

# Promotion of bamboo for poverty alleviation and economic development

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**Abstract**—The paper highlights the development in bamboo in China, and in E. African countries.

*Key words:* Cultivation; utilization; development; China; Africa.

## INTRODUCTION

Bamboo is a fast growing, renewable, wide spread, low cost, environmental enhancing resource with great potential to improve poverty alleviation and economic development. Bamboo can be utilized at all levels of industrial activity from a small-craft based industry up to a modern highly integrated plant. Bamboo and bamboo fibre can be used for the widest possible range of products, from simple artisan articles to high-tech, fibre-based products. Bamboo industry is making important contribution in providing food, housing and income generation for 2.2 billion people in the world. Half of the world population is involved in the use and trade of bamboo products.

As the market for environment-friendly green bamboo products is growing, it is estimated that the world bamboo market will grow from the present size of US\$ 10 billion to over US\$ 20 billion by 2015.

Bamboo forests and plantations are mainly distributed in rural rears. The main features of the bamboo industry are that it is labour intensive, low to medium investment, and simple in technology and equipment. Development of industrial utilization of bamboo would make a great contribution to poverty alleviation and economic development.

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## MAJOR DEVELOPMENT IN THE BAMBOO SECTOR: CHINA'S STORY

China has a long history in cultivation and utilization of bamboo. In the past twenty years, in China there have been significant achievements in bamboo cultivation, processing and utilization. Bamboo industry is playing a more and more important role in poverty alleviation and economic development in China. China has also been one of the major innovators of new bamboo products.

### *Bamboo cultivation*

Of the total forest area of 133.7 million ha (1999) in China, around 5 million ha belong to bamboo forest, accounting for 4% of the country's forest area. Monopodial bamboos dominate the bamboo forests. Specifically, bamboo forests consisting of *Phyllostachys heterocycla* var. *Pubescens* (*Moso bamboo*) cover two-thirds of the total bamboo forest area.

Bamboo resources in China have been increasing for decades at an annual rate of 1.8%, with the total area of bamboo forests expanding from 3.67 million ha in 1980 to 5 million ha at present.

Bamboo forests are mainly distributed in the south of China, especially in the provinces of Fujian, Jiangxi, Hunan and Zhejiang. Together these four provinces account for 59% of the country's total bamboo area. China's 500 bamboo species account for around one third of species worldwide; Yunnan Province is the most rich in species with over 200, although the bamboo stand area there is rather poor.

Prior to the 1980s, attention was given to Mao bamboo because of the wide use of its timber as a raw material for construction, and for weaving handicrafts. Consequently, Mao bamboo stands have been under high-level management practices for some time and there are some very high-yielding stands. For example in Anjie, Zhejiang Province, stand density reaches 6165 plants/ha (average diameter at breast height (DBH) is 12 cm) and the annual volume per hectare is over 238 tonnes with an annual output of timber of 27.2 tonnes.

Since the 1980s, management aims have turned to the production of the edible bamboo shoots. Thus the Mao bamboo stands are changing into both shoot and timber-producing plantations. In a model high-yielding plantation in Zhejiang Province, where shoots were produced in all four seasons of the year for five successive years, the average annual output of shoots exceeded 30 ton/ha. In another model plantation of Lei bamboo (*Phyllostachys praecox*), shoot production was 34.7 ton/ha.

### *Industrial utilization of bamboo*

At present there are about 3000 companies around the country engaged in the production of various bamboo based panels, bamboo flooring, bamboo pulping, bamboo charcoal, edible bamboo shoots and other daily use articles [1]. In 2002 the production of bamboo-based panels was over 1 million m<sup>3</sup>, bamboo flooring

1000 m<sup>2</sup>, bamboo shoots canned products 250 000 tonnes. Some new developments of bamboo products in China are described below.

*Bamboo-based panels.* The main kinds of bamboo-based panels are bamboo timber plywood, bamboo curtain plywood, bamboo mat plywood and bamboo particleboard. These panels can be used for building floors, walls, ceilings, and interior decoration of houses and platforms for lorry and train carriages. Thin bamboo panels have been used for ceiling at the International Airport Terminal in Spain.

*'Pack flat' furniture.* Traditional bamboo and rattan furniture is assembled in the raw-material producing country. Bamboo tubes or rattan canes are bound together to form furniture. The binding brings the necessary strength and rigidity. However, such furniture, when shipped, has a low volume-to-value ratio. Therefore, INBAR has funded adaptive research by three bamboo factories to make 'pack flat' furniture from laminated bamboo panels. The finished furniture was presented in a workshop in China in April 2002 and has been followed up commercially by several Chinese manufacturers.

*Bamboo pulp and paper.* Bamboo has been made into paper for hundreds of years. Bamboo paper was used for highest quality art paper in China. Rough bamboo paper has been made and used in India for many years. At present, China produces bamboo pulp about 200 000 tons and imports pulp and paper valued at US\$ 5 billion annually. Three big bamboo pulp and paper projects (one each in Shichun, Guangxi and Guizhou) were launched in recent years, with total new capacity of 520 000 tonnes.

*Modern snacks from edible bamboo shoots.* The international trade in bamboo shoots from China started in the mid-1980s. There is a steady and growing market for edible bamboo shoots. In 2002 INBAR sponsored adaptive research to see if bamboo shoots could be used to produce new foods. It was found by the Beijing Food Research Institute to be relatively easy to combine bamboo shoot paste with corn flour to produce a range of modern snacks.

### *Bamboo products trade*

In 2002 the export of bamboo and rattan products reached US\$ 314 million, among which US\$ 23.5 million (7.5%) came from edible bamboo shoots, US\$ 23.2 million (7.4%) from raw bamboo and rattan and US\$ 267 million (85%) from bamboo- and rattan-processed products (Table 1). In 2002, China exported US\$ 314 million worth of bamboo and rattan products valued to 122 countries and regions. The major importers of bamboo and rattan products from China are USA (32%), Japan (22.5%), Hong Kong (15.1%) and European countries.

### *Bamboo development contributes to poverty alleviation and economic development*

In China, where mountainous areas occupy 69% of the total land with a population over half of the total, forestry is important to mountainous economy and poverty

**Table 1.**

Import and export of bamboo products in 2002 [2]

Item	Import		Export	
	Amount ( $\times 10^3$ kg/piece)	Value ( $\times 10^3$ US\$)	Amount ( $\times 10^3$ kg/piece)	Value ( $\times 10^3$ US\$)
Edible bamboo shoots				
Fresh shoots	150.8	7.925	5152.334	4949.994
Salted water shoots	78.406	85.867	11074.331	7261.075
Dried shoots	9.5	43.083	3149.234	11316.691
Subtotal	238.714	136.245	19375.899	23527.760
Raw bamboo	6541.648	3951.787	96766.906	21713.996
Bamboo plaiting and weaving products	33.436	77.456	76892.223	138121.777
Seats made of rattan, bamboo and similar materials	823.1	108.053	2331.857	21049.851
Furniture made of rattan, bamboo and similar materials	36.256	94.350	23346.455	33533.269

alleviation. There are more than 10 million peasants involved in the bamboo sector. China's bamboo industry is playing an increasingly important role in China's economy.

Anji County of Zhejiang, China's largest grower of bamboo for commercial use at county level, has a bamboo forest area of 66 700 ha and more than 1600 bamboo-processing enterprises, with a total output value nearly US\$ 400 million and an export value of US\$ 71.4 million annually. Major products include bamboo mattress, bamboo flooring, bamboo curtain, bamboo charcoal, bamboo beer, bamboo shoots, etc. The bamboo industry there provides more than 20 000 jobs and the annual income for farmers increased to US\$ 760 per household [3].

Anji's experiences in bamboo development include:

- Household-based responsibility contract system.
- Good development mode between companies and household, and between industry, universities and research institutions.
- Combination of ecology security and economic development.
- Marketable export-oriented products structure: products developed focus on exports needs.
- Government support and favourable policies.

## INBAR'S NEW EFFORTS TO ASSIST BAMBOO DEVELOPMENT IN EASTERN AFRICAN COUNTRIES

INBAR is the only organization with a specific mandate to develop the global bamboo and rattan sectors. It promotes bamboo and rattan development activities throughout Asia, Africa and Latin America.

In 1999–2001 INBAR funded studies of the bamboo sectors in Ethiopia, Kenya, Tanzania and Uganda. These studies followed the production-to-consumption systems (PCS) of bamboo in these countries and looked at all aspects of the system, from production and harvesting, through intermediate processing to final sale and use. The studies identified some opportunities and constraints in the PCSs and in the enabling (or otherwise) environment in which they operate. They also identified a very low level of technological input during processing, and the production of a very limited range of products, all of relatively low value. Since then INBAR has worked with local stakeholders to develop recommendations for a bamboo development project in Eastern Africa.

Co-funded by the Common Fund for Commodities (CFC), INBAR and the Forest Resources Research Institute of Uganda, a regional 'Workshop market based development with bamboo in Eastern Africa (Ethiopia, Kenya, Tanzania and Uganda)' was held in Kampala, Uganda, on 15–19 July 2003.

Actionable recommendations were made on developments in East Africa:

- Markets for bamboo products.
- Production and use of bamboo products to improve livelihoods.
- Improved environment for bamboo sector including awareness raising.
- A draft project proposal 'Market based development with bamboo in Eastern Africa' was prepared, which will be submitted to CFC by INBAR for consideration for funding after developed into a full project proposal.

To facilitate the preparation of the said project proposal, an INBAR expert team visited Ethiopia on 20–30 July 2003 to make field trips to typical bamboo resources and discuss with relevant officers on utilization of these bamboo resources and identify cooperation areas with INBAR.

It was found that bamboo is very important to Ethiopia. In the country the high forest coverage is only 2.7% and still decreasing, but bamboo resources are rich, comprising 67% of that of Africa. Development of industrial utilization of bamboo would help to solve problems of housing and furniture shortage and provide more jobs opportunities. There are two indigenous species of bamboo in Ethiopia, i.e. the highland or African alpine bamboo (*Arundinaria alpina* K. Schumach.) and a monotypic genus, lowland bamboo (*Oxytenanthera abyssinica* (A. Rich.) Munro).

Major recommendations include:

- (a) To give priority to bamboo development in both national level and international cooperation, including bilateral cooperation with the Chinese government.
- (b) To set up a national bamboo development office under the Ministry of agriculture for

- coordinating R&D in bamboo to improve networking in bamboo sector;
- preparing sustainable bamboo development plan at national level.

In the preparation of the CFC/INBAR project, it is suggested to include the following items in the project proposal:

- (a) Identification, processing and marketing of most promising bamboo products in Ethiopia:
- To send to China a container of highland/lowland bamboo for testing and making samples of the promising products in China. As a first step, bamboo mat corrugated board, bamboo curtains and gas generator are recommended. At present, iron-corrugated sheet is used as the major roof material. It needs import and it is poor in heat and sound insulation properties. Bamboo mat corrugated board can be made from Ethiopian bamboo and would be better in heat and sound insulation properties and more cost effective.
  - To use the bamboo mat corrugated board for roof in Ethiopia for market study.
  - To produce the well proved bamboo products in Ethiopia.
- (b) Sustainable management of bamboo forests in Ethiopia.
- (c) Introduction of exotic and economic important bamboo specie to Ethiopia for bamboo production security.
- (d) Establishment of a demonstration bamboo base near Addis Ababa.

It is our wish that from this project a big progress can be made in the promotion of bamboo for poverty alleviation and economic development in eastern African countries.

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