatory.in, there are 11 cane and bamboo clusters in Meghalaya. Of these, six have been mapped with select details as given in the following table:

Table 3.3 Key Bamboo Clusters of Meghalaya

#	Cluster Name	District	Artisan No.	Major Products	Specialization
1	Umroi Cluster	Ribhoi	300 + Artisans	Night Lamp, Fruit Tray, Umbrella Stand, Flower Vase, Tray Stand, Wall Hanging Rack, Fruit Basket	Night Lamp & Fruit Tray
2	Nengsangre Cluster	Shillong	98 + Artisans	Table Mat, Coaster, Fruit Bowl, Napkin and Wine Packaging	Wine and Napkin Packaging
3	Mawsynram cluster	East Khasi Hills	500 + artisan	Knup, Baskets, Home décor, Flower Vase, lamp shades, decorative items	Knup & Lamp Shades
4	Selsella Cane & Bamboo Cluster	West Garo Hills	241+ Artisan	Bamboo Baskets, Cane Baskets, Tray, Containers, Shopping bags	Shopping bags & Baskets
5	Tynnai Cluster	South West Khasi Hills	249 + Artisans	Stools, baskets, mats, bamboo rice winnowers	Bamboo Rice winnowers
6	Umroi Cluster	Ribhoi	300 + Artisans	Night Lamp, Fruit Tray, Umbrella Stand, Flower Vase, Tray Stand, Wall Hanging Rack, Fruit Basket	Night Lamp & Fruit Tray

Source: Cluster Observatory-FMC

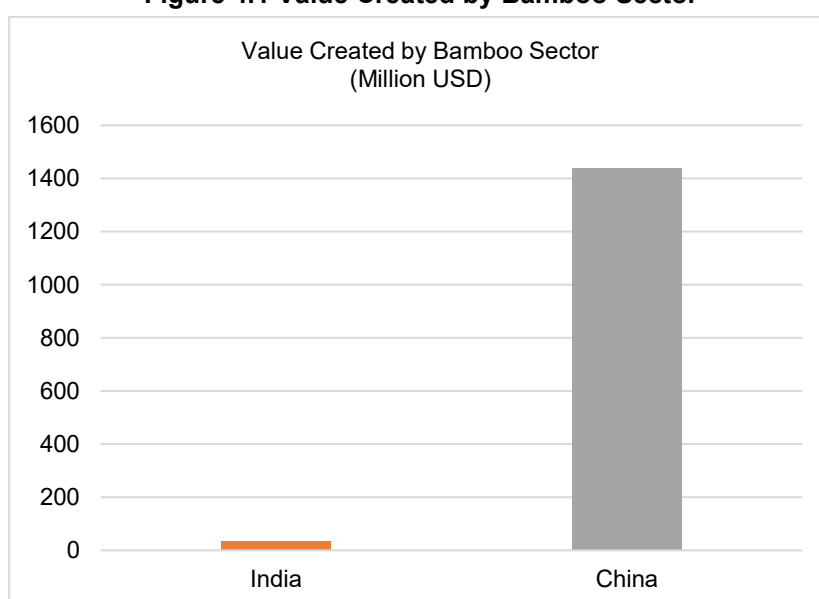
4. Bamboo and Economic Development

Given its prominence and relevance in the society and its culture, both rural and urban, bamboo is an excellent source of economic growth and development. World over and specifically in India, millions of households depend on bamboo for their income, food, and utilities.

8.6 million people in India rely on the bamboo industry for their livelihood. The bamboo industry is significantly underutilised and has the potential to provide more than 516 million man days of work annually, according to the Dalwai Committee report on Doubling Farmer's Income.

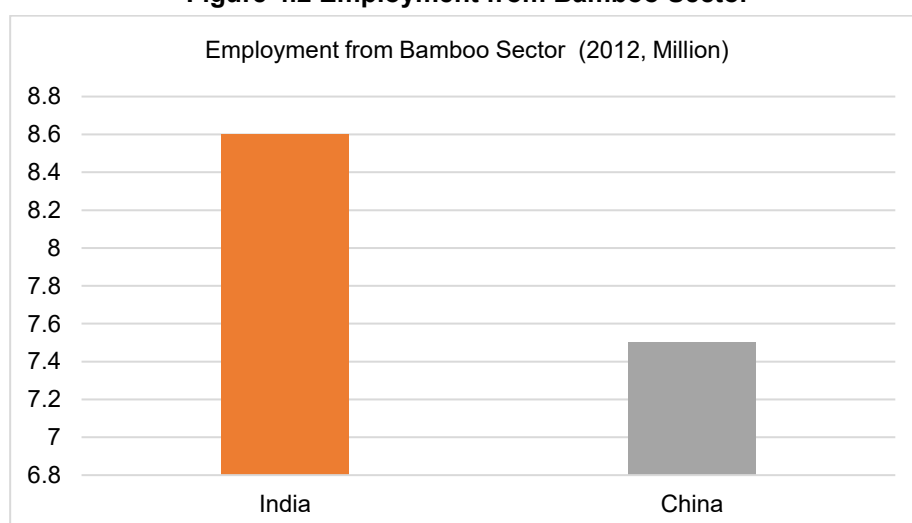
Indian bamboo is currently estimated to create value equal to USD 4.4 billion – approximately 130 times the USD 34 million recorded in 2003. In China, the world's largest bamboo producer, production was valued at USD 19.5 billion in 2012 – an increase of nearly 50 per cent from the 13.1 billion recorded in 2010.

Figure 4.1 Value Created by Bamboo Sector



Source: INBAR

Figure 4.2 Employment from Bamboo Sector



Source: INBAR

According to the International Bamboo and Rattan Organization, the estimated worth of bamboo and rattan sector across the world is approx. USD 60 billion a year and its annual international trade is close to USD 3.4 billion.

4.1. India's Share in International Trade

Even though India is one of the leading producers of bamboo, its share in world market is negligible, accounting for 1% of the total global trade in 2020 (Data: UN Comtrade). Some of the leading exporters of bamboo products are China, Vietnam, Thailand, and Indonesia.

Table 4.1 Bamboo Trade Statistics – India & China

Commodity	India's Export	India's Import	World Export	Export Share of India	China's Exports	Export Share of China
Bamboo Shoots	0	0.3	1820	0.00%	1528	84%
Bamboo Used Primarily for Plaiting	3.7	596	709	0.60%	475	67%
Bamboo Charcoal	2	1.5	818	0.20%	641	78%
Bamboo Flooring	2	7	720	0.30%	627	87%
Bamboo Plywood	0.4	0.9	627	0%	508	81%
Bamboo Mats / Screens	0.4	2.6	1049	0%	954	91%
Bamboo Plaits & Plaiting Materials	0	0.7	333	0%	299	90%
Bamboo Basketwork	5.8	3.1	1674	0.30%	989	59%
Bamboo Pulp	0.2	2.7	38	0%	19	50%
Bamboo Paper Based Products	0	0	224	0%	50	22%
Total	14.5	614.8	8012	1.40%	6090	71%

Source: UN Comtrade

China has a dominant position in exports of bamboo products across all product categories, especially the bigger ones such as bamboo shoots, bamboo mats/screens and bamboo basketwork. After China and Thailand, some of the largest exporters of bamboo shoots are European countries such as Germany, Netherlands, Italy. It is to be noted that these countries don't have a bamboo production base - they import bamboo as raw material, process it and export it to others.

This could be made possible by providing an enabling environment for entrepreneurship or in general enterprise development where entrepreneurship along with adequate policy support creates a competitive industry geared towards exports. Whereas, in case of India, despite being the leading consumer and producer of bamboo, we are often unable to competitively tap the market as in the case of incense sticks. India imported Rs. 800 Crores of incense sticks' (Agarbattis) by value in 2020, primarily from China and Vietnam. This primarily happened due to the reduction in import duties, due to which the imports grew exponentially from 31 Crores in 2008 to 800 Crores in 2020.

If adequate incentives and policy support is provided to the sector, these items can be gainfully produced in India creating employment and prosperity for tens of thousands of people. Thus, support for enterprise development is key to poverty alleviation and very often needs support from multiple

stakeholders, including government, civil society, and private sector.

4.2. Meghalaya's Share in Exports and National Markets

In the absence of information on the market size of bamboo products within Meghalaya and state's share in the national and international markets, it is difficult to assess state's contribution. However, given that the leading cane and bamboo clusters are in North-East India, it can be assumed that Meghalaya has tapped national and international opportunities and its products caters to all markets.

4.3. Key Issues with Bamboo Sector

The key constraints and challenges faced by bamboo sector in Meghalaya is like the ones faced by artisans, entrepreneurs, and producers in other parts of India as well. The major issues emerging from various studies are (i) lack of availability of uniform quality of raw material and training facility; (ii) lack of organized market; (iii) insufficient market information (iv) absence of value-added products and (v) lack of market linkages and (vi) lack of modern technology.

4.4. SWOT Analysis

<p>Strengths</p> <ul style="list-style-type: none"> • Abundance of natural resources esp. wood and bamboo • Favorable environment for bamboo growth and development • Fastest growing woody grass with less production cost and more employment • Availability of high skilled artisans • Strong indigenous knowledge in production and consumption of bamboo 	<p>Weakness</p> <ul style="list-style-type: none"> • Low productivity is due to lack of scientific management of different species. • Lack of capacity building in post-harvest management • Lack of exposure of different market segments. • Vulnerability of artisan and low risk-taking capabilities • Lack of enterprising and marketing skill
<p>Opportunities</p> <ul style="list-style-type: none"> • High export potential • Development of agro-ecological zone-specific farming and production systems using bamboo. • Industrial approach to bamboo sector • Diverse range of products and market. 	<p>Threats</p> <ul style="list-style-type: none"> • Poor linkages between production and marketing bamboo products • Low cost-benefit ratio at times • Substitute products that are made by wood and plastic.

5. Opportunities in the Bamboo Sector

Creating meaningful livelihood opportunities from agriculture and allied sector such as bamboo cultivation and value addition has been the aim of several government, civil society, research institutions, multilateral institutions, and private sector interventions.

In the “Report of the Committee on Doubling Farmers’ Income” by the committee headed by Dr. Ashok Dalwai, bamboo has been identified as an important source of income for farmers through enterprise development based on its various uses. It also generates opportunities from cultivation to value addition at the household level and opportunities for entrepreneurs to manufacture bamboo products at commercial level and at scale. Some of the opportunities identified in the report and by other experts and organizations include:

5.1. Housing and Construction

Housing is a major source of consumption of bamboo and continues to grow with the sector. Due to its strength and diversity in applications, apart from scaffolding, bamboo is used in flooring, door and window frames, roofing, composite boards, and prefabricated houses. Several opportunities for prefabricated bamboo buildings and bamboo toilets are already demonstrated by at least a dozen public and non-governmental institutions. The National Building Code, 2005 provides room for usage of several species of bamboo. There also lies potential in public initiatives in housing (Pradhan Mantri Awas Programme), schools and toilets (Swachh Bharat Initiative). This will be a new area of Meghalaya based enterprises to venture into since there are few existing enterprises of this kind.

5.2. Boards and Panel

Bamboo has applications as particle board, floorboard, laminated board, pressed boards, compound board used at household and industrial levels. This will also be a new area for Meghalaya to tap into and help create enterprises in this capital-intensive sector.

5.3. Food

Bamboo shoots are already a popular food in several Asian countries and are becoming popular globally. The sector has seen consistent growth in exports in the last 10 years. In 2020, the total value of world exports was approx. 256 million USD or approx. Rs 1820 Crores. Apart from the large domestic consumer base, India can benefit from the growing export market, where it is an insignificant player as of now. However, there are hardly any enterprises of this kind in Meghalaya and their development will involve the creation of a proper ecosystem around it.

5.4. Crafts and Utilities

Craft and utilities are already a major source of consumption of bamboo and continue to find new opportunities through product development and orientation amongst the consumers towards eco-friendly alternatives to plastics. Partnerships with a wide range of institutions and the private sector can help build on its existing strength in this sub-sector where Meghalaya is already strong.

5.5. Energy

Due to its fast growth, bamboo is considered a good source of renewable energy such as charcoal and biomass. In 2020, more than Rs 818 Crores of charcoal were exported globally, of which two-thirds was exported by China. Other leading exporters were Namibia, Indonesia, and Egypt. This is not a very capital-intensive segment of the bamboo sector, and a lot of bamboo waste or unusable bamboo can be used for this. The level of technology required is also not very high.

5.6. Sanitary Applications

According to the report on doubling farmers' income, "bamboo fiber has natural effects of sterilization and bacteriostasis and is therefore widely preferred for manufacturing sanitary materials such as sanitary towel, gauze mask, absorbent pads and food packing". This technology intensive segment will also require nurturing in Meghalaya since there are no existing enterprises to draw experience from.

6. Enterprise Development in Bamboo

To tap the opportunities in bamboo sector, it is important to create enterprises that can set up business and business models to grab the market potential and create jobs and economic benefits for the society and state. Entrepreneurs, both large and small, individual, and institutional are key to the sustainability of the sector as they take risks and create opportunities for all.

In areas where not enough enterprises exist, there is a need to create more entrepreneurs and enterprises to strengthen the sector. For a successful model of enterprise development, support from the other actors in the ecosystem is equally important. These actors include government agencies, programs, producer networks, research institutions, business development service providers and training institutes amongst others.

FMC has supported enterprises in a range of sectors and in Meghalaya bamboo sector through a hub and spoke model, with Shillong and Ri Bhoi as its hub. The details on some of the enterprise development ideas and opportunities in bamboo sector are shared in the next section of the report.

7. Enabling Institutions in Meghalaya

The bamboo sector is supported by several national and state level institutions on skill development, production, technology, infrastructure, marketing, enterprise promotion (MSME) and credit linkages amongst others. There are other important institutions and programs that provide indispensable support to the sector. Some of the key government programs are as follows:

7.1. Meghalaya Bamboo Mission

Meghalaya Bamboo Mission (MBM) is an initiative of the Government of Meghalaya for integrated development of bamboo sector in the state. The Mission's objectives to increase the area under bamboo plantation in non-forest Government and private lands to supplement farm income and contribute towards resilience to climate change as well as availability of quality raw material requirement of industries. The bamboo plantations will be promoted predominantly in farmers' fields, homesteads, community lands, arable wastelands, and along irrigation canals, water bodies etc.

7.2. Forest Development Corporation of Meghalaya

FDCM Ltd. is privileged to avail the facility of setting up of a Vacuum Pressure Bamboo Treatment Plant at Nongpoh sawmill. The main purpose of the plant is for chemical treatment of Bamboo having various utility. After commissioning the plant is presently projected to receive (approx) 30,000 bamboo culms. The pressure treatment facility being the first such unit to be established in the State and with the increasing demand of treated bamboo in the market, is expected to enhance and generate more revenue urgently required to sustain the earnings of the Corporation.

7.3. Department of Commerce and Industry, Meghalaya

The District Commerce & Industries Centre at the district level is set up for providing integrated administrative framework at the district level for encouraging entrepreneurs in rural areas. Master Craftsman scheme is launched by Department of commerce and industry, Meghalaya. This scheme aims at promoting the traditional practices of the local people in the villages where traditions and daily activities are showcase in the work. Training in these activities and crafts will help in keeping the tradition alive with the development that takes place around. The district has multitalented artisans in cane and bamboo works and their daily life too involves most of the cane and bamboo art.

7.4. NABARD

An apex level development bank of Government of India aimed towards credit flow for promotion and development of agriculture, small-scale industries, cottage industries, handicrafts and other rural enterprises. NABARD is support (supporting) the program named Self-help group promoting institution in four blocks of West Khasi hills district. With the support of the Inter-loaning and Bank Credit the group members started bamboo cultivation, poultry, and other such activities and this had helped the members of SHGs to improve income.

7.5. MSLPS

Meghalaya State Rural Livelihood Promotion Society is the state rural livelihood mission of Meghalaya started with an aim to "improve rural livelihood options and work towards social and economic

empowerment of rural poor and women". It works through the institutional structure of SHGs and their federation. Financial inclusion and enterprise promotion are one of the key works of MSLPS and the bamboo artisans could benefit from it, especially in capacity building and financial linkages.

7.6. Rural Self Employment Training Institutes (RSETI)

An initiative of Ministry of Rural Development, Government of India, they have dedicated infrastructure in each district to impart training and skill upgradation of rural youth geared towards entrepreneurship development. They are managed by banks with active co-operation from the central and state governments.

7.7. Foundation for MSME Clusters (FMC)

Foundation for MSME Clusters (FMC) is a not-for-profit organization known worldwide as a pioneer agency for the development of Micro Small and Medium Enterprises (MSMEs) with the help of cluster development approach. FMC has rich experience of working with MSMEs and has provided services in the areas of advocacy, implementation and coordination, training and research to more than 200 MSME clusters nationally and globally across 19 countries. FMC provides a broad range of project-based services to the MSMEs, their representative Industry Associations (IAs), Technical agencies, Financial institutions/ Banks and Government (both state level and national level) across various thematic areas of specialization that include value chain development, productivity & competitiveness, energy efficiency, sustainable production and consumption, business development services (BDS), common infrastructure development and innovation. FMC has provided training and policy advisory services both nationally and internationally in MSME development and helped draft a number of schemes of assistance followed by training of policy makers & practitioners to then implement those schemes effectively. FMC is currently implementing two flagship projects supported by the European Union SWITCH Asia initiative and SAARC Development Fund and NABARD to promote bamboo as a sustainable resource and generate green jobs. FMC intends to help grounding of 350 MSMEs in Bamboo sector and enhance livelihoods of more than 1000 artisans/ farmers through these two initiatives respectively. Details of both the initiatives can be seen towards the end of this report.

7.8. Evangelical Social Action Forum (ESAF)

ESAF stands for sustainable holistic transformation of the poor and the marginalized for a just and fair society. It is registered charitable society, working in Bamboo sector for more than a decade. It is also working with the Foundation for MSME Clusters under the EU Switch Asia & SDF & NABARD co-funded bamboo initiative in Meghalaya.

Currently there are 2 organization working with FMC for two different projects in Meghalaya.

7.9. Tripura Bamboo and Cane Development Center (TRIBAC)

TRIBAC is a Tripura based not for profit organization which is working in Bamboo sector for more than a decade and helping FMC to implement the EU Switch Asia Project in Meghalaya.

7.10. Khyndai Kyntoit Social and Cultural Organization (KKSCO)

KKSCO is a local based not for profit organization which is currently working with FMC in implementing the "Promoting Integrated Bamboo Based Enterprise Development among SAARC Countries, India

Component.” project funded by SDF and co funded by NABARD.

7.11. North-East Centre for Technology Application & Reach, Shillong

To undertake support measures under public private partnership (PPP) in various areas of bamboo applications to generate employment, create sustainable livelihood and incomes, especially among the poor and disadvantaged groups, including women. To support measures for expansion and consolidation of bamboo technologies, achievement of economies of scale, expansion of markets, product improvement and development.

7.12. Indian Institute of Information Technology (IIT), Mumbai

The Indian Institute of Technology, Mumbai developed tools and technologies for processing of bamboo and cane. 400 set of improved tool kit have been fabricated which are being distributed among Artisans in craft clusters of Mawsynram (Meghalaya). The Bamboo Tool Kit contains the tools based on process i.e., Sawing, Scrapping, Measuring, Marking, Weaving, Binding, Sharpening and Finishing.

7.13. Timpack Pvt. Ltd., Byrnihat

In the year 2001, Sampuran Singh setup the New Bamboo Based Industry in India at Byrnihat, Meghalaya, with technology transfer from Indian Plywood Industries Research & Training Institute (IPIRTI), Ministry of Environment & Forests, Bangalore & Buildings Material Technology & Promotion Council (BMTPC), Ministry of Housing & Urban Poverty Alleviation, New Delhi and with support from Cane and Bamboo Technology Centre (CBTC), Meghalaya Government, Planning Commission of India and various other departments. Government is keen to promote and encourage this new bamboo-based industry which in turn will result in generating huge employment and providing economic upliftment to the rural people.

8. Select Bamboo Product Profiles

8.1. Bamboo Water Bottle

The bamboo water bottle has immense potential as a substitute for plastics. They are eco-friendly, long-lasting, and superior to plastic bottles as they can keep the water cooler for longer periods even in summers.



Figure 8.1: Different Types of Bamboo Bottle

Source: Shutterstock

8.1.1 Investment and Expected Returns

For an industrial set up to make bamboo bottles, the entrepreneur would need to invest around Rs. 25 Lakh including around Rs. 5 lakh working capital. The machines and components needed are a treatment tank, drying chamber, lathe machine, sanding machine and portable cross cutting machine.

8.1.2 Market

Bamboo based water bottles have seen a steady rise in demand in the national as well as the international market.

Bamboo water bottles can be sold in retail and lifestyle stores such as Home Centre, Home Town, and IKEA. They are available on e-Commerce platforms such as Amazon and Flipkart. The product has good export potential to Europe, North America and Australia as the customer preference is aligned towards more sustainable and eco-friendly substitutes of plastics. Appreciation for such products is also growing in India, especially amongst the youth.

Apart from being utility products, use of such ecologically sustainable products is also seen as a style statement. This segment is driven mostly by social media - Facebook or Instagram. The sale and adoption of such products is highly dependent on references and recommendations. Thus, the entrepreneur needs to have access to markets in lifestyle retail chains, e-commerce, and export market. Needs to be good at social media sales as well.

8.2. Bamboo Barbeque Skewers

Bamboo barbeque skewers are popular with both vegetarian and non-vegetarian barbeque lovers across the world. Earlier iron skewers were used widely but is getting replaced fast by bamboo ones, creating a huge market potential in both domestic and exports markets. These are single use and affordable products having no negative impact on the environment. Studies have shown that food contamination in bamboo skewers is much less than steel skewers.



Figure 8.2: Different Types of Barbeque Skewers

Source: Shutterstock

8.2.1 Investment and Expected Returns

For an industrial set up to make bamboo skewers, the entrepreneur would need to invest 55 - 60 lakhs depending on the planned scale of the business, including 20 - 25 lakhs for working capital. The machines and components needed are bamboo cross cutting machine, splitting machine, slicer machine, stick making machine, skewer making machine and polishing machine and boiling tub. One can easily produce toothpick and chopsticks by the same production line by adjusting the machines or adding a single specific machine to the production line. Prashant Bamboo Machines, Arihant Engineering and Anil Enterprises are some of the suppliers of bamboo skewer machines. One can find machine suppliers from India and abroad on e-commerce portals such as India Mart and Alibaba.

8.2.2 Market

The bamboo skewer market is growing rapidly due to its cost effectiveness in comparison to stainless steel skewers. As single use products, they are more preferred in picnics and marriage parties. The local markets include hotels, dhabas, motels and town side caterers. They can also be marketed through wholesalers and retail outlets. They are also popular on Amazon and Flipkart. One may register on B2B portals such as India Mart, Trade India, and Alibaba for bulk orders across the country and globe.

8.3. Bamboo Straw

Bamboo Culms of *Melocana baccifera*, *Bambusa pallida* of 6-8mm or less diameter and 1-3 years of maturity suitable for making straw. In Jharkhand state branches of *Bambusa nutans* or *Bambusa tulda* could be alternative raw material as *M. baccifera* and *B. pallida* are unavailable. Bamboo straws are natural, eco-friendly, biodegradable, hygienic and chemical free substitutes for plastic straw. They are reusable if washed and dried properly.



Figure 8.3: Different Types of Barbeque Straw

Source: Shutterstock

8.3.1 Investment and Expected Returns

A bamboo straw unit of 1 Lakh pieces per month would need an investment of approx. Rs. 2.8 Lakhs and working capital of Rs. 2 Lakhs for 30-day cycle. Major equipment required are grinding and sanding blade, oven, and straw cleaning brush.

8.3.2 Market

Bamboo straw is the alternative option of plastic and paper straws and has high potential to grab a share of the existing straw market in India. It has an advantage over plastic as it is reusable and biodegradable. Government of India is set to impose a nationwide ban from 2nd October 2019 on six single use plastic items - plastic straw is one of them and can open high demand for bamboo straws. It would be in demand in restaurants, hotels, institutional canteens, corporate house staff canteens, juice bars, coastal area eateries, and eateries where consumers spend about 45 minutes to have beverages. Bamboo straws are better than paper straws as the latter can't withstand more than 5 minutes when dipped in liquid. There is scope of selling a few lacs of bamboo straw in a month through B2B sales.

E-commerce platforms viz. Amazon, Alibaba, Flipkart are already placing bamboo straws as part of their assortment. The product has significant export potential. In the US 500 million straws are used daily. The US and European countries are shifting to sustainable environmentally friendly products and enquiring about single use plastic substitutes. The European Union plans to ban the single use of plastic straws by 2021.

8.4. Bamboo Murha

The '**Murha**', also spelt as **muda, moodha, muddha** is a traditional handcrafted bamboo stool. Bamboo is used in the body while cane is used in binding as well as weaving the seating part. The Murha gets its strength to support huge loads from the elaborate binding details embedded on it. The patterns are created with the artisan's own inventive ideas and skills without using any traced designs. Weaving of stool (Murha) is manually done by experienced artisans. The durability, low weight, easy maintenance, and portability of the furniture further increase its appeal.



Figure 8.4: Different Types of Bamboo Murha

Source: Shutterstock

8.4.1 Investment and Expected Returns

As a household micro enterprise, the tools required are very basic in nature. Only a machete / dao and knife is needed in order to crosscut the bamboo, split it and to make sticks out of the splits. The investment needed is thus, less than Rs. 50,000 even considering the working capital requirement. If the objective is to start the enterprise at a large scale with hired labour, then an investment of Rs. 18 Lakh (*including working capital*) is needed. The necessary machinery can be easily procured from any of the Indian manufacturers. The financial estimates are given below:

8.4.2 Market

Murha is a versatile product with stable demand in local markets and is gaining in popularity across retail outlets and e-commerce platforms.

While the local market is indifferent to the material being used to make the Murha, the retail market (both brick and mortar stores as well as e-commerce retail platforms) show preference for natural fibres like cane being used in place of plastic. Apart from cane, water hyacinth and water reed can also be used as weaving material. Modern retail has good demand for such innovative products. The Murha can be combined with leather and furnished with cushions to provide more value-added options for the national markets. Such innovative products will also have export potential.

E-Commerce platforms like Pepperfry.com and Amazon.com feature Murhas in their marketplace and these products are listed upward of 1500 rupees in these platforms. Similarly, European furniture websites also feature the traditional Murha as one of their many offerings fetching close to 35 Euros per Murha (Around Rs 2,600).

8.5. Office Utility Products (Woven)

Bamboo being a woody grass, with strong fibre is one of the best natural materials for making mats and baskets. As green substitutes, there is increasing demand for bamboo-based office utility products such as Paper bins, Files, Folders, Pen-stand etc. Suitable species are *Bambusa nutans*/ *Bambusa tulda*.



Figure 8.5: Paper Bins, Pencil Box, Magazine Holder made of Bamboo (From Left)

Source: Shutterstock

8.5.1 Investment and Expected Returns

For an industrial set up to make Bamboo Office Utility Products, investment of 6.5 to 8.5 Lakhs (including 2.5 - 3.5 lakh working capital) is needed depending on the scale of business. The machines could be used by vendors such as Anil Enterprises in Dewas (MP).

8.5.2 Market

Due to its environmentally friendly benefits, overall demand for bamboo products is increasing. Government offices, such as Forest and Environment departments are deciding to use bamboo-based office utility products. Students are also showing preferences towards such products and in general people are becoming aware and prefer green bamboo products to non-biodegradable products. This leads towards a large market potential for bamboo-based office utility products like paper bins, file folders pen-stands, pencil boxes etc. and more options likely to emerge in future.

8.6. Round Bamboo Furniture

Round bamboo furniture or the traditional bamboo furniture are seen as low-cost substitute to wooden furniture. The aesthetically designed ones have found a resurgence in demand for interior decoration, use in gazebos, resorts, and lawns. They can outlast wooden furniture and fetch good price in the market, making it a lucrative business.



Figure 8.6: Lounge Chair, Bed-Side Table, Coffee Table made of Bamboo (From Left)

Source: Shutterstock

8.6.1 Investment and Expected Returns

Investment of Rs. 10 - 25 Lakhs including Rs. 5 - 6 lakh working capital is required. Machines needed are pressure treatment plant, LPG blow torch with accessories, straightening wooden column, angle grinder or knot removing machine and portable cross cutting machine.

8.6.2 Market

In 2006, the furniture market of India was estimated at Rs. 35,000 crores. Considering that with the emergence of growth factors like (i) product innovations; (ii) organized retail showrooms (IKEA, Home Town, Home Centre etc.); (iii) advent of e-commerce like Pepper Fry, Urban Ladder, etc. and (iv) organized furniture rental providers such as Furlenco and Rentomojo; the markets have transformed and grown bigger. Around 15 % of the market is in the organized sector, catered by companies such as Godrej & Boyce Manufacturing Co. Ltd., BP Ergo, Featherlite, Zuari, etc.

To meet emerging demand in national and exports market, the entrepreneur will need to develop knock-down or DIY versions of the products for easier storage, packaging, and transportation. Those would require different designs, accessories, and production systems. According to investments in business may vary.

8.7. Toothpick

The bamboo toothpick is preferred over wood as a raw material for the product due to fast growth of bamboo and easy availability.



Figure 8.7: Toothpicks made of Bamboo

Source: Shutterstock

8.7.1 Investment and Expected Returns

To set up a full-fledged semi-automatic or fully automatic bamboo toothpick making production line, 7 basic machines are required. These can be procured from suppliers from India, Vietnam, or China. Prasant Bamboo Machines and Anil Enterprises are few suppliers in India.

The likely capital investment for the production line shall be around 45-50 lakhs depending on the scale of production, excluding working capital for one month of around 20 lakhs. The same production line can be used for making products such as bamboo skewers and chopsticks by adding machines needed to make them. The estimates of the investment and expected returns are as given below:

8.7.2 Market

Bamboo toothpick is one of the hot selling bamboo products in domestic and international markets with a stable and increasing demand. Food points, restaurants, hotels have a regular bulk demand for the product. To reach more bulk buyers across the nation and globe the unit may be registered under different B2B online platform like India Mart, Go for Global, Trade India and Exporters India. For retailing, online platforms like Flipkart, Amazon, Paytm, Nature Baskets, Grofers can be very useful. Offline sales promotion can be done to create a regular business channel in the local and intra-state market. Social networking sites like Facebook and Instagram may be also used to target retail customers.

8.8. Contemporary Basket Products

Bamboo is very suitable for making Basket & Basketry items, which are in demand as they are green packaging substitutes. In Dumka Bamboo Cluster of Jharkhand *Bambusa nutans* or *Bambusa tulda* are ideal to make products like storage bins, fruit / packaging baskets etc.



Figure 8.8: Bamboo Gift Box & Storage Basket

Source: Shutterstock

8.8.1 Investment and Expected Returns

An industrial set up to make basketry packaging items, would need investment of 6-7.5 Lakhs (including around 3-3.5 Lakhs for working capital) depending on the planned scale of his business. The machines and components required can be obtained from vendors such as Anil Enterprise in Dewas (MP).

8.8.2 Market

Using bamboo instead of plastic helps significantly reduces our carbon footprint and creates market opportunity. In terms of uses, it is already playing a leading role addressing the needs of basketry and packaging solutions and other utility items with more options likely to emerge in future.

8.9. Bamboo Shoots

Bamboo Shoots are the young, edible bamboo plants, generally 20-30 cm long, tapering at one end. They are consumed as food items after harvesting and form a traditional delicacy of many countries such as China, Japan, Thailand, Bhutan, Korea, and India (particularly Eastern and Northeast India). Bamboo shoots have high nutritional values - are low in cholesterol and saturated fats (total fats 0.5%), and high in carbohydrate (5.7%), protein (3.9%), minerals (1.1%) and moisture (88.8%). With 17 types of Amino acids, it contains 10 types of mineral elements – Co, Cr, Zn, Mn, Mg, Ni, Co, Cu etc.



Figure 8.9: Raw Bamboo Shoot, Cleaned Bamboo Shoot, Processed & Packaged Bamboo Shoot

Source: Shutterstock

8.9.1 Investment and Expected Returns

- The project is conceived for single shift basis of 8 hours / day and 60 working days in one shooting season.
- Raw and freshly harvested bamboo shoot requirement is 2 tonnes per day. Bamboo Shooting Season is assumed at 60 days in a year. Price of fresh bamboo shoots is considered at Rs 60 / kg.
- Finished and packed bamboo shoots production is 3 tonnes per day, 90 tonnes of annual production and sales in 1 year.
- 8 LPG commercial gas cylinders are required in a month.
- The selling price is assumed at Rs 120 to Rs 130 per kg.
- The shelf life of the vacuum-packed bamboo shoots is 90 days.

8.9.2 Market

Bamboo Shoots whether processed or raw have a good demand for its nutritional value but are not readily available in the metros, Tier 1, and Tier 2 cities. There are hardly any organized bamboo shoots processing facility in India to address the needs and standards of global markets.

Vacuum Packed Bamboo Shoots can be sold in the vegetable markets as well as in local grocery stores and department stores for household use. Marketing networks needs to be developed through distributors and retailers. The Chinese and Thai restaurants require good quality bamboo shoots and sourcing for these institutions is difficult during non-shooting season. These establishments can be tapped for bulk marketing of vacuum-packed bamboo shoots.

8.10. Bamboo Toothbrush

Bamboo handle-based toothbrushes can reduce plastic pollution caused by plastic toothbrushes. They are already in use in Sweden, USA, and China due to natural, eco-friendly, biodegradable handle.



Figure 8.10: Different Types of Bamboo Toothbrush

Source: Shutterstock

8.10.1 Investment and Expected Returns

Bamboo toothbrush handle making unit needs capital investment of Rs 25-30 Lakhs with working capital provision of 5-7 Lakhs. Machines for making bamboo handle are available in India. This industry requires mainly semi-skilled workforce. 3 phase power supply, proper work shed, wide metaled road are minimum basic facilities required to establish the unit. The estimates of the investment and expected returns are as given below:

8.10.2 Market

Bamboo toothbrushes are already in use in India, though at very low scale due to lack of awareness and price. Their uniqueness lies in the raw material itself and after its use. Plastic production from petrochemicals is polluting the environment, whereas bamboo absorbs CO₂ and releases 35% more O₂ in the environment. Plastic brushes are non-degradable (even in 100 years) and source of 2nd largest plastic waste materials worldwide, whereas bamboo toothbrushes degrade in few years.

In India 150 million plastic toothbrushes are thrown to garbage every month. In India, the current monthly demand for bamboo toothbrush handles is around 1 Lakh pieces. It indicates changing practice and increasing use of bamboo toothbrushes. Rs. 6 per bamboo toothbrush handle will reduce the cost of the final product and will encourage and appeal to more people to use them.

Humble Brush, Earth's Daughter, Bmbu, Modest Planet, Wowe are few existing brands selling bamboo toothbrush internationally through e-commerce platforms viz. Amazon, Alibaba, Flipkart etc. Toothbrushes are sold single piece and family pack.

8.11. Bamboo Cutlery

Bamboo Cutlery is a sustainable replacement for plastic cutlery products, with net zero carbon emissions in production, easily bio-degradable, and having no harmful effects on biodiversity. A variety of cutlery products can be produced from bamboo including spoons, forks, plates, chopsticks, etc.



Figure 8.11: Disposable Cutlery, Cutlery Travel Set, Premium Cutlery made of Bamboo

Source: Shutterstock

8.11.1 Investment and Expected Returns

Total project cost is INR 36,48,244. The Investment for machinery and fixed capital is INR 35,07,934. The working capital requirement is INR 1,40,310. Total turnover of cutlery is projected at INR 32.5 lakhs. The turnover of Glasses and cups is projected at INR 20 lakhs. (Assuming prices 110 and 70 respectively).

8.11.2 Market

Recently the Airport Authority of India, fast food giants like KFC's, McDonald' s have decided to cease usage of plastic disposables and opt for biodegradable cutleries. In disposable cutlery, spoons account for 55% of the global market, which is around USD 881 million (Source: Future market insight). The retail sales channel of disposable cutlery primarily targets social gatherings such as marriages, social club meetings and community get-togethers, etc. Institutional buyers include restaurants, event management companies, ice cream companies, temples and government and private canteens across the country. Online portals like India Mart, Amazon, Snap deal etc. can also be explored.

8.12. Incense Sticks

Incense sticks (*agarbattis*) are popularly used in many Indian households and religious places. It serves religious purposes and is also used for its aromatic properties. It is widely used on auspicious occasions, festivals, and social celebrations. Bamboo is an important raw material for making incense sticks and thin pieces of sliced bamboo are used for this purpose.



Figure 8.12: Bamboo Sticks for Producing Incense Sticks, Different Types of Incense Sticks (from left)

Source: Shutterstock

8.12.1 Investment and Expected Returns

The total project cost is Rs.26,64,425, including the cost of machinery, construction, working capital and other costs (preliminary, furniture & contingency). The working capital for one cycle is estimated to be Rs.7,66,825.

The manufacturing unit will have three types of machines- powder mixing machines (2), automatic agarbatti making machine (8) and dryer (2). Proposed machines can produce 450 kg (Assuming 56.5 Kg/Hr.) finished products in one day shift of 8 Hrs. for which 100 Kg raw bamboo sticks (1.3 mm /8 Inch size) and 350 Kg of premix powder is required.

8.12.2 Market

The agarbatti of 1.3 mm round sticks have a large and ready market. The approx. market size is Rs.10,000 crores annually and Madhya Pradesh has become the hub of agarbatti production in the country and almost all the major brands have manufacturing base in Madhya Pradesh. The incense stick of 1.3 mm is the main ingredient of agarbatti and has excellent market within the state. Besides, there is huge market potential market outside Madhya Pradesh as well.

The product will mostly be sold locally to wholesalers/distributors and perfumers in Bhopal where 80-100 such units are functional and remaining could be sold to incense stick wholesalers/distributors in Sehore and Vidisha in Madhya Pradesh. The entrepreneur has in principle agreed to tie up with Mahakaal Traders, in Bhopal to sell of 10-20% of finished products. Besides, the product could also be sold under Khadi Gramodyog Vidhyanchal yojana where retail outlets are established by department. The requirement of wholesalers and distributors will be explored and enlisted as the business and production will be streamlined.

9. Bamboo Sector Development Projects – FMC

9.1. Promote Bamboo MSME Clusters for Sustainable Development

9.1.1 About the Project

- More than 5 million people, half of them being women in the tribal regions across 18 states out of the 29 states of India where abundant quantity of bamboo is available as a resource for their livelihoods.
- However, in the bamboo processing and product manufacturing segment, the number is likely to be around 3 million only.
- While this bamboo resource has been augmented by a range of public initiatives but not sufficiently harnessed in terms of its market applications.
- There is a huge scope for replacement of less sustainable resources and for creation of green jobs by effectively harnessing bamboo by upgrading existing products and introducing new products duly linked with markets.
- For this FMC with its Partners has designed a customized, coordinated and converged local action that integrates a package of inputs through a strong self-sustainable local eco-system under the SWITCH ASIA Umbrella and implementing the project in 9 states in India.

9.1.2 Project Partners with FMC

- **SIDBI:** Small Industries Development Bank of India (SIDBI) is the principal financial institution in India for promotion, financing and developing of MSMEs. Mission Swavalamban of SIDBI is promoting an entrepreneurial culture to stimulate a mindset shift among youth from ‘job seekers’ to ‘job creators’, restrict rural-urban migration and promote sustainable local livelihood.
- **CEMCA:** CEMCA serves as the regional units of the Commonwealth of Learning, Vancouver, Canada and promotes the meaningful, relevant, and appropriate use of media and technology to serve the educational and training needs of Commonwealth member states of Asia. CEMCA works actively in two major sectors – Education and Skills.
- **CBS:** Copenhagen Business School (CBS) is a public university situated in Copenhagen, Denmark and is internationally known for its expertise in business and sustainability.

9.1.3 Expected Outcomes of the Project

- 2250 MSMEs which 40% are women owned, start/expand bamboo product supply worth.
- 25.3 million Euros to existing/new markets, impacting 10,000 livelihoods (more than 50% women) through new income to the tune of 13 million Euros.
- Improved OHS and social security.
- At least 20 successful business start-ups making innovative & high impact making products grounded and connected with the large-scale institutional buyers.
- 9 local Facilitating agencies (FAs) provide services beyond Action, 50 Producer networks (PNs) created are vibrant, 9 CFCs created/ strengthened, 20 equipment/ inputs suppliers and 140 BDSPs provide strategic services sustainably.
- At least 10 FIs provide credit through cluster financing instruments to 2250 MSMEs worth 9 million Euro
- 200 Policy makers from SAARC countries sensitized and 9 Indian states initiate replication of

similar intervention models.

9.1.4 Project Coverage

- **Assam:** Hub – Guwahati, Kamrup, Spoke – Nalbari, Barpeta, Areas in Upper Assam
- **Arunachal Pradesh:** Hub – Itanagar, Spoke – Papum Pare
- **Chhattisgarh:** Hub – Bilaspur, Spoke: Gariabandh, Mahasamund
- **Jharkhand:** Hub – Dumka, Spoke – Deogarh, East Singhbhum
- **Madhya Pradesh:** Hub – Betul, Spoke - Chindwara
- **Meghalaya:** Hub – Shillong, Spoke: East Khashi Hills, West Jaintia Hills
- **Mizoram:** Hub – Aizwal, Spoke : Kolasib
- **Odisha:** Hub – Sambalpur, Spoke: Sonepur, Balangir, Bargarh, Anugul
- **Tripura:** Hub – West Tripura, Spoke : North Tripura

9.2. Promoting Integrated Bamboo Based Enterprise Development among SAARC Countries - India Component



9.2.1 About the Project

- To promote bamboo-based enterprises for income generation and employment opportunities across harvesting to production and then marketing.
- The development model is based on the identification of key stakeholders and their key challenges across the value chain. The creation of sustainable high value economic opportunities will directly improve the quality of life for farmers, artisans, micro & small enterprises, designers, traders, and exporters.
- The project mainly focuses on 4 categories of products: Handicraft, Furniture, Housing & Construction, and lifestyle products.
- The project activities mainly include pre-implementation activities such as baseline surveys, establishment of a near-source common facility centre (CFC), training on bamboo production, harvesting and post-harvest processing, design and product development, skill based trainings i.e., training of trainers and skilling of artisans, enhancing market and finance access.

9.2.2 Project Partner with FMC

- **NABARD** : National Bank for Agriculture and Rural Development (NABARD) is an apex regulatory body for overall regulation of regional rural banks and apex cooperative banks in India. It is under the jurisdiction of Ministry of Finance, Government of India. The bank has been entrusted with "matters concerning policy, planning, and operations in the field of credit for agriculture and other economic activities in rural areas in India". NABARD is active in developing and implementing financial inclusion.

9.2.3 Project Coverage

- **Meghalaya:** Hub – Ri Bhoi
- **Jharkhand:** Hub – Dumka

10. FMC's Role in Meghalaya

In the last 4 years of intervention in Meghalaya, FMC has created/expanded multiple bamboo-based units through bank linkages, market linkages etc. FMC's team and the facilitating agency based in the state imparted various trainings, created producer network, helped the artisans in loan applications, business plans for loans, generated market orders and helped the artisans in execution etc. The project also oriented various bankers, NBFCs, Micro finance institutes etc. to get the units the required loans to set up and expand micro bamboo-based units. Upliftment of women in the targeted states focus area under the project.

10.1. Micro Challenges faced in the Cluster and Steps taken

During the inception of the project, it was realized that the clusters was facing issues related bank linkages, market linkage, products being produced were traditional products and most of the artisans were working individually catering to local and regional markets only with limited access of loans, contemporary market. The bamboo clusters/units were isolated, and bankers lacked awareness about the potential of bamboo-based units. Various interventions were done including skill development trainings to ensure the products being produced can cater to tier-1 and metropolitan markets, along with that various banker's working in the area were oriented and sensitized about the bamboo-based artisans/units to ensure the availability of working capital required and investments required for the units.

10.2. Major learnings and Way Forward:

The major learning from the intervention was that the bamboo based contemporary products has huge potential in the tier-1 and metropolitan markets and the clusters requires proper supply chain development, further design supports and further market linkages with various bamboo-based brands being established in the country like Woody grass, Bamboo Pekker etc. These common issues faced majorly by the unorganized sector is lack of proper supply chain, quality control, fixtures, moulds, etc. to ensure all the products produced are of same size, quality etc. to cater to the orders received from established companies. The project is working towards establishing a buying hub to ensure the correct and proper execution of orders received. A multi stakeholder bamboo-based knowledge platform has been developed to connect all the stakeholders associated with the bamboo. The project will focus on registration of all the units, artisans, and producer networks on this portal to ensure the sustainability of the intervention even after the end of the project.

Case Study: Rakhis's Story of Embracing Bamboo Craft to Combat Poverty

Rakhis Behphatis, a tribal woman in her early 50s, had spent most of her life in the hilly fields of her village in Pynursla region of Meghalaya. Living on the edge of poverty, Rakhis would toil incessantly as an agricultural labour – earning Rs 300 a week. On lean seasons, she would spare her hand to broomstick production, bamboo basket weaving and even beetle nut processing on certain occasions. Her income was barely enough to fetch a proper meal for her family of 5. She, with her family, lived in a rented house which required an array of repairs. Living conditions were poor, posing a plethora of health risks – especially during monsoons. A growing number of families in the region faced similar challenges.

Bamboo forests are found in plentiful in the Pynursla region, offering a renewable supply of non-timber material that can be utilised in producing a variety of objects -that is otherwise produced using timber or plastic. Objects made of bamboo are carbon neutral, and can potentially contribute to the nation's pledge in limiting global warming to 1.5 °C by 2070. FMC in its project "Promote Bamboo MSME Clusters for Sustainable Development" have leveraged bamboo as a sustainable resource in providing livelihood to marginalised communities across several states in India. Due to its abundance of bamboo forests and artisanal heritage, Pynursla was identified as a potential cluster. Pynursla had an existing ecosystem of bamboo craftwork, producing traditional basketry like Khoh (closed weave basket with head strap), Shang (shallow storage basket), Khasi Pig Basket (basket for transporting pigs), Knup (conical head gear), etc. The project's aim had been to uplift and strengthen the cluster by introducing contemporary products/designs, creating pathway to new markets, and developing financial linkages.

Rakhis was identified by FMC during the baseline survey, and was inducted into the training sessions, where she acquired the skills to procure, process and weave bamboo into sellable products. With support from FMC, Rakhis developed samples of contemporary products like water bottles, tiffin baskets, large and small cones, tea coasters, and traditional basketry. The samples helped FMC to fetch initial round of orders from the Shillong market. She started fulfilling orders under the banner R.B. Bamboo Enterprise and FMC further assisted her to develop stamps, invoices, cash memos and marketing materials for her enterprise. She further hired a worker to assist her with the production. Selling products with a higher profit margin, her income jumped to Rs 1500 per week. Even at the age of 52, Rakhis is persistent on improving her income further, through marketing and higher production. Rakhis has initiated repairs of her roof and bathroom, with the higher income allowing for better living standards. Inspired by her success, more artisans are following Rakhis's path with FMC's handholding – transforming Pynursla into a prosperous bamboo cluster.

This page has been intentionally left blank



About FMC

Foundation for MSME Clusters (FMC) is a not for profit organisation. FMC specialises in promoting MSMEs in clusters by creating, promoting and capacity building enterprises, networks of enterprises and strengthening their ecosystem. During the last 15 years of its existence FMC has worked in over 250 clusters in India and 18 other countries across the world.

Address:

USO House, 2nd Floor, USO Road, 6, Special Institutional Area, Off Shaheed Jeet Singh Marg, New Delhi 110067

Phone: +91 11 40563323/24

Email: info@msmefoundation.org

Organisation Website: www.fmc.org.in

Cluster Observatory Website: www.clusterobservatory.in