

DRAFT REPORT

Action Plan for Promotion of Bamboo in the North Eastern Region



## ACTION PLAN FOR PROMOTION OF BAMBOO IN NER



**DRAFT REPORT**

**Submitted to  
Ministry of Development of the North Eastern Region  
Government of India**



**North Eastern Development Finance Corporation Ltd.**

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# EXECUTIVE SUMMARY

## TITLE OF THE STUDY ACTION PLAN FOR PROMOTION OF BAMBOO IN NER

### EXECUTIVE SUMMARY

Bamboo is one of the most versatile plant species in the world. It has a wide variety of uses in today's world. In North Eastern India, local communities have traditionally used bamboo throughout their lives

- from cutting the umbilical cord of new born babies to carrying the dead on their final journey. While it had been eclipsed by other materials after the advent of modernity, bamboo is enjoying a renaissance globally. Nearly two-fifths of the bamboo stock of India is concentrated in the North Eastern (NE) Region of the country. But, the contribution of bamboo towards the economic development of the NE states of India remains subdued.

In July 2020, the Hon'ble Prime Minister of India highlighted the potential of value addition to bamboo in the NE states, which could contribute to the on-going national initiatives for an Aatmanirbhar Bharat (self-reliant India) by replacing imports with local production. Further, he suggested that bamboo centred initiatives could help to boost the incomes of people in these states. Bamboo can play an important role in making a self-reliant India through reduction of import in several product categories such as timber, stick, fibre, charcoal etc. Therefore, it is the need of the hour to explore more impactful initiatives in order to address the gap in the existing bamboo ecosystem above and over the existing initiatives. As an outcome of the above vision, the Ministry of Development of North Eastern Region (DONER), Government of India in October, 2020 assigned the work of undertaking the 'Preparation of an Action Plan for the Promotion of Bamboo in the North Eastern Region' to the North Eastern Development Finance Corporation Ltd. (NEDFi) in association with North Eastern Council (NEC).

The potential role of bamboo in North Eastern economy has also been highlighted in several policy documents and forums such as North East Vision Document 2020, NITI Aayog etc. This Action plan also aims to address the critical issues highlighted in such policy documents and forums.

**Terms of Reference:** The approved Terms of Reference of the present assignment are as follows:

(a) To assess the current status of the bamboo sector of NE region (NER) through stakeholders' consultation on challenges, prospects and recommendations for development and promotion of the sector; (b) To identify priority areas for intervention with its implementation strategy; and (c) To develop a 5-year holistic action plan including state(s) specific sub-plans, implementation mechanism, fund requirement, convergence with existing scheme/mission and formulation of new scheme if required. The Scope of Work has been furnished at Appendix-2 of the report. This covers the above Terms of Reference in detail.

### 1. Current Status of Bamboo Development

**Global Market Size:** The global bamboo and bamboo products market size is about \$ 72.1 billion (2019) and it is projected to reach \$98.3 billion by 2025, after growing by about 5%

per annum in the intervening years (Grand View Research). The robust growth of bamboo based markets is expected on account of factors like growing infrastructural development and the use of sustainable resources (like bamboo) in the manufacture of furniture and industrial products across the world. China is the leading nation in the production of bamboo and bamboo based items.

**Market Segments:** Chapter-2 gives the major segments of the global bamboo market as estimated by various organizations. It may be noted that the segments covering bamboo use for (a) pulp and paper, and (b) construction may account for over 70% of the global market. The other segments (industrial use, crafts, food use etc.) may be about \$ 20-22 billion in size (in 2019). Of this, it has been estimated that non-traditional items like laminated furniture, flooring, panels etc. constitute over 45% (in 2017), while traditional products like handicrafts, traditional furniture, bamboo shoots, chopsticks and blinds will form the balance. It has been projected that the demand for bamboo for industrial use will grow more rapidly in the next few years as compared to its use for handicraft or food use.

**International Trade:** International trade remains a small part of the global output, as most of the output in the producing nations is sold in the domestic markets. The major exporters include China, European Union (EU), Indonesia, Vietnam, the USA, the Philippines and Thailand. The global trade of highly processed bamboo goods is growing, and these items (like flooring, panels, claddings, other highly processed industrial products, bamboo fibre etc.) constitute an ever-growing share of the global trade. However, traditional products are also being traded such as furniture and woven items. In fact, with \$ 380 million in exports, woven bamboo products still made the largest traded item in 2017 accounting for 21% of global exports (INBAR).

**National Status:** While it grows naturally almost throughout India except in the Kashmir region, bamboo occurs in abundance in the deciduous and semi-evergreen forests of the North Eastern region of the country and the tropical moist deciduous forests of Northern and Southern India. As per the India State of Forest Report (ISFR) 2019, an area of 160,037 km<sup>2</sup> has been described as 'bamboobearing areas'.

In India, the demand for bamboo is estimated to be about 27 million MT, as reported by the National Cooperative Housing Federation of India's NCHF Bulletin in July 2017. This is needed for consumption by a range of users like the pulp and paper industry, construction sector, cottage industry and handlooms, food usage (bamboo shoots), fuel (charcoal), fodder (bamboo leaves) and medicines. As per the National Bamboo Mission, the annual harvest of bamboo is about 14.6 million MT (Operational Guidelines of NBM, revised in June 2019).

The bamboo market in India is estimated to be about Rs 23,942 crore (2019). There is no comprehensive data on India's bamboo market, as much of it is based on trade on an unorganized basis. The accurate estimation of bamboo export and import figures of India is difficult, as many of the bamboo products are internationally traded under same HSN code of timber. Data from few of the bamboo specific trade portals reveals that export figure of India in FY 2019-20 was USD 106 million and import figure stood at USD 170.39 million.

As per official records, India imported Rs. 290.07 crore of bamboo items in 2018-19 and Rs. 560.27 crore in 2019-20, which represented a surge of over 93% in the bamboo-based imports. India's exports have reduced by over 9% from Rs. 500.21 crore to Rs. 454.1 crore.

**Regional Status:** The North Eastern states of India account for about one-third of India's area

under bamboo, as well as 38% of the total bamboo stock of the country. Some of these states have skilled artisans who are very skilled at working on bamboo based crafts. The availability of bamboo culms in the states of the NE Region has supported its use for diverse household purposes (utility items, furniture, tools etc.), application in bamboo-based crafts, construction of shelter and erection of fencing, use in farming etc. Further, analysis of the Forest Survey of India reveals that the region has limited “out of forest” bamboo stock which is harvestable. Also, with its wide use at the household level and sale in local markets, it has been reported that a significant proportion of the bamboo resources in the NE states have not been tapped adequately. So far, there have been low levels of investment in bamboo based industrial units in the NE Region.

## **2. Existing National Initiatives**

India is the world’s second largest cultivator of bamboo after China, with 136 species and 23 genera spread over 13.96 million hectares. However, the country’s share in the global bamboo trade and commerce is only 4.5%. This is despite some noteworthy initiatives taken in the past in order to develop the bamboo sector in India. The Planning Commission had prepared a report on National Mission on Bamboo Technology and Trade Development (NMBTTD), which was presented to the Hon’ble Prime Minister in July, 2003. Accordingly, the Planning Commission allocated Rs, 2,600 crore for bamboo under the 10<sup>th</sup> Five Year Plan.

In October 2006, the Government of India (GOI) had launched the National Bamboo Mission (NBM) on the basis of the National Mission on Bamboo Technology and Trade Development Report, 2003. The NBM’s key objective was to address issues relating to the development of the bamboo industry in the country, provide a new impetus and direction and enable the realisation of India’s considerable potential in bamboo production. The Mission was largely limited to propagation and cultivation of bamboo, with limited investment in seasoning and treatment units and bamboo bazaars. The main weakness of the scheme had been the absence of a linkage between the producers (farmers) and the industry and a strong value addition component and also weak efforts in organizing bamboo farmers for aggregation through institutions such as cooperatives, SHGs, JLGs etc.

The National Bamboo Mission (NBM) was restructured in 2018. The Mission was launched as a natural corollary of the historic amendment of the Indian Forest Act in 2017, removing bamboo from the definition of trees. The main objective of the above Mission is to expand the area under bamboo plantation in non-forest Government and private lands in order to supplement farm incomes and contribute towards resilience to climate change as well as availability of quality raw material requirements of industries. In addition, the NBM has sought to address other aspects like post-harvest management, product development, industries, skills development, and import reduction.

**Challenges & Action Points for Bamboo Development in NE Region:** The major emphasis of the existing initiatives appears to be upon the plantation of bamboo. The other aspects seem to be receiving less importance, especially a focus on market driven value addition. NBM has focussed upon 10 species of bamboos. However, there is a need to explore the commercial potential of all the other 128 species of bamboo available in India, as the introduction of new species into an area may be more challenging than the utilization of the existing bamboos. The manufacture of incense sticks is an important activity in India. However, there is a considerable generation of wastes. Much of the bamboo culm is wasted while making bamboo sticks for use by agarbatti units. Activated bamboo charcoal may offer a way out. Other value added items may need to be developed to make fuller use of the bamboo raw materials, including wastes.

The bamboo sector of NER lacks reliable data on raw material and trade intelligence and has witnessed limited research and development with industrial application, inadequate credit linkage, lack of high value added product etc.

Much of the bamboo resources are located in remote areas that are not served by any roads. The sustainable extraction of bamboos (including replanting of utilized areas) is not possible in such a scenario. The other issues which confront the implementation of Government funded initiatives for bamboo development include: Multiplicity of institutions with overlapping mandates in the bamboo sector in NE India; late release of funding; as reported by State Bamboo Missions is impacting planting and other activities; and limited capacities at the state and district levels, especially with regard to bamboo trade and economics; technological innovations and manufacturing of bamboo products.

The following are the major points for any Action Plan for bamboo development in the NE Region: adoption of a market driven orientation; utilization of the full range of bamboos, with preference to the locally available species; research and development; Value Addition to the existing products; addressing the Logistic challenges; capacity Development of Implementing Agencies; and direct Funding supplemented by active Monitoring. The above have emerged from an analysis of the existing challenges as discussed in this section. The present action plan will adopt the above points as its guiding axioms while developing the implementation strategies.

**Other Recent Initiative:** Another major bamboo initiative in North East is Assam Bio-Refinery- the first bamboo based bio-ethanol plant of NER. The unit is expected to consume 5 Lakh MT bamboo. Considering the low volume of “out of forest” bamboo in the region, the unit should look up for other channel of raw materials such as collaboration with State Forest Department for natural stock and own high yield captive plantation can be two options which the unit may explore.

### 3. Policy & Regulatory Framework

**Policy Framework:** India does not have a National Bamboo Policy, despite the need for such an overarching document to guide the various agencies working for bamboo development in the country. However, the National Agro-forestry Policy had been announced in 2014. It seeks to support agro- forestry, which has been defined as a land use system which integrates trees and shrubs on farmlands and rural landscapes to enhance productivity, profitability, diversity and ecosystem sustainability. The above policy intends to encourage and expand tree plantation in an integrated manner with crops and livestock to improve productivity, employment, income and livelihoods of rural households.

As mentioned previously, the Government of India has launched a restructured National Bamboo Mission (NBM) in 2018, with its basic objectives being 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 requirements of industries.

Some of the NE Region have brought out State Bamboo Policies to promote bamboo (and other related items). These include Assam, Manipur (with the policy being at the draft stage), Nagaland, and Tripura. The salient points of the above state level policies have been furnished at Chapter-4. In addition bamboo finds mention in the Socio-Economic

Development Policy 2019 of Mizoram. In addition, the matter of bamboo development has found mention in some of the other policies of the State Governments of the NE Region. These have been briefly mentioned in the above chapter.

**Legal & Regulatory Framework for Bamboo in India & the NE Region:** As per the Constitution of India, 'Forest' is a subject under the concurrent list. Thus, both the Central Government and State Government can enact legislation on the subject, with the acts of the former having precedence in case of any conflict. In India, bamboo is primarily found in forests, whereby it is classified as a forest produce. Hence, it is subject to both Central and State laws.

The Indian Forest Act, 1927 had interpreted 'tree' to include bamboo. This meant that the felling of bamboo grown anywhere in the country was subject to restrictions applicable to 'timber'. The act not only constricted the livelihoods of forest communities, but restricted private growers too. In 2017, Section 2 (7) of the Indian Forest Act was amended to exempt bamboo grown in non-forest areas from the definition of 'tree'. Thereby, any bamboo grown in private or homestead land no longer requires a felling permission or transit permission from any State Forest Department. However, bamboo grown in forest lands will continue to be classified as tree and legal restrictions on cutting and transport of bamboo from such forest lands remain.

Under The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, popularly known as the Forests Rights Act (FRA), bamboo has been classified as a minor forest produce (MFP). This Act recognizes and vests individual forest-dwellers with forest rights to live in and cultivate forest land that was occupied before 13 December 2005 and grants community forest rights to manage, protect and regenerate the forest under section 3(1)(i), and to own and dispose minor forest products from forests where they had traditional access.

As per Schedule VI of the Constitution of India, tribal communities inhabiting areas in some states of the NE Region, designated as autonomous districts, were granted special provisions for the protection of their traditional rights. Autonomous District Councils (ADCs) were established in such areas with powers over land and other resources including forests - excluding Reserved Forests (RF), Proposed Reserve Forests (PRFs) and Protected Area Network (PAN). Thus, under the FRA, 2006 as well as the powers vested with the ADCs, bamboo grown in forests (not being RF, PRF or PAN) can be utilized without any constraint. These forests are usually termed as Un-classified Forests or as Un-classified State Forests (USF) in the hill states of the NE Region. The de-facto control over such forests is exercised by the traditional authority.

#### **4. Stakeholders' Discussions**

International level organizations such as World Bamboo Organization (WBO), International Bamboo and Rattan Organization (INBAR), Japan International Cooperation Agency (JICA) are working for Indian bamboo sector. Nationally, there are numbers of central ministries and agencies which are further supported by research institutions such as NID Ahmedabad, Bengaluru & Jorhat, NIFT Shillong, Indian Institutes of Packaging Mumbai & Kolkata Indian Institute of Plywood Research and Training; IIT Guwahati, National Institute of Natural Fibre and Engineering Technology, Kolkata etc.

North East based stakeholder institutions are North East Cane and Bamboo Development Council (NECBDC), Rain Forest Research Institute (RFRI), Jorhat and its Advanced

Research Centre for Bamboo and Rattan (ARCBR), Bamboo and Cane Development Institute (BCDI), Tripura Bamboo and Cane Centre (TRIBAC), North Eastern Space Application Centre,(NESAC), IITG Guwahati, North East Handicraft and Handloom Development Corporation (NEHHDC), North East Centre for Technology Application and Research (NECTAR) Indian Institute of Entrepreneurship (IIE), Bamboo Technology Park, Chaygaon, Kamrup, Assam, Bamboo Industrial Park, Dima Hasao, Assam, Numaligarh Refinery Limited (NRL) etc.

At state level there are- Department of Industries and Commerce, Department of Horticulture, Department of Soil Conservation State Rural Livelihood Missions State Bamboo Development Agency State Handloom and Handicraft Development Corporations and the Autonomous District Councils etc.

A large number of stakeholders' consultations were organized (15 in all) as a part of the assignment. The stakeholders included participants from the Government, Entrepreneurs, Crafts Clusters, Institutions and Banks. The following summarizes the feedback received from the stakeholders. The details are available at Appendix-3. In addition, Appendix- gives the details of these stakeholders.

### **Government**

Discussions were held with the senior officials of the National Bamboo Mission (NBM). They gave a background of their work, and the progress achieved till date. In addition, they furnished some suggestions for the bamboo sector of the NE Region, as well as their plans for the sector on a national basis.

Officers from the State Bamboo Missions of five states (Assam, Meghalaya, Mizoram, Nagaland, and Tripura) joined discussions organized on two separate occasions. They gave account of the progress of bamboo in their states, as well as the various interventions being undertaken for the sector in collaboration with various stakeholders along with implementation challenges.

### **Entrepreneurs & Industries**

There were consultations with industrial units and entrepreneurs involved in the bamboo sector. These stakeholders gave their feedback on the issues challenging bamboo development across the value chain. These included issues with raw materials (in terms of quality and volumes), technology (need to upgrade tools and equipment), inadequate financing, logistics (high costs of transport), and market development. As many bamboo items were a novelty (tiles, panels, laminated furniture etc.), consumer confidence and tastes will take time to develop. The efforts of institutions and government initiatives need to reach the entrepreneurs, who are working for bamboo development.

### **Banks & Financial Institutions**

Banks were of the opinion that currently there is limited high value bamboo products and they are manufactured mostly in the micro and small scale. The Government schemes along with MUDRA loans (collateral free loans) could be used by micro-level entrepreneurs. The bamboo eco-system needs to be developed on commercial basis, along with the ready availability of data. The importance of entrepreneur linked cluster development was also highlighted. Further, CSR funding could be used for bamboo plantations.

### **Institutions**

The different institutions (both in the region as well as those located outside) gave account of their experience with the bamboo sector. They had undertaken several works for the sector,

including in the NE region. They are ready to support further growth of the sector in the NE Region.

### **International Practices on Bamboo**

Experts from South Asian Countries such as Indonesia, Vietnam, Philippines- the countries which have established bamboo based economy participated, gave their suggestion and shared their willingness to work with NER. Experts from African countries Kenya and Tanzania who has identified bamboo as emerging economic area and way to fight climate change participated and explained their models. Enterprise from Israel working in bamboo electric bicycle has also participated in the session.

## **5. SWOT Analysis**

SWOT Analysis assesses the Strengths and Weaknesses of an entity, along with the Opportunities and Threats emanating from the environment around it. It gives a good starting point for planning a set of future activities related to the entity. In the present case, the concerned entity is the bamboo sector of all the NE states taken together. The SWOT analysis for the sector has been given below.

### **Strengths**

- Availability of **sizeable stocks** of bamboos of various useful species
- Availability of considerable **wasteland areas** that are now unused (or less used) and which can be utilized for bamboo cultivation
- Availability of **traditionally skilled craftsmen** in several clusters in the NE states
- Existence of other **components of a bamboo eco-system** within the region like entrepreneurs, designers, institutions (working in parts of the bamboo value chain), government investment etc. apart from craftsmen

### **Weaknesses**

- Deficiencies in many parts of the **value chain**, which push up costs and reduce the market value of the items produced – including **lack of waste utilization**, use of non-treated bamboo, logistical weaknesses (transport and warehousing), sourcing issues, use of inappropriate copies of imported machinery by industrial units, low use of modern tools and equipment by artisans, limited market etc.
- **Lack of high value** product categories
- **Limited amount of non-forest bamboo** and its huge consumption on traditional industry.
- **Lack of Research and Development** and **limited understanding** of the bamboo as material for various industries
- Lack of thrust upon scientifically managed bamboo **plantations** in the NE states, with resources being mainly available from extraction of natural clumps and forest resources not under government control.
- Inadequate **credit linkage** for entrepreneur and artisan based enterprises
- Limited use of modern **designs** and other **innovations** owing to the existence of a working level gap between the institutions and designers (on one hand) and the entrepreneurs and artisans (on the other hand)
- Unavailability of **reliable data** on many segments of the bamboo sector in NE Region – resources outside forests, quantum of stock (species wise data), locally made products, supporting services etc. – all of which constrain informed decision making

### **Opportunities**

- Increased appreciation of bamboo as a **sustainable alternative** to tropical wood, leading to rise in the global use of bamboo articles (both for industrially made items and artisanal creations) and their global trade (mainly exports from Asia to Europe and North America)
- **Focus of the Government** of India at the highest levels upon the bamboo sector in NE



## Region

- Significant opportunities to **substitute imports** of bamboo items with local alternatives on competitive basis
- Possibility to **converge Government schemes** to develop the bamboo sector in NE Region

## Threats

- High level of **imports** in certain items (like round bamboo sticks for agarbatti)
- Dependence on imported machines
- Competition from **well established players** in the global markets in case exports are attempted
- Absence of **large industrial units** based on bamboo (excluding shuttered paper mills of the public sector)

In addition, Chapt-6 discusses the measures proposed under the present Action Plan to address the identified Weaknesses and Threats of the entity.

## 6. Priority Areas for Intervention

The development of the bamboo sector in NE India will require a host of interventions across the eco- system. These have emerged from the previous chapters including the lessons from past initiatives, study of the policy and regulatory framework for bamboo, SWOT Analysis, stakeholders' consultations, secondary research etc. The key areas across the value chain that will need interventions under the present Action Plan include the following:

1. Market Identification: Survey of Existing and rapidly emerging market segments
2. Availability Survey and Real-time database: Identify the species suitable for target markets, and their availability in the NE states (including species wise stock) and develop system to capture real -time data on annually harvestable stock details.
3. Planting Materials: Develop Tissue Culture Labs & nurseries for increased availability of planting materials
4. Plantation: Implement a plan for bamboo plantation in wastelands and mechanism to extract forest based bamboo (excluding Reserve Forest and Protected Area Network); introduction of FSC certification.
5. Inbound & Outbound Logistics: Develop inbound logistics through the construction of Bamboo Extraction Roads to reach bamboo rich belts in remote areas; potential use of in-land waterway and railway; develop multi-model supply chain.
6. Research & Development and Entrepreneurship Development: Establish National Institute of Bamboo Innovation and Technology (NIBIT) in NER, set up bamboo entrepreneurship fund, capitalize on the innovative and technology driven solution of startups to solve bamboo sector challenges. Establish a Bamboo Entrepreneurship Fund
7. Value Addition and Waste Utilization: Establish decentralized small units and large scale centralized units in the sectors of Agarbatti, Charcoal & Activated Charcoal, Bamboo Fibre, Bamboo Shoot based products, construction sector, and industrial handicrafts and bio-plastics units; set up model multi-processing unit.
8. Machinery for Industrial Manufacture: Develop indigenous tools and machinery which suits the Indian bamboo species; Capacity building of entrepreneur and labour in terms of using advanced machines.
9. Policy Intervention- Need of National Bamboo Policy, policy revision for ease of access to market, develop new market, promote innovation, increase productivity, ease of credit.
10. Finance: To attract private investment
11. Market Development: Through investors meet, buyer-seller meet, exhibition, technology and skill transfer from best practice models, collaboration with South East Asian Countries for skill upgradation and industry specific training.
12. Implementation Model: Progress monitoring, policy advocacy, coordination, convergence, Monitoring of the Activities

## 8. Vision, Goals & Implementation Strategies

**Vision Statement:** The Vision for the Promotion of bamboo in the North Eastern Region has been stated below:

**To take up initiatives for the sustainable and value added development of bamboo in the North Eastern states of India in order to boost the incomes of growers, artisans and entrepreneurs and to thereby contribute to the on-going initiatives at the national level for an Aatmanirbhar Bharat (self-reliant India)**

The above vision will serve the guide the development of the goals and strategies under the present Action Plan. These have been given below.

**Goals:** The goals of the present action plan have been summarized below:

- **Goal-1:** To undertake the **sustainable development** of bamboo in the North Eastern states;
- **Goal-2:** To undertake the **value addition activities** for bamboo in the North Eastern states;
- **Goal-3:** To **boost incomes** in people in the North Eastern states; and
- **Goal-4:** To contribute to the on-going initiatives for a **self-reliant India**.

The above goals have been derived for the above Vision Statement for the development of bamboo in the NE states. These goals represent concrete aims of the Action Plan. The implementation strategies for the plan have been proposed in order to reach the above goals.

**Implementation Strategies:** The table at the next page gives the strategies set out against each of the above mentioned goals of the present Action Plan. It may be noted that the Implementation Strategies seek to address the key areas for intervention that had been identified during the study.

Goal	Implementation Strategy
To undertake the <b>sustainable development</b> of bamboo in the North Eastern states	<b>Market Identification:</b> Survey of the existing and rapidly emerging market segments – both nationally and globally including niche markets as an entry strategy
	<b>Availability Survey:</b> Identify the species suitable for the above markets, and their availability in the NE states (including species wise stock), real time database on annually harvestable stock details
	<b>Planting Materials:</b> Develop Tissue Culture Labs & nurseries for increased availability of planting materials
	<b>Plantation:</b> Bamboo plantation in wastelands to supplement sustainable utilization (including re-plantation) from forest (excluding Reserve Forest and Protected Area Network)
To undertake the <b>value addition activities</b> for bamboo in the North Eastern states	<b>Inbound Logistics:</b> Develop inbound logistics through the construction of Bamboo Extraction Roads to reach bamboo rich belts in remote areas and raw material stores near usage areas
	<b>Interventions for Value Addition in both decentralized small units and centralized large scale units</b> (a) Multi-model supply chain (b) Waste Management, (c) New Product implementation (c) Design & Technology Support, and (d) Research and Development
	<b>Machinery for Industrial Manufacture:</b> Develop suitable machinery and tools that can be used with local bamboos in the manufacture of industrial products like tiles, panels, laminated furniture, and bamboo fibre etc.
	<b>Quality Assurance:</b> Introduction of FSC certification

	<b>Outbound Logistics:</b> Assessment of scope of in-land water transport and railway
To boost incomes in people in the North Eastern states	Establish a <b>Bamboo Entrepreneurship Fund</b>
	Introduce <b>front ended pro-rata subsidy</b> for bamboo enterprise development
	<b>Ease Flows of Bank Credit:</b> Engagement of expert for DPR preparation, Bamboo Finance Consortium, Bamboo Credit Guarantee Scheme for NER
	<b>Revise cost norms</b> of plantation under NBM for increased productivity
	<b>Introduce</b> inter cropping
To contribute to the on-going initiatives for a <b>self-reliant India</b>	<b>Market Development:</b> Support the development of markets for bamboo items by industrial units and entrepreneurs in the crafts sector. Formation of North East Bamboo Market Development Fund
<b>Goal</b>	<b>Implementation Strategy</b>
	<b>Investor Meets:</b> Encourage national and international investors to come to NE Region for bamboo based investments in the region
	<b>Waste Utilization:</b> More cost competitive product from locally available raw material
	<b>Jiggit Plantation:</b> To reduce import dependence of Agarbatti Industry
	<b>National Institute of Bamboo Innovation and Technology:</b> For developing indigenous technology across value chain component of bamboo
[Other Strategies for successful Implementation of the Action Plan]	<b>Implementation Model:</b> Introduce a professional agency to implement the Action Plan with state level implementing agencies (including Forest Departments, Forest Corporations, State Bamboo Missions and other stakeholders including FPOs and SHGs) and other entities in the eco-system like Institutions, Designers, and Machinery Suppliers etc.
	<b>Collaboration with South East Asian Countries:</b> For skill and knowledge to India
	<b>Policy Changes:</b> National Bamboo Policy, Cost norms, export norms, subsidy norms of RNBM

**Table-ES.1: Goals & Implementation Strategies of the Action Plan for the Promotion of Bamboo in the NE Region**

Each of the strategy are discussed in detail in the relevant chapter.

The total fund quantum proposed under the action plan is mentioned below-

Sl. No.	Amount	Rs. (in Cr)	Convergence	Existing Scheme/Fresh fund
1	Market Identification	2.00	NBM	Existing
2	Assessment of Resource Availability and real-time database on annually harvestable bamboo in the region	18.04	NBM	Existing + Fresh
3	Plantation	1234.50	NBM	Existing
4	Planting Material	191.74	NBM/DBT/DST	Existing
5	BER Construction	209.70	PMGSY	Existing
6	Formation of FPC-multi Model supply chain	11.55	DoNER	Existing
7	Outbound logistics- assessment study	2.00	NEC/TEDF	Fresh
8	National Institute of Bamboo Innovation and Technology (NIBIT)	306.00	MoAGFW	Fresh

9	Bamboo Entrepreneurship Fund	100.00	Ministry of DoNER, NITI Aayog	Fresh
10	Value Addition and Waste Utilization	243.78	NBM	Existing
11	L. Glutinosa (Jiggit) Plantation	12.50	Forest, CAMPA, JICA	Existing
12	Machinery, tools and capacitybuilding	4.40	NEC	Fresh
13	North East Bamboo Market Development Fund	10.00	NEC	Fresh
14	Implementation Agency and Bamboo Investment Promotion Council of NER	20.00	NEC/DoNER	Fresh
	<b>Total</b>	<b>2366.21</b>		

**Table ES2: Total Financial Resource Requirement of the Action Plan**

## 9. Implementation Arrangement

For implementation of the action plan, it is suggested to engage a professional agency which will work closely with the various stakeholder ministries, agencies and other stakeholders. Further, NECBDC need to be scaled up as “One Window Solution” for bamboo sector challenges of the region. A Bamboo Investment Promotion Council for NER is proposed under the Aegis of North East Council with experts from World Bamboo Organization and India Bamboo Forum. The mode of engagement of the professional agency and other details are discussed under the relevant section of the report.

## 10. Expected Output and Outcome of the Plan

### Summary of expected Output and Outcome

**Increase in Out of Forest Bamboo Stock:** The region has country’s 40% of the growing stock of bamboo, however extractable stock is significantly less. The action plan aims to increase bamboo cultivation area by 59,746 Ha, out of which 50,000 Ha is proposed to be developed on wasteland and 9,746 Ha will be under certified captive plantation of Forest Department.

**Improve Productivity:** For improved productivity through scientific management, it is proposed to revise the existing plantation cost norms under NBM with incorporation of additional components vital for plantation health.

**Environmental Benefit:** Bamboo has found growing interest amongst the global community due to its contribution towards fight against climate change through restoration of degraded land and wasteland. With this action plan 50,000 Ha of wasteland is expected to be restored. This will significantly contribute in India’s commitment towards environment protection and will assist in achieving Bonn Target.

**Production of Globally standard Raw material:** The proposed FSC certification in bamboo forestry management will ensure globally compliant raw material production. This will create new avenues for the entrepreneurs and growers for their products.

**Emphasis on Indigenous Technology Development:** The turn-around of Indian bamboo sector depends upon its emphasis on research and development. The proposed National Institute of Bamboo Technology is expected to give the much needed impetus to the industrial application oriented bamboo sector research and development.

**Reduce Import Dependence:** By introducing enterprise in the entire value chain of bamboo and focusing on waste utilization, it is expected that the Indian bamboo and raw material of bamboo based products will become cheaper than their import substitute.

**Connectivity Improvement:** Bamboo sector of the region suffers logistical challenge with poor road connectivity especially in the growing belt. This reduces cost competitiveness of the Indian products. The proposed action plan aims to improve connectivity from source till market. With the proposed 520 kms. of Bamboo Extraction Road, emphasis is given on ease

of sustainable extraction of the natural stock. Further it is also proposed to explore more cost effective inland water and railway route for raw material and finished goods transportation.

**Bamboo Trade Intelligence:** The glaring absence in the current ecosystem is that of reliable data on bamboo. The proposed species wise stock survey and development of portal for real time data of annually harvestable stock details will address this issue to a great length.

**Entrepreneurship Development:** In addition to supplement the NBM initiative of bamboo entrepreneurship development, it is proposed to capitalize on the startup movement of the country by launching Bamboo Entrepreneurship Development Fund. Startups can also help to tackle the bamboo sector challenges with newer and innovative approach.

**Revival of Traditional Industry:** Once glorious agarbatti industry of India is today facing challenge from other countries in terms of cheaper raw material. The action plan seeks to address the root cause of such debacle through action in terms of waste utilization and introducing high value supplementary products such as charcoal and activated charcoal.

**Accelerate India's Race to Global Bamboo Market:** Sector specific time bound and outcome oriented action is required to regain the global market. The action plan outlines several such critical gaps which need to be immediately addressed. Many of the existing research projects need to be expedited which aims to introduce new product development such as bamboo fibre, etc. Further through the proposed Bamboo Market Development Fund, it is proposed to develop Indian bamboo products at par with global standard through improved machinery, increased investment and global market linkage.

**Global Skill and Skill Knowledge Transfer to NER:** The NER region has strong artisanal skills. This can be further improved in terms of design, finishing etc. with help from experts or master artisans from South East Asian countries.

**Improved Package of Practice for Harvesting:** Through formation of 77 nos. of FPC with multi-model supply chain orientation, there will be improved harvesting practice, reduction in wastage and increase in farmers' income.

**Strengthening existing stakeholder:** Through setting up of Bamboo Cell/Division under each Forest Department of NER states; strengthening of State Forest Development Corporations; setting up of Centre of Excellence for Bamboo Machinery at NECBDC-dedicated bamboo specific initiative from the existing stakeholder institution is expected to increase.

**Improving Credit Flow:** The action plan understands challenges of central sector scheme implementation in the region. Institutional credit is inadequate for the bamboo ecosystem of NER. The action plan makes specific suggestion to improve credit flow to the entrepreneur through revision of existing NBM norms of funding and suggesting new financial products such as Bamboo Credit Guarantee Scheme etc.

### **Expected Socio-Economic Impact**

On implementation, it is expected that there will generation of 47,000 nos. of direct employment and 1, 63,672 nos. of indirect employment. Detailed sector wise employment generation is given under the relevant chapter. In addition to this, there will be an earning of Rs. 4.04 Cr in form of GST by the government upon establishment of the proposed value addition units. Break up given in relevant section.

Further, it will also help in increasing farmer's income, contribute towards the mission of doubling farmers income, bring economic opportunity to rural women thereby reducing poverty.