

# **Bamboo And Bamboo-Based Industries, Its Economic Prospects, Potentiality, Challenges and Problems in North-Eastern Region of India: An Overview**

**Manoj Kumar Das<sup>1</sup> and Amit Choudhury<sup>2</sup>**

<sup>1,2</sup>Department of Business Administration, University of Science & Technology, Meghalaya, India

## **Abstract**

The North-Eastern Region of India is famous for huge reserves of bamboos available in the forests as well as the plantations cultivated along with homestead plantations available in the rural areas. The availability of many species of bamboos bearing huge potentiality makes the region famous and rich in natural resources. This paves the way towards development and prospects of bamboo-based industries in the North-Eastern region. This paper indicates and highlights the various literature reviews done, on the researches conducted by researchers to identify the potentiality, economic prosperity, availability of bamboos, and the challenges, problems, difficulties faced by the bamboo-based industries in the North-Eastern Region of the Country.

**Keywords:** Bamboo, Potentiality, North-Eastern, Industries, Prosperity, Challenges, Problems.

## **Introduction**

The states of NE Region, India comprising of the states Assam Meghalaya, Manipur, Mizoram, Arunachal Pradesh, Nagaland, Tripura, Sikkim, lies between 21°34 'N to 29°50 'N Latitude and 87°32 'E to 97°52 'E Longitudes. The North-Eastern Region has a total area of 2,62,179 Sq Km which accounts to 7.98% of the total geographical area of the country and has a total population of 3.98% of total India's population (Ministry of Home affairs).

The Indian State of Forests Report (ISFR) 2021, states that the North-Eastern states have a total forests coverage of 1,69,521 sq km. Bamboo is one of the species which is found in abundance in these forests. Bamboo being a fast-growing plant covers around 8.96 million ha of the total 63.3 million ha forests in India. India itself has 136 exotic and indigenous species of which 50% of the 'Bambusa 'specie are available in the North-Eastern states of India –Arunachal Pradesh, Sikkim, Mizoram, Manipur, Nagaland and Assam followed by the state of West Bengal.

The global scenario of bamboo and bamboo products markets plays a bigger role in the economy. The world 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). While assessing the growing demand of bamboo and bamboo products, the reason justifies the growing infrastructural development and its uses as sustainable resources in the manufacture of furniture and industrial products. China is the leading country in the production of Bamboo and Bamboo products (Action Plan for Promotion of Bamboo in NER).

Since ages uses of bamboo are a part of one's life and widely used by the rural population of the North-East as a source of livelihood and as a traditional practice in making bamboo products, using as edibles because of its nutritional benefits, some of the tribes use as a spiritual practice also. Bamboo Wood is being used in construction of houses, bridges and has been used for multi-purpose uses. Bamboo based industries basically the handicraft industry of the North-Eastern region is popular since the ancient times for manufacturing a number of handmade bamboo items such as Khaloi, Dola, Polo, Juluki, Jakoi, Dola, Pasi, Japi, Tupi, Hand fans, Fishing implements, furniture like (murha, chairs, sofa, tables) decorative items, xoza, etc. The craftsmanship in building houses of bamboo, bridges and other items etc counts the practice of using bamboo for daily uses by the rural population of the north-east. These activities of the rural household have proved to be providing employment and livelihood to the rural population since the past even the women folk and other members of the family engage themselves in producing bamboo-based items. Today a bigger part of the rural population in those areas which were once famous for traditional bamboo handicraft work are still dependent in this work for their livelihood. However, artisans have to face the various challenges and competition in today's context, meeting the various constrains like scarcity of requisite raw material, development of updated technology etc. As on the other hand local artisans still survive applying the obsolete or semi-manual methods in production. Lack of market channels, lackadaisical institutional support, high prices of raw material, poor production, obsolete technology, lack of finance etc. are common.

Govt. of India has taken the initiative of development of existing Small and Rural Industries and Cluster Development programmes with a view to increase productivity, innovation etc. and on the other hand to bring the unorganized units under a Cluster or a group to prevent certain problems due to rise of prices of raw material, providing employment, intermediaries etc. The Khadi and Village Industries Commission (KVIC, Guwahati) under the Scheme of Fund for Regeneration of Traditional Industries (SFURTI) has taken up the Cluster Development initiatives at Chakchaka block of Barpeta district during the year 2008. (Dr. Rabinjyoti Khataniar).

Tripura, one of the States of the North-Eastern Region has huge contribution towards the bamboo-based industries of the North-Eastern Region. Apart from a number of bamboo products the role of furniture making and using the bamboo extracted from the plantations for multi-purpose uses are extraordinary. The Katlamaro Chalo Project has lots to direct towards design development strategy to support rural development in this regard (M.P. Ranjan).

Cluster Development Programmes were conducted in a number of Bamboo Handicraft units of the North-Eastern Region of India. Specializing in a number of bamboo and Root carving items. These clusters need opportunities to equip themselves with updated technology and upgrade the skills of the artisans to compete in the national and international markets. Better opportunities for the artisans such as proper marketing channels, exposure of the products and benefits of various government schemes supporting the artisans are compulsory for the development of the traditional industries.

### **Significance of Bamboo-Based Industries in North-Eastern Region**

The exceptionally high natural resource found in abundance is “bamboo”; which is an asset for the bamboo-based industries to grow in the North-Eastern Region of India. Technological development and research of bamboo uses can lead the bamboo-based industries to the top level. Unscientific management systems which cater to the extraction of bamboo culm structure and culm population of dolu bamboo (*Schizostachyum dullooa*), a priority-based forest bamboo species was studied in a forest patch of Cachar District, Barak Valley, Assam, North-East India (Arun Jyoti Nath, Gitasree Das, Ashesh Kumar Das). The conservation of the valuable species because of its economic importance should be a priority. North-Eastern Region constitutes a number of valuable species of bamboo which can suffice the importance of bamboo-based industries and make economically efficient. Bambusa Balcooa (for structural application), Bambusa Bambos (for paper, house construction, panel production and fencing etc) Dendrocalamus Asper (This species is mainly cultivated for edible shoot) (Uditya kr Borah) etc.

### **Objectives**

The main objective of writing this paper is to highlight the literature reviews of the various research studies and researches/articles conducted by scholars and professionals to focus the potentiality, importance constituting commercial, nutritional and medicinal values, means of livelihood and employment generation, economic prosperity, etc. of the bamboo-based industries in North-East India. In addition to gain valuable information from such literature reviews which attempt to identify the various challenges, problems, etc. and other set-backs faced by the bamboo-based industries in the North-Eastern Region of India.

### **Methodology**

Since the study is based on the literature review, collection of Secondary data is the major method applied to collect information. Enough information from published research papers, reports/articles and published books and the specific surveys conducted by the researchers, has been capable to identify the potentiality, nutritive effects of bamboo, difficulties, challenges, and problems etc. faced by the bamboo-based industries in the North-Eastern Region of India. Standardized literature easily accessible in various websites, the most extraordinary being the “Google Scholar” paved the way to collect information and review literature of published research papers based on different aspects of Bamboo like commercialization, utility challenges and problems etc. Literatures were downloaded from the Web sites. In reviewing the literature on different aspects based on potentiality, challenges, problems and difficulties of the bamboo-based industries, the methodologies followed by the scholars or authors in compiling their research papers etc. was the approach in collecting Secondary and Primary data information mainly, or only Secondary information through various sources, data analysis and findings. Reviewing techniques like thorough reading of various literature collected, giving special emphasis to the abstracts, introduction, findings etc. helped to understand the authentic views and suggestions of the authors, with the aim of targeting the objectives.

### **Discussion**

#### **Availability Of Productive Bamboo Species and Its Potentiality**

B.P. Bhatt, L.B. Singha, K. Singh and M.S. Sachan, in the study “Some Commercial Edible Bamboo Species of North East India: Production, Indigenous Uses, Cost-Benefit and Management Strategies” highlights that the availability and importance of productive bamboo species which are commercially edible species and are found mostly in Meghalaya, Sikkim and other North-Eastern Himalayan States. Species like *n. Bambusa balcooa* Roxb., *Chimonobambusa hookeriana*, etc. are treasures not only of the forest, their utility, commercial importance, cost effectiveness has encouraged many inhabitants of the region to cultivate these species in their homestead gardens. As culture and tradition demands, besides food species, bamboo cultivation plays a very important role in tribal folk as it fulfils some daily needs as well as for paper pulp industries. The better yield in the states has increased the tribal people’s income.

T. C. Upreti and R. C. Sundriyal in the study “Bamboo and Cane resources of Arunachal Pradesh: Utilization pattern and implications for management”, narrates, Arunachal Pradesh is rich in highest number of different types of valuable bamboo species found in India. Special importance is given to East Siang District of Arunachal Pradesh comprising of ‘Adi Tribe’, their utilization pattern, conservation pattern, specially used in construction, making basketry items, implements, tools, fencing, food, craft, ritualistic items etc. Villagers have their own plantations of the valuable species. However, cane faces scarcity in availability and considering the national and global market the bamboo and cane products commands adequate potentiality and demands value addition of the products, capacity building of the artisans to compete with the markets and fulfil the socio-economic needs of the people.

According to (P. Medhi\*, S.K. Borthakur<sup>1</sup> and D.K. Hore<sup>2</sup>), in the study “Phytoresources from North Cachar Hills of Assam, India-IV: Bamboos and Rattans” narrates, the region of North Cachar Hills has a specialty when we discuss about availability of bamboo, as the region has around 32 species of bamboo and 8 species of rattans belonging to 1 and 3 genera respectively in North Cachar Hills (presently known as Dima Hasao). The availability of these species provides a huge potentiality in the rich traditional lifestyle of the tribes in the area. The identification of the different species with some of the districts named after the species highlights how tribes uses these Bamboo species and Rattans for various purposes namely making basketry, as traditional rites and rituals, for bamboo ornaments, in construction, medicinal purposes as well as edibles. The excellent traditional knowledge on the lifestyle of the tribes on bamboos and rattans are remarkable.

Robindra Teron and S. K. Borthakur, in the study “Traditional uses of bamboos among the Karbis, a hill tribe of India”, *Bamboo Science and Culture:*” narrates, the bamboo species which are available and most widely used plant resources by the Karbi Tribe of Assam are, *Bambusa tulda* Roxb. and *B. balcooa* Roxb. (*Sil Borua*), *Dendrocalamus hamiltonii* Nees et Arn. ex Munro. Using bamboo in meeting their daily needs is a traditional practice and a part of the lifestyle of the Karbis. Resources of bamboo has increased potentiality and supports the Karbis to develop the rural economy. The knowledge, craftsmanship with artistic skills inherited are evident from the products made by the Karbis, products of cane and bamboo and wood are some of them. The proverb “Karbi aso ke jintak cheripdongse pirthe kevang lapen jintak cherip pondongse chomarong kedam” itself signifies that a Karbi is born with ‘Jintak’ that is a

bamboo split in his hand and leaves the world with a “Jintak”. The use of bamboo shoots during scarcity of rice, traditional festival while harvesting bamboo shoots are of remarkable cultural significance.

### **Bamboo- source of economic prosperity and sustainable development**

K Narendra Singha, Longkiri Timung in the study, “Significance of bamboo in Karbi culture; A case study among the Karbi Tribes of Assam, India” narrates the importance of bamboo in the culture of Karbi Tribes of Assam. Karbis are scattered in North-East India and are concentrated mostly in Karbi Anglong district of Assam. It highlights the importance of ritual practices associated with a number of ritual traits collected from the environment. ‘Bamboo ’ having huge economic potentiality, serves the livelihood of the tribal people of the North-Eastern region of India. This extraordinary nature’s gift “–bamboo” is the backbone of the rural economy in the North Eastern region, supplementing income of the tribes by selling bamboo culms and shoots, handicraft products, incense sticks and other industrial products made out of bamboo. Mostly dependent on the forest produce.

Sarkar J and Sundriyal, R.C. (2002) in the study “Indigenous uses, management and conservation of Bamboo Resource in Arunachal Pradesh, North East-India” narrates about the role of bamboo in the life of the rural people meeting the basic needs like house construction, repairing, fencing, food, craft-based needs, and input to paper- pulp industries. Giving focus on the “Tangsa Tribe” found in the Changlang District of Arunachal Pradesh of the North Eastern region in India, their traditional knowledge with bamboo uses, management and conservation practices. Out of the 16 genera and 58 species that are available in Arunachal Pradesh only 12 species are being used, of which only 7 are most commonly used to meet the day-to-day needs. The wide uses of bamboo by the ‘Tangsas’ identifies their close association of bamboo and proves the culture and mainstay of the rural life. Having deep knowledge in making traditional crafts their products do not get a better market due to lack of value addition of the products and capacity building due to which the products get lower economic returns.

Amit Saha and Pranab Jyoti Sonowal (2020) in their study entitled “A Study on Prospects and Challenges of Bamboo Wood Products in Assam” signifies the prospects and potentiality as well as challenges of bamboo wood industry in Assam. A natural resource, bamboo is found in abundance in Assam. A resource which no longer stands as “poor man’s timber” but considered as 21st Century “Green Gold”. Bamboo being an eco-friendly product is transformed into timber known as bamboo wood, having high market potentiality and not yet reached the masses leading to poor investment in the region. The study makes an attempt to verify the prospects of bamboo wood products in Assam as well as to examine the challenges faced in the production, distribution and marketing of bamboo wood products. The major constraints being frequent power cuts, lack of skilled staff, in efficient distribution channels, pricing etc.

### **Prospects of Agarbatti Industry with reference to NER**

P. Hazarika, Nibedita B. Dutta, S. C. Biswas, R. C. Dutta & amp; R. S. C. Jayaraj, in their study, “Status of Agarbatti Industry in India with special reference to Northeast” highlights that India being the largest producer of Agarbatti (incense sticks), this industry captures both the domestic and the foreign markets because of its quality. Incense sticks have huge demand in



the domestic markets as well as exports, increased sale, provided huge employment including women empowerment in India. However certain constraints stand as obstacles. Because of availability of necessary raw materials found in abundance naturally in North-East India for Agarbatti industry, there is huge potential in North-East India. NER can become production Centre of India not only serving the domestic market but also far-east Buddhist countries who are large importer of Agarbatti from India. There is an ample scope of creating employment opportunities and means of livelihood in the rural sector. Tripura and Assam contribute 80% of the total requirement of bamboo sticks for hand rolled Agarbatti.

A. K. Sinha and S. Deb, in their study, “A study on the status of incense stick making in Tripura, Northeast India” highlights the traditional Agarbatti industry in Tripura of the North-East Region of India. Tripura supplied previously 90% of the bamboo sticks required by the Agarbatti industry of India. Providing employment and livelihood to the rural artisans of Tripura, especially women are involved in this work. It’s an age-old traditional industry for the rural artisans, especially women. Certain constraints related to the extinct of certain specie has affected the production. However, the availability of the bark of *L. glutinosa* (jiggot) is a major source of adhesive material found in Tripura and contributes in making the ‘masala’ or coating paste for incense sticks which further contributes to the quality of the incense stick.

### **Clustering rural household units and industries -Bamboo based industries**

Dr. Rabinjyoti Khataniar, in his paper “Cane and Bamboo Based Industrial Cluster in Assam – Profitability and Vulnerability”, highlights the functioning, productivity and income generation of cane and bamboo cluster of Barpeta Cane and Bamboo Based Industrial Cluster. The Cluster has benefitted around 1382 artisans of which 40% are women, providing employment, livelihood etc. and supporting the rural economy. The cluster has been manufacturing bamboo products meeting the growing needs at the local and regional level. In spite of various attempts by the Central and State governments the industries did not show much progress, as the artisans of the cluster are still dependent on traditional techniques. There are a number of constraints standing as obstacles for progress. For promoting livelihood govt grant is necessary as well as technological upgradation, support to marketing activities etc. is necessary.

Ramnundanga, Ramswamy Rama in the paper “Entrepreneurship Development of Bamboo based Enterprises in Bairabi Cluster, Mizoram”, expresses that clustering of Micro, Small and Medium Enterprises can be a way to improve the individual rural and small households and also contribute towards the development of the communities involved in these industries. Besides trying to understand the significance of the handicraft cluster in general and bamboo clusters related to providing employment at the national level and remote areas in Mizoram where 39 enterprises are operating in Bairabi Bamboo Cluster in Kolasib District of Mizoram. It covers all the four villages under the cluster where the units are spread in Bairabi, Meidum, Pangbalkawn and Chhimluang. However, Cluster development initiatives are essential which emphasizes improving the value addition of the products for sustainability and growth of the cluster.

### **Challenges, problems and difficulties**

Jamatia, Samir in his paper “Livelihood of the Bamboo base: Challenges and Opportunities” narrates the importance of bamboo and its multi-uses such as paper pulp resource, scaffolding, agriculture implements, weaving material, plywood and particle board manufacture, basketry, furniture, pickled or stewed bamboo shoots, medicines, etc. Resource management and technical improvement can convert bamboo into a resourceful material for construction and semi-industrialized products. The biggest impediments which slow down the bamboo-based sector is the irregular supply of bamboo for entrepreneurial development. Efficient regulatory institution for markets, relaxation of forest laws, requisite linkages that industrialization of bamboo sector can provide linkages with rural livelihood has become essential.

Baishya, Panchalee and Baishya, Mrinmoyee in the paper “Developmental Prospects and Problems of Bamboo Industry of Assam” mentions about the huge potential of the bamboo industry in Assam. Not only will it generate employment but also will generate huge amount of revenue to the state. Due to lack of proper attention of these industries there are issues which need proper attention like exposure of the people serving the industries, proper vocational training, skill development etc. Giving importance to its quality of sustainable development, and as an era of globalization, emphasis should be given to sustainable products for better future. Even after the approval of Assam Bamboo and Cane Policy in 2019 for the better utilization of the resources, there are number of inadequacies which is on the way of development of the bamboo industry.

Baruah Palashi, in this paper “Prospects and Problems of Bamboo-based Entrepreneurship Development in North-East India”, highlights that entrepreneurship is the possible way to empower the people economically and further contribute towards the economic development of the nation. North-East is gifted with natural resources in abundance like oil, mineral, river, dense forests.

Bamboo is one of the resources which is found in abundance and has immense opportunities for the people of North-East to set up enterprises and improve the rural economy, as huge scope lies ahead as input for cottage industries, paper pulp industry, handicraft industry, medicinal product, textile industry, as sustainability and livelihood. Government schemes can promote such bamboo-based entrepreneurship. However, a list of problems stands as obstacles for bamboo-based entrepreneurship like, land ceiling act, problems in marketing, lack of education and training, finance etc.

## **Conclusion**

Bamboo is a great resource, called “Green Gold”. It has very high productivity and rapid growth. North East has best economically useful species of Bamboo and major share of India’s Bamboo reserves. Carbon sequestration, providing green cover, common men’s cheap material Bamboo is part of culture and heritage of the Tribes and ethnic population of NER, encompassing all walks of life, starting with the cutting of umbilical cord with Bamboo knife till the last journey on a bamboo platform. Bamboo and Cane provides material for housing, day to day farming implements, basketry, fishing implements, storage, food, fencing, musical instruments, hunting equipment etc. It is also a source of livelihood through handicraft items for which there is an ever-growing demand nationally and internationally in the areas of mats,

baskets, gift items, furniture, household items, packaging material, charcoal etc. There is organised industrial use through paper industry, Bamboo Wood etc. To ease harvesting and marketing of bamboo, a new policy was put in place to reclassify Bamboo as Grass. Institutional approach through National Bamboo Mission, North East Cane and Bamboo Development Council, State Bamboo Missions have given boost to refocus Bamboo as a priority Sector.

### **Bibliography**

1. Ministry of Home Affairs, North-East Division, "Basic Data of NE states" <https://www.mha.gov.in/en/commoncontent/north-east-division>.
2. Basumatary Anusriti, Middha Kumar Sushil, Usha Talambedu, Brahma Kumar Birendra and Goyal Kumar Arvind "Bamboo, as Potential Sources of Food Security, Economic Prosperity and Ecological Security in NorthEast India: An Overview" *Research in Plant Biology*, 5(2): 17-23, 2015
3. Action Plan for Promotion of Bamboo in the North Eastern Region, Submitted to Ministry of Development of the North Eastern Region Government of India, North Eastern Development Finance Corporation Ltd, December 2020
4. Nath Arun Jyoti, Das Gitasree, Das Kumar Ashesh "Culm characteristics and population structure of dolu bamboo (*Schizostachyum dullooa* (Gamble) Majumder) in Barak Valley, Northeast India, the need for conservation and implications for management" *BAMBOO SCIENCE & CULTURE The Journal of the American Bamboo Society*, American Bamboo Society Copyright 2007 ISSN 0197– 3789, [http://bamboo.org/publications/e107\\_files/downloads/ABSJournal-vol20.pdf#page=17](http://bamboo.org/publications/e107_files/downloads/ABSJournal-vol20.pdf#page=17)
5. Ranjan M. P, "Katlamaro Chalo, A Design Development Strategy" Centre of Bamboo Initiatives National Institute of Design, Paldi Ahmedabad
6. Bhatt B.P. Singha L.B. Singh K. and Sachan M.S. , "Some Commercial Edible Bamboo Species of North East India: Production, Indigenous Uses, Cost-Benefit and Management Strategies", *Bamboo Science and Culture: The Journal of the American Bamboo Society* 17(1): 4-20, ©Copyright 2003 by the American Bamboo Society
7. Borah Kr Uditya, "Bamboo for Economic Prosperity and Sustainable Development with special reference to North-East India" *International Research Journal of Management Sociology & Humanity ( IRJMSH )* Vol 6 Issue 7 [Year 2015]
8. Upreti T. C. and Sundriyal R. C. in the paper "Bamboo and cane resources of Arunachal Pradesh: Utilization pattern and implications for management, *Bamboo Science and Culture, The Journal of American Bamboo Society* 15(1) : 20-14
9. Singha, K. N. & Timing, L. (2015). Significance of bamboo in Karbi culture; A case study among the Karbi tribes of Assam, India. *International Journal of Advanced Research in biology and biotechnology*, 1(1), 2-9. Website of ESES Bio-Wealth Pvt. Ltd. Retrieved from <http://esesbiowood.com/index.php>
10. Saha Amit and Sonowal Jyoti Pranab (2020). A STUDY ON PROSPECTS AND CHALLENGES OF BAMBOO WOOD PRODUCTS IN ASSAM, *International Journal of Research and Analytical Reviews (IJRAR)*, Vol 7, Issue 4,



11. Sarkar J and Sundriyal, R.C. (2002) Indigenous uses, management and conservation of Bamboo Resource in Arunachal Pradesh, North East-India, *Bamboo Journal* 19:24-39
12. Jamati Samir, Livelihood of the Bamboo base: Challenges and Opportunities, *Proceedings of the 55th International Convention of Society of Wood Science and Technology*, August 27-31, 2012- Beijing, CHINA
13. Baishya Panchalee, Baishya Mrinmoyee, KANCHIOLI , *Journal of Humanities and Social Sciences*, Volume- II, Issue – 1, JANUARY-2022, [https://lgcjournal.in/issue/2/Paper\\_4.pdf](https://lgcjournal.in/issue/2/Paper_4.pdf)
14. Khataniar, Dr Rabinjyoti (2017). Cane and Bamboo Based Industrial Cluster in Assam - Profitability and Vulnerability, *International Journal of Humanities and Social Science*, Volume 6 Issue 11, November. 2017, PP.05-09
15. Baruah Palashi, Prospects and Problems of Bamboo-based Entrepreneurship Development in North-East India, *Entrepreneurship in the New Era*, ISBN: 978-81-946375-8-5
16. Ramnundanga , Ramswamy† Rama, Entrepreneurship Development of Bamboo based Enterprises in Bairabi Cluster, Mizoram, *Mizoram University Journal of Humanities and Social Sciences*, Vol. V, Issue 2 (December 2019)
17. Hazarika P, Dutta B Nibedita., Biswas S.C., Dutta R.C. & Jayaraj, R.S.C. “Status of Agarbatti Industry in India with special reference to Northeast,” *International Journal of Advanced Research in Biological Sciences*, Volume 5, Issue 1- Volume 5, Issue 1.
18. Sinha K. A and. Deb. S, “A study on the status of incense stick making in Tripura, Northeast India”, *Bamboo and Rattan*, Vol. 15, Nos. 1-4, pp. 13-21 (2016)
19. Teron Robindra and Borthakur S. K., “Traditional uses of bamboos among the Karbis, a hill tribe of India”, *Bamboo Science and Culture: The Journal of the American Bamboo Society* 25(1): 1-8, Copyright 2012 by the American Bamboo Society
20. Medhi P, Borthakur S.K. and Hore D.K., “Phytoresources from North Cachar Hills of Assam, India-IV: Bamboos and Rattans”, *J. Bamboo and Rattan*, Vol. 9, Nos. 3&4, pp. 115-125 (2010), KFRI 2010
21. [industry.nagaland.gov.in/development-of-bamboo-cane-woodwork-clusters-under-nertp-north-east-regional-textile-promotion-scheme-government-of-india/](http://industry.nagaland.gov.in/development-of-bamboo-cane-woodwork-clusters-under-nertp-north-east-regional-textile-promotion-scheme-government-of-india/)
22. <http://mzuhssjournal.in/images/resources/v5n2/ramnundanga.pdf>
23. <https://handicrafts.nic.in/CmsUpload/29072016110703ADVERTISEMENT-SEPT-2016.pdf>