CHAPTER IV

BAMBOO BASED INDUSTRY: AN OVERVIEW

4.1 INTRODUCTION

Bamboo based products are produced from thin strips of bamboo. There are a wide variety of such products and they have been closely associated with the development of civilizations in bamboo growing regions of the world for many millennia. The products may be primarily intended for agricultural use, such as baskets for vegetables or animals and winnowing trays for cereals, or they may be household products such as baskets, trays, jars, case, lampshades, fans and mats.

The techniques require considerable skill and experience on the part of the weavers and the designs require innovation on the part of the designers. A bamboo based product unit provides income generation and skills development to those that it employs. Weaving can be done on site or at home in spare time or full time. Increasing the use of local bamboo resources also encourages their sustainable management and benefits the bamboo cultivators.

The production of bamboo based products is a traditional technology that has been practiced for more than a thousand years and is widely distributed. Manufacturing bamboo based products combines traditional weaving skills with modern technology. The majority of the bamboo based industries are grouped as cottage and small-scale enterprise.

There are various bamboo based products including sofa, dining tables, baskets, trays, jars, boxes, cases, vases, folding screen, models of animals and figures, building, furniture, lamps and lanterns, bags, toys, fans and mats. Some are graceful pieces of art for decoration or enjoyment and some of them are
indispensable commodities. The style of the products often varies according to place of production. This natural resource plays a major role in the livelihood of rural people and in rural industry. This green gold is sufficiently cheap and plentiful to meet the vast needs of human populace from the “Child’s cradle to the dead man’s bier”. So, sometimes it is known as “poor man’s timber”\(^1\).

4.2. BAMBOO UTILIZATION

Bamboo is utilized for various purposes depending upon its properties. It plays an important role in the daily life of people for house construction, agricultural tools and implements, as food material and weaponry etc. Besides being a convenient source of cellulose for paper manufacture and rayon, it supports a number of traditional cottage industries. Bamboo based industry is one of the oldest of traditional cottage industries in India. The origin of this rural craft is traced from the beginning of the civilization when men started cultivation of food crops. People started making baskets, mats and many other products of households use with bamboo that was abundantly available in nearby forests. Later, tribal and rural people in the vicinity of bamboo forest took up this as a means of livelihood. Now bamboo based industries are spread in all rural areas of the country and it feeds millions of traditional workers. Bamboo is emerging as a major source of raw material for several processed products primarily due to its fast growth, wide spread occurrence and its multiple uses.

Bamboo has versatile uses as building material, paper pulp resource, scaffolding, food, agriculture implements, fishing rods, weaving material, substitute for rattan, plywood and particleboard manufacture. Pickled or stewed bamboo shoots are regarded as delicacies in many parts of the country\(^2\). The major
user of bamboo in India is paper industry, which consumes sizeable proportion of
the total annual productions. Bamboos are good soil binders owing to their peculiar
clump formation and fibrous root system and hence also play an important role in
soil and water conservation.

Over 1,500 bamboo based products are documented. From A-Z, bamboo
products adorn every letter of the alphabet are listed below:

A - Activated charcoal, acupuncture needles, alarms, alcohol, anchors, antenna
supports, aphrodisiacs, arrows and arrow tips, ashtrays, awnings.

B - Baby carriages, bagpipes, barrels, baskets, beads, beanpoles, beds, boat hoods,
boats, bolts, bookcases, boxes, bracelets, bridges, brooms, buttons.

C - Candlesticks, carts, chairs, chop sticks, clothes racks, colanders, combs,
cooking vessels, chicken coops, couches, cradles, crates, crosses, cups,
curtains.

D - Dams, desks, diesel fuel, dolls, dry cells, dustpans, dykes.

E - Eggcups.

F - Fans, fishnets, fish poles, flag poles, flooring, flowerpots, flutes, fodder, food,
fuel, furniture.

G - Gabions, garments, gates, grain, grain storage, graters, greenhouses, guns,
gutters, gypsy vans.

H - Hairpins, hampers, handles, hats, hay and forage, hedges, helmets, henhouses,
hinges, hoops, hookahs, houseplants, houses.

I - Incense sticks, insect cages, irrigation waterwheels and pipes.

J - Jackets, jars, jewellery, joss sticks.

K - Kiosks, kites.

L - Ladders, ladles, lamps, lampshades, light bulbs, lofts, looms.
M - Mahjong tiles, Matting, mattresses, medicines, musical instruments.

N - Nails, napkin rings, needles, net floats, nets, netsuke.

O - Ornaments, oyster cultivation.

P - Packaging, paper cutters, paper pulp, pegs, pen and pencil holders, pins, pipes, plates, poles.

R - Racks, rafts, raincoats, rakes, rattles rayon, rings, river bank protection, roofing and ropes.

S - Scaffolding, scales, scarecrows, shades, shovels, shuttles for weaving, sieves, sticks, stilts, stools.

T - Tables, tallies, tea houses, tea strainers, tea whisks, tents, tiles, towers, transport.

U - Umbrellas.

V - Valiha (musical instrument).

W - Wagons, walking sticks, walls, water jugs, water storage, wheelbarrow, Wind mills.

X - Xylophones.

Y - Yurts.

Z - Zithers.

The following technical stages are involved in manufacturing woven bamboo products:

- Conception and design of handicrafts.
- Strip and split making.
- Weaving skills.
• Methods of colouring, preservation and protection against pests and relevant facilities.

Bamboo woven articles are made with various widths, thicknesses, lengths and sizes of bamboo splits made from bamboo culms, based on the design of the products. There are two kinds of bamboo splits used for weaving: bamboo threads and bamboo strips. As their names imply, the thickness and width of threads are approximately equal. Strips are much broader than they are thick.

Bamboo is traditionally used in rural areas for weaving products or handicrafts. Manual crosscutting, splitting and slivering of bamboo culms is normally done by men with various tools like knives.

It is possible for people to weave products such as mat and baskets after short–term training. Much more experience and higher levels of skill are required to weave superior quality handicrafts and these can only be learnt from master craftsmen and women.

The tools required for weaving bamboos are strip knives, saws, striking planks, sharp knives, shaving knives and hand drills. These tools can easily be purchased from any tool supplier or can be made by the weavers themselves.

Although cross–cutting, splitting of bamboo culms and making strips and threads can be done manually, machines are normally used to increase productivity, reduce wastage of raw materials, increase the yield of bamboo strips and remove drudgery in the primary processing of the culms. The main machines are crosscutting machine, sliver-making machine, splitting machine and width sizing machine.
The land requirement for setting up the unit is negligibly small and the investment required low. As a micro enterprise it can be established near the resource, and can form a significant part of both monetary and non-monetary economies in bamboo growing regions. However, technical assistance for production, organizing seminars and training courses (management, production and maintenance), conducting relevant research and development are all required to ensure success, especially in the establishment phase.

Manufacturers rarely conduct market surveys to keep abreast of business trends and accepted products. In the export markets, low prices offered for relatively high quality products deter them from entering these markets and so assistance is required to disseminate information on marketing.

Institutional and economic policy support is also required to guide new products into markets, to introduce preferential financial investment policies and to set up networks of technical and information services to train workers.

4.3. BAMBOO ECONOMY

In the oldest sacred book of the Hindus, the Rig Veda, bamboo finds evocative mention, with an invocation for many bamboo clumps to be bestowed upon mankind. From birth to death, the divine grass is a close companion of every Indian, be it the cradle that rocks the baby or the bier on which cremation takes place. Even weddings traditionally take place under the bamboo pole. Bamboo has as many as 1,500 recorded uses from food and housing to a wide range of agricultural and industrial activities, in both rural and urban areas. Bamboo material is highly correlated with our life in every occasion.
Bamboo in India generates 432 million workdays annually. Some 25,000 bamboo based industries provide employment to about 20 million people. Of the 13.47 million tonnes of bamboo consumed, 11.77 million tonnes are used in construction, small and cottage industries, handicrafts, paper production, as wood substitutes and for domestic purposes. About 1.7 million tonnes of bamboo are smuggled out to neighbouring countries. Commercial consumption of bamboo in the world is to the tune of $10 billion (Rs 46,000 crore), which is expected to double by 2015. While the size of the bamboo economy in 2001 was $444 million (Rs 2,043 crore), the market potential is estimated to be $970 million (Rs 4,463 crore) with a projected annual average growth rate of 15-20 per cent. Based on current trends, it is estimated that the bamboo industry in India could grow to $5.6 billion (Rs 26,000 crore) by 2015⁴.

Bamboo can play a significant role in solving many of India’s development problems. Recognizing bamboo’s enormous potential worldwide, there has been an overdrive in R&D activities to find new applications for the plant. Already bamboo is generating energy in some places and acting as a wood substitute in paper and other allied industries. According to estimates, bamboo-based activities could easily generate 8.6 million additional jobs in India and thus enable 5.01 million families to cross the poverty line. Currently there is a mismatch in demand and supply. At present the demand for bamboo is 26.9 million tonnes as against the supply of 13.47 million tonnes. A coordinated action plan could put this skewed equation right, especially given the wide availability of bamboo in India⁵.

Bamboo provides tremendous employment opportunities right from resource generation to resource use, from plantation and harvesting to primary
processing and making end products. In India there are many communities such as the Gonds (population: 8.33 million), Baigas (370,000), Korku (100,000) and Basodes (1.1 million) that are wholly dependent on bamboo for their livelihood. Twenty three million people are involved in the handicraft sector in India, which is the second largest employment generator after agriculture. In the country-two million people work on bamboo-based crafts. Micro enterprises can be set up that make extensive use of bamboo in furniture, handmade paper, handlooms, charcoal, blinds, toothpicks, incense sticks, chopsticks and many more utilitarian products. Supplying corrugated bamboo roofing sheets for 15,000 houses can create employment for 4,000 people for 30,000 human days. A tonne of bamboo creates 350 person days of work in the ‘production by masses’ sector whereas the giant mill sector gives us only 12 human days.

More than two million households in India sustain on bamboo-based handicrafts. The world over, the figure is about eight million. Many of the crafts reflect the mystic relationship of bamboo, people and culture. Indigenous skills revolve around slivering, weaving, stitching, splitting, layering, inserting, winding, stringing, and pinning and create hundreds of beautiful patterns, decorations and useful products. Different geo-climatic regions support over a hundred different species which are shaped into artifacts appropriate for the area. In India, Dendro, Melocanna baccifera, Bambusa tulda, Bambusa vulgaris, Ochlandra travancoria and Dendrocalamus longispathus are commonly used in handicraft. Elsewhere, species such as Phyllostachys pubescens, Ph. bumbusoides, Ph. glauca, Ph. angusta and Ph. Heteroclada are used for making different woven articles.
Except in the nodes, bamboo fibres run straight. A single human hair can pass through the pores between fibres. The traditionally woven baskets are of elliptic, rectangular and octagonal shapes, and of very fine workmanship. Sometimes as many as 120 thin threads can be woven in a width of 3 mm. Artistes bleach and strip the bamboo and then add colour to the handicrafts. Before the invention of paper, sculptured bamboo slips were used for writing and carrying messages. The bamboo culms and roots must be fumigated and thoroughly dried before being sculptured. It should be 3-4 years old and free of insects.

4.4. BAMBOO AND THE ENVIRONMENT

Call it green gold or nature’s band-aid, bamboo is a great protector of the earth’s health and wealth. It is a critical element in maintaining the balance of oxygen and carbon dioxide in the atmosphere. Carbon gets trapped within bamboo forests, thus reducing carbon dioxide gases. It also lowers the intensity of light and protects us from harmful ultra-violet rays. Bamboo exists naturally on every continent except Antarctica. It has found a niche for itself in sea-level tropics and on 13,000 ft mountain slopes. It is a cheap, abundant resource that is recyclable and can outgrow any other plant. A 60-foot tree cut for the market takes 60 years to replace, whereas a 60-foot bamboo takes just 59 days to replace. Bamboo can tolerate diverse soil moisture regimes, can heal degraded land, stop soil erosion and help in drought-proofing. Bamboo foliage acts as a shelter for the top soil against tropical downpours and cloudbursts, while the leaf litter helps in moisture conservation by forming a soft cushion on the soil. Bamboo has an extensive underground root-and-rhizome system that effectively binds the top one foot of soil, critical for soil health. A single bamboo plant can bind up to six cubic metres
of soil. Bamboo forests nurture wildlife. Apart from the endangered panda, the most famous symbol of bamboo forests, many birds, monkey sand boars depend on bamboo shoots. Their very survival depends on this grass.

Bamboo is a good substitute for fossil fuels in the form of charcoal briquettes. Experiments indicate that the charcoal obtained from bamboo is of good quality and can be used in industrial processes after activation. Gasification with bamboo is a process in which a solid fuel is burnt at very high temperatures, between 700°C and 900°C, in the presence of a gasification agent such as air. By this process, the energy present in the biomass is converted into a gaseous combustible, or chemical energy. Gas products are easier to handle. They can be used in combustion engines or gas turbines. The combustion is clean and less polluting.

The produced gas has a calorific value of 25-30 per cent of that of natural gas and is a valuable source of bio energy for a variety of purposes. Bamboo has a number of desirable fuel characteristics such as low ash content and alkali index. The heating value is higher than most agricultural residues, grasses and straw. Besides, bamboo has high biomass productivity and is self regenerating. It can thus provide power on a sustainable and environment-friendly basis. The net calorific value of bamboo is comparable or higher than other wood species like beech, spruce, eucalyptus and poplars and is in the range of 18.3-19.7 MJ/kg.

Bamboo is one of the world’s best engineering material and perhaps the oldest. It is used for making bridges, scaffolding, roads and embankments. Buildings made from bamboo survive earthquakes while concrete structures do not. Its ability to withstand vibrations helps in mitigating disasters. The tensile
strength of bamboo is 28,000 per square inch as against 23,000 per square inch for steel. Its load-bearing capacity is nearly double that of steel. What’s more, bamboo costs just six per cent of the price of steel. Traditional bamboo houses provide shelter to more than 10 billion people worldwide. In Ecuador, the NGO Vivendas Hogarde Cristo provides 70 bamboo houses to the poor every day. In Ghana, a school building using bamboo has been constructed at 40 per cent of the cost of a conventional building.

In the Philippines, weekend retreats make extensive use of bamboo. Rising 12 stories tall, the three pillars of the 1987 Eucharistic Congress Tower were made from 200 poles tied together in a triangular section that tapers to narrow spire. The tower has passed the test of gale-force winds. The United Nations High Commissioner for Refugees (UNHCR) and the International Network for Bamboo and Rattan (INBAR) have designed a bamboo tent that can be used as a temporary shelter for refugees.

4.5. THE GLOBAL SCENARIO

Bamboo is woody grass belonging to the sub-family Bambusodease of the family poaceae. Worldwide there are more than 1,250 species under 75 genera of bamboo, which are unevenly distributed in the various parts of the humid tropical, sub-tropical and temperate regions of the earth.

It is estimated that about 2.5 billion people use bamboo in one form or the other at the global level. The annual turnover is estimated to be more than USD 15 billion and this is estimated to shoot up to USD 20 billion by the 2015. China is the biggest player among the bamboo exporting countries. The total export value of bamboo products of that country is $5.50 billion per annum. Advanced research
activities are conducted to utilize bamboo for efficient fuel generating systems. Networks like the International Network for Bamboo and Rattan (INBAR) are functioning at the international level. The Government of India is a signatory to this bamboo network. At the global level, primary processing and product manufacturing is shifting to a highly mechanized mode\textsuperscript{12}.

### 4.5.1. Trade flows of Bamboo based Products

Trade flows are the buying and selling of goods and services between the countries. This is the amount of goods that one country sells to other countries and the amount of goods that a country buys from the other countries. On the basis of the year 2010 INBAR data, many countries are engaged in foreign trade of bamboo based products, out of it, the countries which is having highest trade flows i.e. top ten exporters and importers of bamboo based products are exhibited in the following table

#### TABLE 4.1

**TOP TEN EXPORTERS AND IMPORTERS OF BAMBOO BASED PRODUCTS DURING 2010**

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Countries</th>
<th>Export (in million US$)</th>
<th>Countries</th>
<th>Import (in million US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>China</td>
<td>1022</td>
<td>European Union</td>
<td>721</td>
</tr>
<tr>
<td>2</td>
<td>Indonesia</td>
<td>485</td>
<td>USA</td>
<td>277</td>
</tr>
<tr>
<td>3</td>
<td>European Union</td>
<td>225</td>
<td>Japan</td>
<td>214</td>
</tr>
<tr>
<td>4</td>
<td>Vietnam</td>
<td>87</td>
<td>China</td>
<td>61</td>
</tr>
<tr>
<td>5</td>
<td>Philippines</td>
<td>33</td>
<td>Singapore</td>
<td>42</td>
</tr>
<tr>
<td>6</td>
<td>USA</td>
<td>25</td>
<td>Yemen</td>
<td>33</td>
</tr>
<tr>
<td>7</td>
<td>Singapore</td>
<td>21</td>
<td>Australia</td>
<td>31</td>
</tr>
<tr>
<td>8</td>
<td>Thailand</td>
<td>19</td>
<td>Korea</td>
<td>29</td>
</tr>
<tr>
<td>9</td>
<td>Hong Kong</td>
<td>9</td>
<td>Switzerland</td>
<td>23</td>
</tr>
<tr>
<td>10</td>
<td>Malaysia</td>
<td>8</td>
<td>Russia</td>
<td>23</td>
</tr>
</tbody>
</table>

Source: INBAR data base
FIGURE 4.1
TOP TEN EXPORTERS OF BAMBOO BASED PRODUCTS DURING 2010

Source: INBAR data base

FIGURE 4.2
TOP TEN IMPORTERS OF BAMBOO BASED PRODUCTS DURING 2010

Source: INBAR data base
We can understand from the above table and chart that China occupies first in the export of bamboo based products by earning 1022 million US$ in the year 2010. Indonesia gets second position by exporting 485 million US$. European union, Vietnam, Philippines, USA, Singapore, Thailand, Honghong and Malaysia are the countries getting succeeding positions. In the import side, the European Union takes up the first place by importing 721 million US$ followed by USA by bringing in 277 million US$ in the year 2010. Japan, China and Singapore get subsequent positions by importing 214 million US$, 61 million US$, and 42 million US$ respectively. Being India having rich resources it did not get any ranks in both the export and import.

4.6. INDIAN SCENARIO

India is the second richest country in terms bamboo genetic diversity with a total of 136 species under 75 genera distributed throughout the length and breadth of the country. North–east India supports about 50 per cent of the total genetic resources which is followed by peninsular India where the Eastern and the Western Ghats are located which accounts for about 23 per cent of the genetic resources occurring naturally. North–Western India, Indo–Gangetic plains and the Andaman & Nicobar Islands account for the remaining diversity. More than 50 per cent of bamboo species occurring in India are endemic, and roughly 19 species are rare and threatened. The ten major species used in India for commercial purposes are Bambusa bamboos, B.balcoa, B. Nutans, B.Tulda, Dendrocalamus strictus, D. Hamiltonii, Melocanna baccifera, Ochlandra ebracteata, O. Scriptoria and O.Travancorica.\(^{13}\)
TABLE 4.2
TOTAL GROWING STOCK OF BAMBOO IN INDIA

<table>
<thead>
<tr>
<th>States / Region</th>
<th>Area (percentage)</th>
<th>Growing Stock (percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>28.00</td>
<td>66.00</td>
</tr>
<tr>
<td>Mizoram</td>
<td>8.45</td>
<td>13.18</td>
</tr>
<tr>
<td>Assam</td>
<td>7.54</td>
<td>16.23</td>
</tr>
<tr>
<td>Arunachal Pradesh</td>
<td>4.21</td>
<td>11.91</td>
</tr>
<tr>
<td>Manipur</td>
<td>3.39</td>
<td>13.88</td>
</tr>
<tr>
<td>Meghalaya</td>
<td>2.89</td>
<td>5.34</td>
</tr>
<tr>
<td>Tripura</td>
<td>0.86</td>
<td>1.04</td>
</tr>
<tr>
<td>Nagaland</td>
<td>0.70</td>
<td>4.43</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>20.30</td>
<td>12.00</td>
</tr>
<tr>
<td>Maharastra</td>
<td>9.90</td>
<td>5.00</td>
</tr>
<tr>
<td>Orissa</td>
<td>8.70</td>
<td>7.00</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>7.40</td>
<td>2.00</td>
</tr>
<tr>
<td>Karnataka</td>
<td>5.50</td>
<td>3.00</td>
</tr>
<tr>
<td>Others</td>
<td>20.20</td>
<td>5.00</td>
</tr>
</tbody>
</table>

Source: National Horticulture Mission, 2012

The collection and evaluation of genetic resources of bamboo started in India in the year 1970s, but the pace of work was rather slow. According to the forest survey of India, Bamboo covers 8.96 Million Hectares of forest area (approx. 12.8 per cent of total forest area). It is found in all parts of India except the cold regions of Jammu and Kashmir. Bamboo is concentrated in the North East region and Central regions of Madhya Pradesh and Chattisgarh. However while the area in North East is 28 per cent of total area under Bamboo and for Madhya Pradesh and Chattisgrah it is also high at 20 per cent, only 12 per cent of the total growing stock is found in these two states while 66 per cent of the growing stock is found in the North East Region. Though India has wide area under bamboo cultivation, the yield per hectare is estimated around 0.4 tones, which is very low in comparison to other countries like China, Malaysia and Costarica.
4.6.1. Consumption Patterns of Bamboos in India

**TABLE 4.3**

CONSUMPTION PATTERNS OF BAMBOO IN INDIA

<table>
<thead>
<tr>
<th>Uses</th>
<th>Percentage Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulp</td>
<td>35</td>
</tr>
<tr>
<td>Housing</td>
<td>20</td>
</tr>
<tr>
<td>Non – residential</td>
<td>5</td>
</tr>
<tr>
<td>Rural uses</td>
<td>20</td>
</tr>
<tr>
<td>Fuel (non – industrial)</td>
<td>8.5</td>
</tr>
<tr>
<td>Packing, including basket</td>
<td>5</td>
</tr>
<tr>
<td>Wood based industries and transport</td>
<td>2.5</td>
</tr>
<tr>
<td>Furniture</td>
<td>1</td>
</tr>
<tr>
<td>Others, including ladders, mats etc.</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: centre for civil society, 2012

Bamboo has an astonishing 1500 documented uses and the number is growing with new research initiative taking place across the world. In the North East, Bamboo is considered the ‘cradle to coffin’ timber due to extensive use in every-day life. Up to 30 day Bamboo shoots are food, between 6 – 9 months; for basketry, between 2 – 3 years: for laminates and boards and between 3 – 6 years for construction.

The consumption of bamboo can be broadly classified as (i) wood substitutes and composites (ii) Industrial use and products (iii) Food products (iv) Construction and structural application. The first category includes goods like Bamboo based panels, flooring and furniture. There are many advantages of Bamboo over wood which have come to light due its rigidity, durability and insulation qualities and in recent years advances in design technology have
mitigated problems like low productivity, varying quality and susceptibility to fungi and insects. The most important industrial applications of bamboo in India are in the paper and pulp mills. However, some other lucrative options include using bamboo as fuel, for producing electricity and bamboo based fiber and fabric.

Bamboo charcoal has gained popularity in international trade because of not only its high renewably but also because of its calorific value and absorption properties comparable to wood charcoal at the same time it is cheaper and easier to produce. The gasification of bamboo which is a clean, cheap and renewable source of energy produce4s charcoal as a byproduct (approximately 15 per cent of the biomass gasified) further this process is independent of the quality, Species, and maturity of bamboo. Apart from these bamboos can also be used in pharmaceuticals, creams, beverages and traditional medicines. Bamboo shoots are the most main item under food products

India is different from other bamboo producing Asian countries because bulk of bamboo consumption is not by artisans but by industries which use bamboo for paper and rayon, scaffolding, and bamboo boards. Subsequently this bias towards industries was not a result of efficient allocation of resources, but a result of government policies.
### 4.6.2. India’s Import and Export of Bamboo Products And Its Composition

**TABLE 4.4**

**COMPOSITION OF EXPORT OF BAMBOO PRODUCTS DURING 2012**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bamboo</td>
<td>5619830</td>
<td>23.22</td>
<td>76085</td>
<td>3.51</td>
</tr>
<tr>
<td>2</td>
<td>Rattan</td>
<td>301250</td>
<td>1.24</td>
<td>40840</td>
<td>1.88</td>
</tr>
<tr>
<td>3</td>
<td>Bamboo shoots</td>
<td>65159</td>
<td>0.27</td>
<td>9424</td>
<td>0.43</td>
</tr>
<tr>
<td>4</td>
<td>Bamboo charcoal</td>
<td>3566</td>
<td>0.015</td>
<td>7950</td>
<td>0.37</td>
</tr>
<tr>
<td>5</td>
<td>Bamboo flooring</td>
<td>782841</td>
<td>3.25</td>
<td>3413</td>
<td>0.16</td>
</tr>
<tr>
<td>6</td>
<td>Bamboo panels</td>
<td>13837002</td>
<td>57.18</td>
<td>79708</td>
<td>3.68</td>
</tr>
<tr>
<td>7</td>
<td>Bamboo mats and screens</td>
<td>786717</td>
<td>3.25</td>
<td>251637</td>
<td>11.61</td>
</tr>
<tr>
<td>8</td>
<td>Rattan mats and screens</td>
<td>34095</td>
<td>0.14</td>
<td>2560</td>
<td>0.11</td>
</tr>
<tr>
<td>9</td>
<td>Bamboo plaits</td>
<td>946755</td>
<td>3.91</td>
<td>11366</td>
<td>0.52</td>
</tr>
<tr>
<td>10</td>
<td>Rattan plaits</td>
<td>4015</td>
<td>0.02</td>
<td>7756</td>
<td>0.35</td>
</tr>
<tr>
<td>11</td>
<td>Bamboo basket</td>
<td>523699</td>
<td>2.16</td>
<td>2427</td>
<td>0.11</td>
</tr>
<tr>
<td>12</td>
<td>Rattan basket</td>
<td>53830</td>
<td>0.22</td>
<td>990</td>
<td>0.05</td>
</tr>
<tr>
<td>13</td>
<td>Bamboo pulp</td>
<td>553885</td>
<td>2.29</td>
<td>1732</td>
<td>0.07</td>
</tr>
<tr>
<td>14</td>
<td>Bamboo paper articles</td>
<td>1975</td>
<td>0.01</td>
<td>714973</td>
<td>33.00</td>
</tr>
<tr>
<td>15</td>
<td>Bamboo seats</td>
<td>41684</td>
<td>0.17</td>
<td>264426</td>
<td>12.20</td>
</tr>
<tr>
<td>16</td>
<td>Bamboo furniture</td>
<td>641185</td>
<td>2.65</td>
<td>691613</td>
<td>31.92</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>24197488</strong></td>
<td><strong>100</strong></td>
<td><strong>2166900</strong></td>
<td><strong>100</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: INBAR data base

Generally, composition of foreign trade means goods that we are exporting to other countries and goods that are imported from foreign countries. After efforts were made to diversify and expand our exports, India’s composition of foreign trade has undergone substantial changes from independence mainly after
globalisation and liberalisation. Therefore, over the years, many new commodities have emerged in our export list. Bamboo based product is one of the commodities in the list which is having more potential for exports. In the above table, on the basis of the year 2012 INBAR data, various bamboo based products imported and exported by India and its values are presented. By analysing the composition of import and export of bamboo based products, the producers can understand which commodities moving higher and opportunities for exports.

The above table shows that India imports different varieties of bamboo based products fewer than sixteen heads. As per the year 2012 INBAR data, out of sixteen products imported for 24,197,488 US$, bamboo panels were imported for 13,837,002 US$, which is 57.18 per cent of total bamboo based products imported. Raw bamboo imported for 5,619,830 US$, which is 23.22 per cent gets the second position. Bamboo plaits, bamboo mats and screens, bamboo flooring, bamboo furniture, bamboo pulp and bamboo baskets are getting succeeding positions of India’s bamboo products import.

India also exported all the above sixteen bamboo based products and received 2,166,900 US$ as foreign exchange. Out of these products bamboo paper articles are exported for 714,973 US$, which is 33 per cent of total bamboo based product export. Bamboo furniture gets the second position in the bamboo product export by earning 691,613 US$, which is 31.92 per cent of total export. Bamboo seats, bamboo mats and screens and bamboo panels are getting the next positions in the bamboo based product export of India.
4.6.3. The Growth of Export of Bamboo Based Products:

The growth of particular industry mainly depends upon the growth of foreign trade of that particular commodity, because trade explores and opens new avenues for a product. If an industry earns more it can earn more profits and grow faster through fetching high prices in the foreign market. The growth of bamboo based industries is ascertained on the basis of the year 2009 to 2012 data.

**TABLE 4.5**

GROWTH OF EXPORT OF BAMBOO BASED PRODUCTS

<table>
<thead>
<tr>
<th>Sl. NO</th>
<th>Year</th>
<th>Export (in US$)</th>
<th>Percentage of growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2009</td>
<td>1050798</td>
<td>------</td>
</tr>
<tr>
<td>2</td>
<td>2010</td>
<td>723507</td>
<td>-31.15</td>
</tr>
<tr>
<td>3</td>
<td>2011</td>
<td>1525806</td>
<td>110.89</td>
</tr>
<tr>
<td>4</td>
<td>2012</td>
<td>2166900</td>
<td>42.02</td>
</tr>
</tbody>
</table>

Source: INBAR data base

**FIGURE 4.3**

GROWTH OF EXPORT OF BAMBOO BASED PRODUCTS

Source: INBAR data base
The above table and chart shows that, in the year 2009 India exported bamboo based products for 1,050,798 US$ and 723,507 US$ in the next year 2010. The amount declined by 31 per cent due to economic slowdown in the different countries in the world. After a strong export promotional measures, India’s bamboo based products grew to 1,525,806 US$ in the year 2011, which is 110 per cent more than the last year. In the year 2012 also, the export increased by 42 per cent and the value has grown up to 2,166,900 US$. When we analyse the growth of bamboo based products, India’s export remarkably increased except the year 2010 and this growth level has not been achieved by the other industries.

It is estimated that India has utilized only a tenth of its bamboo producing potential. The commercial consumption of bamboo globally is worth around $15 billion, India’s share of this global market is very low while China’s share is currently the highest at $5 billion.

It is estimated that 8 million bamboo artisans are dependent on this craft for their livelihood. By and large, this is a totally unorganized sector and has always been considered from the craft point of view and if considered otherwise, for pulp making only. The livelihood support provided by bamboo to the rural poor and the agricultural sector was overlooked.

Bamboo craft has been practiced by the North Eastern States for centuries as their prime livelihood and income source and, in the process, the weaving skill of the artisans had involved to levels comparable with the craft persons from skilled societies like Japan, China though the product diversity still remains undeveloped.
As the industry attractiveness matrix is provided by the planning commission the prospects for not only the large but also small scale enterprises are bright. Further, as many as seven industries are in a stage of high readiness to accept bamboo products, due to developed markets and processes which would mean profits will accrue to them immediately. Most of these industries also require primary processing to be done by the growers, thus making them an integral part of the value added supply chain.

All bamboo based wood substitutes have extremely high viability with Internal Rate of Return (IRR) varying from 27 -30 per cent (depending upon scale of manufacturing and cost of raw material) replacing wood based panels and hard wood with bamboo mat boards/ flattened bamboo boards and flooring tiles, is now a fairly well documented, demonstrated and commercialized technology. The bamboo based plywood is fairly competitive in its pricing and removal of bottlenecks on the supply side will only create further downward pressure on the prices.

**4.7. Bamboo Based Industries in Tamil Nadu:**

In Tamil Nadu bamboo based industry, being one of the traditional industry, the people of all the districts are engaged in bamboo and cane based furniture making industry. These industries are more distributed in Nagapattinam, Vellore, Kanchipuram and Tirunelveli districts. The industry mainly targets the rural people with the provision of employment and consumption of bamboo based products. Weaving can be done as an additional activity during spare time or outside the cropping season and thus the farmers can maximize their productivity. Bamboo weaving is a traditional labour intensive industry. Although the weaving
of handicrafts involves high levels of skills and creativity on the part of the weavers, in general, the technology for making commodities such as mat and baskets, is not so intricate such that unskilled workers and those with lower levels of education require only short periods of training before they are competent in it. Bamboo weaving can be done in a much decentralized manner and is easily done by homebound women and those that are unable to do manual labour. The unit like bamboo industries may be established on a small scale as private household businesses. Therefore, bamboo based industries generates employment, especially for women and other disadvantaged groups, ensures better income distribution, and earns valuable foreign exchange through exports. The development of bamboo based industries will not only generate income for both men and women, but also will create more economic activities and benefit the growth of the rural economy in bamboo growing regions and countries. Bamboo based products, particularly bamboo based handicrafts, have high value addition and their production does not damage the climate or environment.

In addition, manufacturing bamboo based products consumes a large quantity of bamboo materials that lead to more income activities based on bamboo forestry, which promotes cultivation and management of bamboo stands and generates incomes to farmers. Additionally, bamboos can be intercropped with food crops and thus enhance the food security of the growers.

4.8. INSTITUTIONS PROMOTING BAMBOO BASED INDUSTRIES

4.8.1 International Network for Bamboo and Rattan

The international network for bamboo rattan (INBAR) is an intergovernmental international organisation established by a treaty deposited with the United
Nations. It was founded by nine states in November 1997 with a mission pillared by environmental conservation, poverty alleviation and industrial promotion through bamboo and rattan products. Membership in INBAR is open to all which are members of the United Nations or of its specialised agencies and organisations constituted by sovereign states accepting the mission and purposes of INBAR. It is dedicated to improving the livelihoods of the poor producers and users of bamboo and rattan, within the context of a natural environment.

- INBAR connects a global network of partners from the government, private and non-profit sectors in over 50 countries.
- INBAR promotes sustainable development with bamboo and rattan by consolidating, coordinating and supporting strategic and adaptive research and development.

The missions of INBAR are

- The mission of the INBAR is to improve the well being of producers and users of bamboo and rattan while maintaining a sustainable resource base by supporting innovative research and development.
- After more than 15 years of successful operations, the INBAR is now widely recognized as the premier source of expertise on bamboo and rattan. This work will continue to attain its objectives.
- INBAR aims to have further improved the lives of the people who live with bamboo and rattan and to have produced a broad portfolio of tested solutions to development challenges.
As INBAR strives to contribute to the UN millennium goals. It aims to promote these solutions among researchers, policy makers and private sectors and encourage them to invest in bamboo and rattan.

4.8.2 National Bamboo Mission

With a view to harness the potential of bamboo crop in the country through a multidisciplinary approach, the Planning Commission brought out a report titled National Mission on Bamboo Technology and Trade Development (NMBTTD) in 2001-02. The report brings out the country's future potential in bamboo development for the next two decades. Subsequent to this, a detailed project report for setting up a National Bamboo Mission was prepared.

The National Bamboo Mission will be a centrally sponsored scheme in which the contribution of the Central Government will be 100 per cent. The Scheme shall be implemented by the Division of Horticulture under the Department of Agriculture and Cooperation in the Ministry of Agriculture, New Delhi.

The main objectives of the Mission are:

- To promote holistic growth of the bamboo sector through area based regionally differentiated strategies;
- To increase the coverage of area under bamboo both in forest and non-forest areas; with appropriate varieties to enhance yields;
- To promote marketing of bamboo based handicrafts.
- To establish convergence and synergy among stakeholders for the development of bamboo based sectors
• To promote, develop and disseminate technologies through a seamless brand of Traditional wisdom and modern scientific knowledge.

• To generate employment opportunities for skilled and unskilled persons, especially unemployed youths

To achieve the above objectives, the Mission would adopt the following strategies:

• Adopt a specific approach covering production and marketing to assure appropriate returns to growers/producers;

• Promotion of Research and Development (R&D) of technologies for production.

• Enhanced acreage (in forest and non-forest areas) and productivity;

• Adopt a coordinated approach and promote partnership, convergence and synergy among R&D marketing agencies in public as well as private sectors, at all levels;

• Promote cooperatives and self-help groups to ensure support and adequate returns to farmers;

• Facilitation of capacity-building and Human Resource Development;

• Setting up of National, State and sub-State level structures, keeping in view the need for getting adequate returns for the produce of the farmers and eliminating middlemen to the extent possible

4.8.3. Bamboo Technical Support Group (BTSG)

The National Bamboo Mission will cater to a new and emerging area of development and the role of Experts will be central to the management of the Mission. The BTSG will be housed at the National/Regional level institutions
located in different regions, which will have flexible norms for recruiting professionals on contract. Service providers could also be engaged for giving the technical services in accordance with the terms of reference laid for the purpose and approved by National Steering Committee. The BTSG would comprise personnel at different levels, who will provide the technical services and their honorarium will be fixed on the basis of qualification, experience and last pay drawn, if retired from Government. Fresh graduates having knowledge in horticulture/forestry, computer professionals, MBA graduates, young professionals could also be a part of the BTSG.

The role and functions of BTSG are

(a) To visit the concerned states frequently to provide guidance in policy, organizational and technical matters

(b) To compile materials for the conduct of regional workshops in respect of bamboo plantations, handicraft, bamboo marketing and exports

(c) To conduct studies on different aspects of bamboo

(d) To assist the states in capacity building programmes

(e) Undertake publicity campaigns to promote the Mission objectives

(f) To document and disseminate case studies of success stories

(g) To conduct special Training Programmes at the Regional Level

(h) To network with various stakeholders and Institutes/ Organizations/ Agencies, both in India and abroad

Functions regarding handicrafts, bamboo marketing and exports are

The purpose of this component is to provide and increase employment opportunities, preservation and introduction of new designs and
mechanization of bamboo-based crafts as living heritage and to assist in marketing these products. The main objectives of this component are:

- Introduction of grading systems of round and primary processed bamboo
- Introduction of preservative methods (both conventional and chemical) according to use.
- Conversion of niche bamboo handicrafts products to mass products.
- Introduction of utility handicrafts through industrialized means.
- Setting up of bamboo wholesale and retail markets near villages.
- Marketing through Bamboo Festivals, Melas, Expos, Craft Bazaars, bamboo markets and introduction of an effective Electronic Information Flow system.

4.9. CONCLUSION

This chapter gives a clear picture about the status of bamboo based industries in India and other countries. This material is one of the alternative to consumption and environmental friendly goods. It provides employment and enhances the market economy. With the help of government and NGO’s this sector may gain more in terms of more exports earn foreign exchanges, effective function of theory of location and relevant areas in the field of working economies.
END NOTES


