



Bamboo

Researched by Bethany Albert



<http://agreenhorizon.com/category/45210465721/1/Kitchen.htm>

Introduction

Bamboo is a certain type of grass that grows very rapidly. There are many different types of bamboo that vary in size and root structure, but specific species of bamboo are extremely useful as a construction material. It is strong, lighter than steel, and consumes little energy to produce. As a building material, it is fire resistant and earthquake resistant. It is also useful as animal fodder and human consumption.

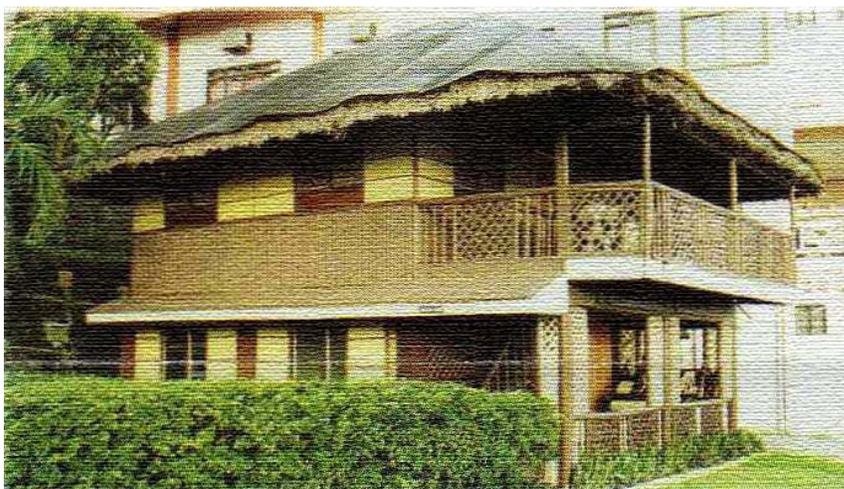
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Strength

Bamboo is well known for its long-lasting sturdiness and resilience. Ounce for ounce, bamboo is stronger than wood, concrete, and bricks (Roach 92). It is so strong that a “short, straight column of bamboo with a top surface area of 10 square centimeters could support an 11,000-pound elephant” (Roach 92).

It is estimated that over a billion people live in some form of bamboo housing (INBAR 2010). Its strength makes bamboo an ideal building material, but experts that have been researching bamboo in the last few decades say that even though it is known to be strong, it hasn't really been measured how exactly how strong until recently; as a consequence, there is no formal grading system or standard that would encourage builders to use it for large scale housing projects (Roach 92). The flexibility of bamboo is ideal as a building material in earthquake prone locations. For an instruction manual on how to build a bamboo house, please look for the document “Manual on Building Bamboo Houses” under the appropriate technology tab of <http://blog.agriculture.ph/wp-content/uploads/2008/10/wonder-island-bamboo-house.jpg> the Sustainable Village Library.



Efficiency



- It can take three weeks to build a house and the house can last for fifty years (Power 2004).
- Its versatility and ease to use as a building material makes for efficient construction that requires few workers or equipment. In China, thirty foot long bridges that can hold eight tons of traffic are being made in a week's time using only eight workers and no heavy construction equipment (Mankin 2007).
- Bamboo is more practical than other building materials because it can grow up to three feet in a day, and can be harvested every year, unlike trees which can only be harvested.
- Harvesting itself is easier for bamboo than for trees because all that is needed is a machete or hacksaw and no sawmill is required to process it (Roach 92).

Eco-Friendliness

- The energy required to produce bamboo is about half of that necessary for wood, one eighth the energy necessary for using concrete in the same capacity, and only one fiftieth of that needed for steel.
- Bamboo absorbs four times as much carbon dioxide from the environment as trees do (McCoy 2009).
- Bamboo can produce more housing while using less land than timber. Only 70 hectares of a bamboo plantation can provide enough material to build 1000 houses per hear. In contrast, it would require the destruction of 600 hectares of natural forest for the same result. (INBAR 2010).

As Food

Bamboo is not recommended for its nutritional value. Still, the tender shoots of bamboo have long been used in Southeast Asian cooking. They can be sliced, canned, or pickled, among other preparation methods, and are generally used as an added ingredient in many dishes. Pulverized bamboo skin includes antioxidants that make it useful as a natural food preservative (EBF 2010).

Bamboo in Belize

Guadua Bamboo. "Bamboo Species of Belize"
<http://www.guaduabamboo.com/bamboo-species-of-belize.html>

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Bamboo in Ghana

The Bamboo and Rattan Network of Ghana (BARNET)

<http://www.inbar.int/livelihood/Partners%20-%20BARADEP.htm>

“The Bamboo and Rattan Network of Ghana (BARNET) is the key NGO dealing with bamboo and rattan in Ghana. BARNET draws its members from the business, academia, forestry and development sectors in Ghana and focuses on implementing projects to promote the use of bamboo and rattan for environmental amelioration and for income generation. BARNET also offers policy advice, training and skills development, natural resource management expertise, and awareness raising.”

“The main objectives of the program are:

1. To promote bamboo and rattan resources as an alternative to timber in Ghana and thus reduce the pressure on the natural timber forest.
2. To ensure sustainable management of the country's bamboo and rattan resources
3. To facilitate the setting up of bamboo and rattan nurseries and plantations
4. To facilitate research into bamboo and rattan
5. To build capacity in terms of human and other resources
6. To engage the rural communities in income generating activities with bamboo and rattan as a means of reducing poverty in the communities.

Activities:

1. Awareness Creation - Since its inception in December 2001, BARADEP has organized a series of sensitization workshops for all regions of the country except the three northern regions. The effect of these workshops is characterized by a number of calls and visits to the office for inquiries on one aspect of the other on the bamboo and rattan industry
2. Training Workshops - A number of training workshops on the management of bamboo natural stands, propagation and harvesting of bamboo has been held in various localities for members of the communities. Staffs of Forestry Services Division (FSD) and the Department of Parks and Gardens have also been given training in these aspects to equip them to be trainers in the various districts in which they are located. The head of the Botany Department of the University of Ghana and some of his staff have also benefited from these training workshops. They plan to inculcate the study of bamboo into their syllabus possible from this academic year.
3. Housing Workshop: BARADEP collaborated with the International Network for Bamboo and Rattan (INBAR) in organizing a bamboo-housing workshop in Fumesua in the Ashanti Region. A three-classroom block was constructed with bamboo as part of activities for the workshop. INBAR intends to donate the building to the community before the end of the year.

4. Capacity Building: The above-mentioned activities have built-up some human resources in the country for the bamboo industry. The topics were new to most of the participants to the workshops, and feedback shows that a lot had been learnt, some of which is now being put into practice.
5. Nurseries: The country was presented with 18 new improved bamboo species in April 2003 via OIC International. BARADEP is funding the care of these seedlings in the BARNET nursery until the plants are matured and multiplied for distribution to various agencies interested in bamboo plantation like, the Universities, Forest Research Institute of Ghana (FORIG) and FSD.
6. Donor Proposal: A consultant was tasked to write a donor proposal for the funding for the programme. The work has been completed and distributed to donor agencies by the Ministry. We are awaiting a response.

Funding:

The main source of funding for the programme at present is the Government of Ghana.

Relationships and Partnerships:

BARADEP has good working relationships with organizations like, INBAR, BARNET, CARE International, OIC International and a range of private individuals. OIC International for instance was instrumental in the presentation of 18 new improved bamboo species by one Prof. Bezona on behalf of the Tropical Agriculture University in Hawaii.

Projections for the future:

- *Acceptability of Products*

Since this whole concept is new to the people of Ghana, there is still much more to do in making the populace accept bamboo and rattan products as substitutes for wood products. The products that have come out from some of our factories are very beautiful and comparable to any wood product but have not achieved the level of acceptability desired.

- *Training*

There is the need for more people to be trained in the cultivation and processing of bamboo.

- *Research*

UNIDO engaged the services of some scientists to make some studies in the market potentials and the processing of our bamboo for flooring and other industrial products. The market potentials is great but there is still the need to research into various aspects of bamboo and rattan before we can be comfortable to use these two resources as substitute for timber. Our bamboo was sent to for processing and the feedback was not too good. With some initiatives that have started here by some firms like, Kumasi Logging and Lumber, Masterpiece Bamboo Ltd., it has been realized that our bamboo is usable but not with the Chinese machines. Our bamboos are harder than what they have so it is difficult to process our bamboo in their factories.

The machines produced locally, are doing the job with ease, thus the need to do some more research on our type of bamboo.

- Nursery and Plantation Development

For the industry to thrive, there is the need for the raw materials. The bamboo in the country presently has not been managed so most of them in the stands are of no economic value. There is the need therefore to facilitate the establishment of more nurseries and encourage the establishment of plantations. That will be the main focus of the programme in the coming years as we also encourage the establishment of processing plants.”

Bamboo in India

National Bamboo Mission.

Dr. Gorakh Singh, Horticulture Commissioner/Mission Director
(National Bamboo Mission)

Dept. of Agriculture & Cooperation
Ministry of Agriculture, Govt. of India
Krishi Bhawan, New Delhi-110001
Ph.No: 011-23381012
Website: <http://dacnet.nic.in/nbm/>

- Mission: To promote the growth of the bamboo sector through as an area based regionally differentiated strategy, to increase the coverage of area under bamboo in potential areas, with improved varieties to enhance yields, to promote, develop and disseminate technologies through a seamless blend of traditional wisdom and modern scientific knowledge, and to generate employment opportunities for skilled and unskilled persons, especially unemployed youths.

National Mission on Bamboo Applications (NMBA)

<http://www.bambootech.org/subsubTOP.asp?subsubid=173&subid=13&sname=MISSION&subname=NMBA>

- The National Mission on Bamboo Applications has been tasked with creating the basis for enlarging the bamboo sector, and with supporting the efforts of the Government of India towards augmenting economic opportunity, income and employment.

Rawat, J. K. (*Forest Research Institute*) and D. C. Khanduri (*India, Ministry of Environment & Forests India*). “The Status of Bamboo and Rattan in India.”

Bamboo in Kenya

Articles:

Alex Carrere “Materials: Bamboo in Kenya.”

Brown University 2008

<https://wiki.brown.edu/confluence/display/kenya/Materials+++Bamboo+in+Kenya>

“I did some research on the availability of bamboo in Kenya and found some interesting results. Bamboo does seem to be a viable material in Kenya, but its logging is restricted by the government. This may or may not be a problem for us or local farmers, but it is worth taking

note of the issue. Another detail to note is that bamboo is that current demand for the material is higher than the supply. Therefore it may be hard to obtain some easily and cheaply. Here is my Research in full.

There are about 150,000 hectares of bamboo forests in Kenya, partly pure and partly in mixture with trees and shrubs. Bamboo in Kenya play a very important role in fencing, house construction, water harvesting, cottage industries dealing with matchsticks, baskets, tooth-picks, various other handicrafts and, in agricultural farming especially for supporting horticultural crops. The bamboo resources in Kenya consist of indigenous *Arundinaria alpina* K. Schum and introduced (exotic) species. The indigenous bamboo species is mainly found in gazetted indigenous forests and small proportions are in farmlands. The following are the common bamboo species and, their production and cultivation status.

***Arundinaria alpina* K. Schum**

The largest bamboo patches of the species are found in high altitude areas (2000m and above) such as Aberdares, Mau ranges, Mount Kenya and Mount Elgon. The amount available in farmlands is not known since inventory has not been undertaken.

Utilization of bamboo in Kenya is still largely confined to domestic usage. In the highland areas where the resource is plentiful fencing and, house and food storage constructions are major consumers of bamboo. The later usage is done with minimal processing. This is the same case for bamboo used in the making of tea picking baskets.

Currently demand for bamboo raw materials is higher than the supply. The situation is mainly exacerbated by an existing presidential ban on cutting of bamboo in public natural forests. Recently cutting of smaller quantities to provide the needs of flower farming was allowed. The socio-economic impact of bamboo sector in the living standards of people is not widely felt. Only a few people are directly involved in the use of bamboo due to the ban on cutting of bamboo.

Ever since the imposition of Presidential ban on exploitation of bamboos, hardly any bamboos find their way to the market in townships. Only a small fraction out of total number of requests for issue of cutting licences are entertained and authorised by the Conservator of Forests. Allowance for use in the horticultural industry was made since four years ago. It is however notable that small uses by individuals for tea-picking basket making and tooth-pick cottage activities contribute to employment opportunities for the rural and peri-urban people. The imposition of the ban has restricted the use of bamboo to some selected users and government institutions. The ban has been a disincentive to the farmers in that they cannot freely harvest their bamboo and market their produce without interference from the government Inspectors. <http://www.inbar.int/documents/country%20report/KENYA.htm>

Kenya: Bamboo Project to Expand Rural Housing <http://allafrica.com/stories/201005280525.html> 28 May 2010

Nairobi — Kenya should encourage the use of bamboo in building affordable shelters, especially for 60 percent of the population who live in poorly constructed dwellings in rural areas, says a specialist.

"Poor construction means they [houses] serve as breeding grounds for diseases including malaria, amoebic dysentery and respiratory conditions, which commonly claim the lives of many of their inhabitants," Jacob Kibwange, project director of an initiative at Maseno University that aims to encourage bamboo exploitation, told IRIN.

The project, Tobacco to Bamboo, is pioneering the construction of cheap bamboo houses in the Mau and Kakamega areas of Western Kenya.

"If we improved bamboo housing, we could change the lives of many people," Kibwange said. "With about 15,000ha of mature bamboo ready to be used, particularly in the Aberdares, Mau ranges, Mt Kenya and Mt Elgon, [we have] viable and inexpensive housing material in Kenya."

According to a 2007 study by the International Network for Bamboo and Rattan, nearly 60 percent of Kenya's 37 million people are rural farmers who live on less than US\$2 a day and live in inadequate homes that are often made of mud and poorly ventilated.

In the cities, the housing demand has reached 150,000 units per year against an annual production of about 50,000 units. According to the UN Human Settlements Programme, UN-HABITAT, the shortfall in the cities has led to overcrowding, slums and sub-standard housing.

The tobacco to bamboo project was launched by Maseno University's School of Environment and Earth Studies in 2006. It began as a research activity to encourage the cultivation and utilization of bamboo as an alternative livelihood to tobacco farming in South Nyanza and Western Kenya and later set up nurseries in Migori, Kuria, Homa Bay and Suba districts.

Maseno launched housing projects in Kisumu town and trained 240 bamboo small-scale farmers and set up 120 field experimentation sites. The aim is to train 20,000 farmers to exploit bamboo in the next 15 years.

"Bamboo is a remarkably fast-growing plant that thrives in a range of different climates," Kibwange said. "It can be planted easily in homesteads and harvested at the time of need without any additional expenditure

"Because of its lightness, a bamboo house suffers very little damage from earthquakes and could serve as temporary and quick construction in disaster-prone areas in emergencies."

After the Indian Ocean tsunami in 2004, about 4,000 bamboo houses provided shelter to thousands made homeless by the disaster, particularly in the Andaman and Nicobar Islands. It was also found that bamboo could resist heat of up to 55 degrees and unlike steel, was not vulnerable to rust and salty humidity.

In Kenya, however, an existing ban on harvesting bamboo could affect plans for its use. A Kenyan Forestry Services source, who requested anonymity, said the ban restricts harvesting to some selected

Bamboo in Nepal

Bradshaw, Robert. "Bamboo in Nepal: A Management Guide." 1997.

<http://www.robibrad.demon.co.uk/Bamboo.htm>

- Growing
- Seed collection
- Harvesting etc

International Network for Bamboo and Rattan. "Himalayan Bamboo."

<http://www.inbar.int/Board.asp?BoardID=143>

- Himalayan Bamboo Pvt. Ltd. provides bamboo flooring for many NGOs
- Located at: Hetauda Industrial District in Hetauda, Makwanpur, Nepal.
- Mr Ajaya Kumar Mudbhari (email: kkf@mos.com.np)

Joshi, Rajendra B., Swoyambu Man Amatya. "Bamboo & Rattan Development in Nepal"
Department of Forest Research & Survey.
<http://www.inbar.int/documents/country%20report/nepal.htm>

- Information on studies on bamboo/rattan usage in Nepal

Rural Empowerment Society (RES). <http://www.resnepal.org/> 2006.
<http://sgp.undp.org/index.cfm?Module=Projects&Page=ShowProject&ProjectID=6902#javascript>

- Information on a bamboo housing project conducted in western Nepal from 2003-2005

Articles:

"Bamboo Houses can Help Alleviate Poverty" Himalayan News Service April 18th 2010
<http://www.thehimalayantimes.com/fullNews.php?headline=Bamboo+houses+could+help++alleviate+poverty&NewsID=239749>

KATHMANDU: Along with providing low cost and environment-friendly houses, construction of houses made of bamboos might even lead to poverty reduction and employment generation in Nepal.

Agro Enterprise Centre (AEC), affiliated to Federation of Nepalese Chambers of Commerce and Industries (FNCCI), has entered into an agreement with International Centre for Bamboo and Rattan (ICBAR) for the promotion of bamboo house construction in Nepal. These projects will be undertaken with the financial aid of Common Fund for Commodities (CFC).

AEC will be the project implementation authority and ICBAR will provide technical assistance.

These pre-fabricated bamboo houses are affordable, quick to construct and durable. They can also provide cheap shelter to the relatively poor population of Nepal. Bamboo houses require minimum technology.

Most of the bamboo houses are based on existing local technology, which doesn't require high-tech tools for construction.

Similarly, these houses are supposed to help in generating employment opportunities as a greater number of local manpower can be engaged in the production of these houses — right from the plantation of bamboo to the construction of houses.

The promoters have also emphasised that such houses can decrease the dependency on the foreign materials for the construction of houses. Currently, most of the raw materials required for the building of a house are imported from foreign countries.

These bamboo structures use local materials, energy-efficient designs, materials that don't harm health and the environment and labour-intensive technologies that employ more people.

Since bamboo can be used as a substitute of timber, this will help in decreasing rampant deforestation as well. Moreover, bamboo is highly sustainable as it can be regenerated within 2-3 years, while timber could take longer than 25 years.

Third world countries of Africa, South America and Asia are now solidly in favour of constructing bamboo houses.

Sources and Resources

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For PDF documents such as:

- How to make Bamboo Joints
- Bamboo Scaffolding
- Bamboo Charcoal: Training Manual
- Bamboo Propagation: Rhizome based
- Bamboo as a building Material

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For PDF documents such as:

- Bamboo Rat Trap
- Bamboo Water Pipes
- Growing Bamboo

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