

# **BAMBOO FOR PLANET, PEOPLE & PROFITS**

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## **0.0 Abstract**

Bamboo, known as a giant grass, sustains extremes of drought and drowning, generates more oxygen and sequesters more CO<sub>2</sub> than trees, is considered a critical element in the balance between oxygen and carbon dioxide in the atmosphere. Bamboo is well placed to address 4 major global Challenges i.e. Food, Shelter, livelihood & ecology.

Bamboo can be used for almost every purpose and can touch the life of every person on this planet. Till now almost 1500 applications/ products of bamboo have been identified across the globe. People from every walk of life are associated with Bamboo right from farmer, Industry, designers, craftsmen, healers, consumers etc.

Bamboo is one of the most versatile material to be used in many forms right from food, fabrics, construction material, medicine, handicrafts, utilities etc. Presently it is being looked after as a very promising raw material to feed many industries like Bamboo Timber to make furniture & other house hold items like flooring, blinds etc. Bamboo fibre to make clothing & furnishing fabrics, towels etc. As fuel to feed the boiler in power plants as bamboo dust, pallets, charcoal etc. Bamboo ethanol is being used as good substitute of motor spirit to run our vehicles.

In nutshell, Bamboo has capacity to touch almost every human being as well as every industry in one or other form and can take care of 3 Ps i.e. Planet, People and profits. So, maximize the use of bamboo for sustainable today and flourishing tomorrow.

## **01.0 Introduction**

Bamboo is one of those providential developments in Nature which, like the horse, the cow, wheat and cotton, have been indirectly responsible for man's own evolution. It's name originated from the Malay word "Mambu", Dutch named it "Bamboes" after which it got its Neo-Latin name "Bambusa", then in English it became "Bamboo"

Bamboo, also known as a giant grass, is inherently, a Nature grown pipe and is the fastest growing plant in the world. A few species of bamboo grow as fast as 47.6 inches in a period of 24-hours. There are over a thousand species all over the planet that are native to every continent except Europe, North America and the poles. It sustains extremes of drought and drowning, generates more oxygen than trees and is considered a critical element in the balance between oxygen and

carbon dioxide in the atmosphere.

## 02.0. Planet

Our home planet, Earth, is a world unlike any other planet. Earth is the only place in the known universe confirmed to host life. With a radius of 3,959 miles, Earth is the fifth largest planet in our solar system, and it's the only one known for sure to have liquid water on its surface.

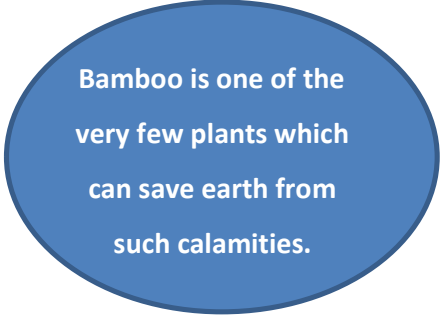
But the most intelligent creation of nature called human beings have left no stone unturned to spoil this beautiful planet and making it non-conducive for the survival of entire flora fauna and living creatures. Many species have become extinct and few are at the verge of extinction. Scientists confirm that if the man kind continues with the practices, it has been doing for last century, there will be no water on earth and so it will also become like other planets means not suitable for human life.

### 02.01. Resilience of Bamboo

**Resilience** means the capacity of a material to recover quickly to its usual shape after difficult situations like bending, stretching or pressing, the amount of potential energy stored in an elastic material when deformed and the ability to recover strength, spirits, good humor, etc.

Bamboo is flexible, bend with the wind but never breaks, **capable of adapting to any circumstance**. Like a judo player, take everything in stride with grace, putting forth energy when it is needed, yet always staying calm inwardly. Due to this property bamboo survives in extreme conditions like drought, floods, earth quakes etc.

An **extraordinary example of bamboo's resilience** is the fact that it was the only plant to survive the radiation of the atomic bombings in Hiroshima, Japan in 1945.



Bamboo is one of the very few plants which can save earth from such calamities.

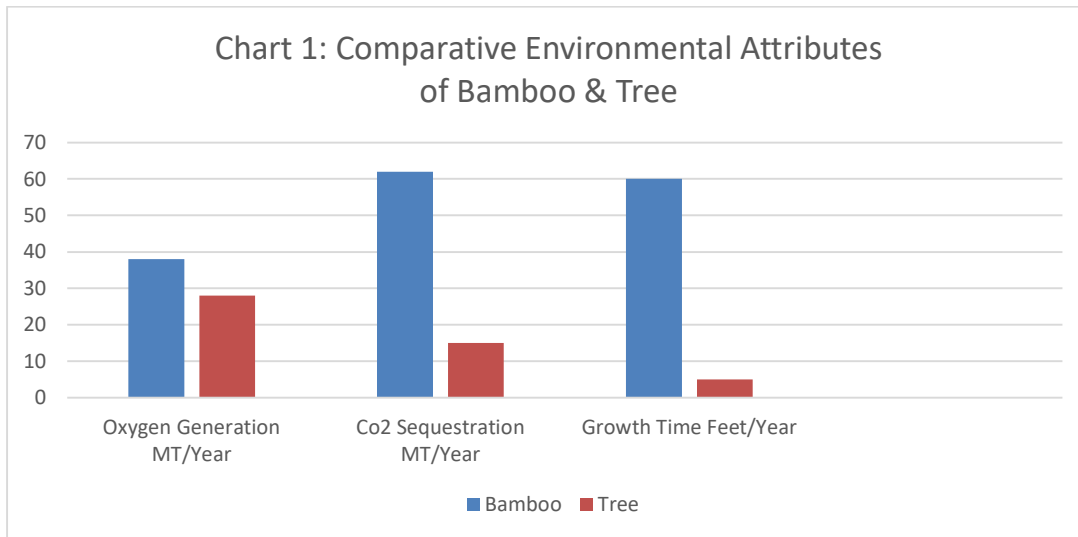
### 02.02. The Eco Healer

**02.02.01. Oxygen Generation:** Bamboo is the most oxygen generating plant. It emits oxygen round the clock and generates up to 35% more oxygen than equivalent stand of trees.

**02.02.02. Co2 Sequestration:** Bamboo minimizes CO<sub>2</sub> gases. 1 hectare of bamboo sequesters 62 tons of CO<sub>2</sub>/year whereas 1 hectare of young forest sequesters 15 tons of CO<sub>2</sub>/year

**02.02.03. Growth:** A sixty-foot tree cut for market takes 60 years to replace. A sixty-foot bamboo cut for market takes 60 days to replace.

**02.02.04. Friend of Soil:** Bamboo stops soil erosion, improves water table below ground and acts as soil nutrient.



### 03.00. People

Bamboo is a boon of nature for mankind. It is associated with human civilization from time immemorial fulfilling all human needs, particularly in East and South East Asian region. It is a plant which is considered as holy as Tulsi and revered as God and teacher. It is used for shelter, food, medicine, furniture, weapon for hunting and protection from enemies, utensils for cooking and eating, musical instruments for entertainment etc.

In Indian scriptures Rig Veda has a mention about bamboo, it is called as ‘Divine grass’. In Chinese culture, bamboo is considered as friend of the people symbolizing gentleness, modesty and serenity. For centuries, bamboo is being considered as indispensable part of cultural, traditional, spiritual and economic requirements in Asian regions.

### 03.01. Bamboo is Essential

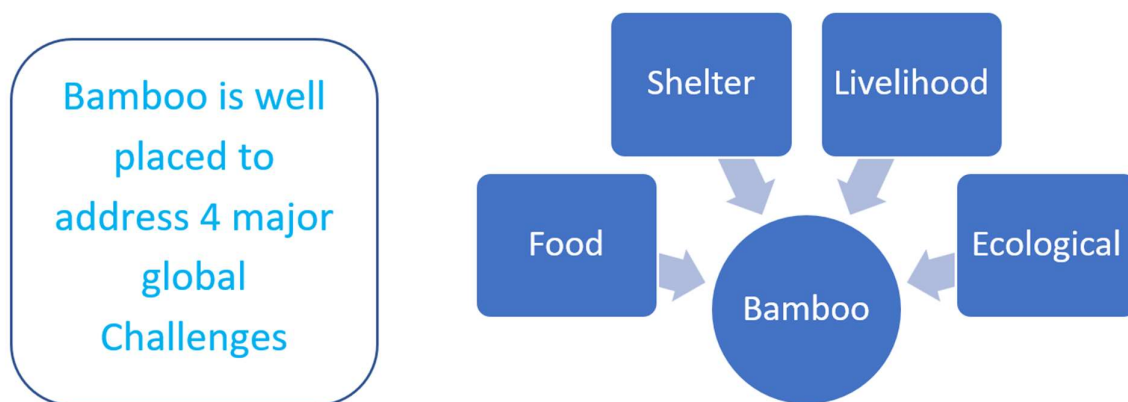


Figure 1: Bamboo & Global Challenges

- i. **Shelter Security**, through the provision of safe, secure, durable and affordable housing and community buildings
- ii. **Livelihood Security**, through generation of employment in planting primary and secondary processing, construction, craft and the manufacturing of the value-added products

- iii. **Ecological Security**, by conservation of forest through timber substitution, as an efficient carbon sink and as an alternative to non-biodegradable and high embodied energy materials such as plastics and metals.
- iv. **Food Security**, through bamboo based agro-forestry systems, by maintaining the fertility of adjoining agricultural lands and as a direct food source i.e. bamboo rice and bamboo shoots.

### 03.02. Bamboo Stake Holders

This wonder grass can be used for almost every purpose and can touch the life of every person on this planet in whatever way or form. Till now almost 1500 applications/ products of bamboo have been identified across the globe. Diagram below shows different categories of people using bamboo in a different way and making a value addition to the society at large.



Figure 2: Bamboo Stake Holders

**03.02.01. Farmer** is the first person in value chain of Bamboo. He is the person who should be honoured for growing this wonder grass and making the planet a better place to live. There is misnomer that growing bamboo is not economically viable but after detailed study it is found that land utilised for bamboo plantation gives more returns over a period of 10 years as compared to any other crop. It is true that in the initial 3 years the returns are less but 4<sup>th</sup> year onwards it can fetch good returns. Income from bamboo plantation after 4<sup>th</sup> year is a continuous one till approximately 40 years (flowering stage) irrespective of the weather conditions. No such crop has this kind of potential. Bamboo plant does not require any care after 2<sup>nd</sup> year. So, it is a perfect crop for farmers to devote at least 10% – 20% of their land to get assured returns in long term.

**03.02.02. Craft men** are the people who earn their livelihood from bamboo and engaged in this craft from generations. The credit of keeping bamboo craft alive and visible goes to these people.

**03.02.03. Artists** from various streams take inspiration from bamboo. Painters portray the beauty of bamboo through their art. Musicians use bamboo instruments mainly flute and percussion instruments to create beautiful symphony and enthrall the audience.

**03.02.04. Healers** use all elements of the bamboo plant to cure various ailments including dreaded diseases. Ayurveda, the ancient Indian system of medicine has a reference of using bamboo in health tonic Chyavanprash around 10000 years ago. Bamboo and its products such as

Banslochan, Tabasheer and Sitopaladi Churna are recommended for treatment of heart ailments, asthma, cough and other debilitating diseases. Since ancient times, Banslochan is being used as a cooling tonic.

Apart from being used as medicine, Bamboo and its parts like rhizomes, culms and bark shavings, resin, shoots, leaves, and seeds have clinical applications. These are rich in nutrients, health promoting bioactive compounds like phenols, phytosterols, dietary fibres, vitamins (vitamin A, vitamin B1, vitamin B3, vitamin B6, vitamin C, vitamin E), amino acids, and minerals etc.

**03.02.05. Designers** have been using bamboo as a most versatile material for fulfilling their requirements. May it be construction, interiors, furniture, utensils, jewellery, toys or any other utility product to meet the general or specific requirements, bamboo is considered as the first choice of designers from ancient times to contemporary times.

In present days even fashion designers have also started playing with bamboo fabrics for creating their designer outfits.

**03.02.06. Industry** is one of the major consumers of bamboo. From ancient times bamboo was mostly used to make paper. Apart from paper now bamboo is being used as raw material for many industries like Bamboo wood composite to substitute hard wood, bamboo mat board as substitute of plywood and laminates, ethanol an alternative fuel for vehicles, as fuel for power generation to substitute coal and other fossil fuels, bamboo fabric etc.

These technological developments are expected to generate more demand of bamboo which in turn will lead to more plantation and more eco-healing of Earth.

**03.02.07. Consumer** is the guiding force which governs the entire market activity through his decisive pursuits and is said to be the King of the market. He is the last link in the value chain of bamboo. Ultimately all the products and services provided by entire value chain are consumed by him. The awareness about bamboo is constantly rising which is providing larger market for bamboo products resulting into more plantation and ultimately healthy people & happy planet.

#### **04.00. Profits**

Profit is a term that often describes **the financial gain a business receives when revenue surpasses costs and expenses**. For example, a child at a lemonade stand spends Rs.2.00 (two rupees) to create one cup of lemonade. She then sells the drink for Rs.5.00. Her profit on the cup of lemonade amounts to Rs.3.00 (Rupees Three). It not only indicates the monetary value but includes non-monetary benefits too.

Every transaction in the business world is done with an intent of earning profit either in short run or long run and monetary or non-monetary. Bamboo being a plant with multifaceted usages having multiple benefits can be considered as a profitable preposition for all the links involved in its value chain. But still, some of the attributes of bamboo make it more profitable than any other crop. There are many industries using bamboo as raw material, some industries have an edge over the others due to technology and marketing dividend. Few medium and largescale

industries pertaining to bamboo sector are mentioned here in 04.02

#### 4.01. Bamboo as Zero waste material:

Like sugar cane, every part of bamboo plant is usable and giving some value. A case study of a bamboo processing unit engaged in the manufacturing of value-added building components reveals this fact. Bamboo is procured from farm, trash is converted into biomass pellets, bamboo is cut as per size, remaining piece of whole bamboo can be used for making any smaller item like rings, pen stands, other handicraft etc. Later in the process of knot removal and de-skinning, lot of bamboo dust is generated, it can be sold for fuel to rural masses or some nearby power plants. After making of components, small left over cut pieces can be converted into charcoal and activated carbon. So, no part of bamboo is unusable. Same kind of waste utilisation can be applied in all the medium and large industries using bamboo as raw material. “Concept Note on Opportunities and Challenges in India” issued by Government of India has also stressed on waste utilisation of Bamboo sector. Diagram below explains this cycle:

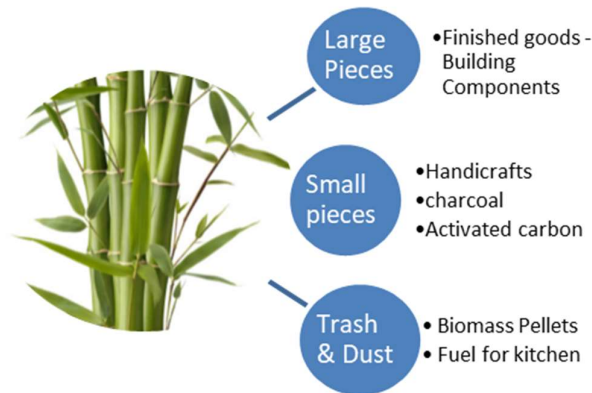


Figure 3: Uses of Various parts of Bamboo

#### 04.02. Bamboo Industries

New age bamboo-based industries which exist and have a huge potential in the domestic and global markets as mentioned in “Concept Note on Opportunities and Challenges in India” are summarised as follows:

**04.02.01. Engineered Bamboo** was first developed in India in 2016, at the Indian Plywood Industries Research and Training Institute (IPIRTI) Bangalore. The Central Building Research Institute in Roorkee has also tested engineered bamboo for strength and longevity and found its potential to be promising. This has been beneficial to India’s booming construction industry that is widely dependent on teakwood and which has also needed to import timber to meet its demands. This bamboo lumber is about 25% economical than the teak wood. This holds tremendous promise for bamboo in India’s construction sector which is experiencing a boom with a CAGR of 15.7 percent, it is expected to reach USD 738.5 Bn by 2022.

Bamboo Mat Board is a plywood-like wooden board made from layers of woven bamboo mats that have been pressed together. Like plywood its thickness varies from 3 mm to 24 mm. This is resistant to pest attack, extreme climatic conditions, and fire, and is as durable and stable as wood-based plywood. It can be used in panelling, ceilings, prefabricated shelters, packing cases and storage bins, roofs, doors, and door panels, furniture, and household utensils such as trays and

plates. BMB is also used in concrete formwork.

#### **04.02.02. Bamboo Charcoal & Activated Carbon**

Bamboo charcoal has widespread use in reducing indoor pollution, purifying drinking water, adjusting humidity, promoting metabolism and food circulation, in air filters, mattresses, and pillows as a deodorizer, and for certain industrial purification uses. A more environment friendly fuel, bamboo charcoal has traditionally also been used as a substitute for wood charcoal and mineral coal.

Technological developments and the push towards a cleaner and renewable fuels are enhancing the popularity of bamboo charcoal. Charcoal briquettes compressed from biomass materials produce less ash and reduce greenhouse gas emissions. The global charcoal market, valued at USD 5.88 Bn in 2018, is projected to surpass USD 6.57 Bn by 2024, growing at a CAGR of 1.9 percent between 2019 and 2024.

#### **04.02.03. Bamboo Ethanol**

There is an urgency to produce more renewable energy, to replace fossil fuels, especially in a developing country like India where the energy demand is rapidly growing and it has been a challenge for the government to cater to the huge energy demand for an ever-increasing population. In recent years, stress has been given on replacing fossil fuels with renewable resources and one of the major thrust areas has been to replace petrol gasoline with ethanol produced from biomass. The global biofuels market size is expected to be at USD 44.6 Bn by 2021 at a CAGR of 44 percent.

#### **04.02.04. Bamboo Sticks**

Stick making is another industry which has ever increasing demand. This includes sticks for incense, blinds, skewers etc. Though it is a small scale industry, it employs 20 lakh people of the country. This product is being exported worldwide and it fetched a revenue of Rs.1000 crores in the year 2018-19. India's Agarbatti Export Industry has shown an upward spike at a Compound Annual Growth Rate (CAGR) of 15%.

#### **04.02.05. Bamboo Furniture**

India is one of the largest economies in the world that has experienced remarkable development in recent years. According to CSIL, India is the 4<sup>th</sup> largest furniture-consuming country and the 5<sup>th</sup> largest furniture producer at a global level. The Indian domestic furniture market is expected to expand at a CAGR of 12.91% during 2020- 24.

With these industries on the fore front and good prospects, it can be said that Bamboo has a potential which can be converted into profits.

### **05.00. Assimilation**

Bamboo has a vital role to play in the present times of global warming, climate change, forest depletion, deserts expansion, diseases, earthquakes, worldwide housing scarcity and dwindling food & fossil fuel supplies. These complex and multi-dimensional problems have no apparent solution but amazingly, a humble bamboo plant can make a dramatic positive impact – socially,

environmentally and economically.

Hence, bamboo is truly a wonder plant as it is called in Rig Veda, a divine grass. So maximise the use of bamboo for sustainable today and flourishing tomorrow for People Planet and Profits.

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