



International Network for Bamboo and Rattan

BAMBOO SHOOTS CULTIVATION

COMBINING FOOD SECURITY WITH INCOME GENERATION

Source of the Technology Expected Benefits Suitable for

Many locations around the world. Particularly advanced in China, Thailand and S. E. Asia.
Increased food security, environmental amelioration, income generation.
Individual farmers, community-based groups, commercial companies

Key Words

Bamboo shoots, food security, income generation, environmental amelioration.

Bamboo shoots



Bamboo shoots are young bamboo stems (culms). They are very nutritious and have been eaten as a vegetable for thousands of years in many Asian countries. Temperate, running bamboos produce three types of shoots; spring or summer shoots, winter shoots (which are very tender) and rhizome shoots. Tropical, or clumping, bamboos produce only summer shoots.

Most bamboos produce new culms each year, usually in the spring or autumn. By careful management of bamboo plantations a maximum number of shoots can be encouraged to grow each year. Many farmers already grow and harvest bamboo shoots for their own consumption but the global markets for fresh and processed shoots are very large. China earns over \$150 million US per annum from exports of its processed canned bamboo shoots, but there are also local markets too, that provide much needed income on a small scale to individual farmers.

Impact on Poverty and Environment

A bamboo shoots plantation can bring degraded lands back into production and provide income-generating options for farmers. It is easily adopted because it builds on the inherent plant cultivation skills of the farmers. Bamboos grow better with organic inputs, such as fertiliser, so the production of shoots is not harmful to the environment. Additionally, if established in conjunction with a local shoot-canning unit, benefits to the employees and the wider community will result.

The main development attributes of the technology are as follows:

- Improves food security.
- Provides income generation for poor rural people
- Improves and broadens farmers plant cultivation skills base, making the farm enterprise more resilient
- Increases the area of managed bamboo resources
- Can bring degraded land back into productivity

The main advantages of the technology are:

- It builds upon rural farmers own inherent plant-cultivation abilities and hence is easily adopted.
- It is extremely environmentally-friendly - organic inputs such as fertiliser are better for bamboo growth than inorganic ones.

Key points for success

The essential requirements for successful shoot production are:

- Availability of bamboo forests and plantations of the right species for producing bamboo shoots.
- Availability of basic management skills for shoot-producing bamboo plants.
- Access to markets – anything from local vegetable markets to processing factories.

Producing bamboo shoots

Bamboo shoots can be produced on any scale, from a single homestead bamboo plant owned by a farmer to a large scale commercial plantation. The basic techniques involved in their production are the same whatever the scale of production and are very simple.

Bamboo shoots may be harvested at many stages – before they break the surface of the soil, shortly afterwards, or once they have reached a metre or more high. The stage at which they are harvested determines their fibre content and tenderness, with younger shoots being more palatable. Their fibre content also determines the way they are handled or processed – long, fibrous bamboo shoots such as those that are harvested around Mt Elgon in Kenya and Uganda are smoked. Long shoots harvested in China are dried. Spring shoots in China and summer shoots in Thailand are par-

boiled and canned for export. Winter shoots in China are canned or eaten fresh.

Bamboo plants are perennials and it is necessary to leave some of the shoots unharvested so they can grow into new stems to ensure the plant can survive. Old stems, usually those over 3 years old, are cut out each year.

Chemical fertilizers are usually applied two to four times during the shooting stage at intervals of one or two months. It is applied in 10-15 cm deep drills that are prepared about 50-60 cm around the clump. Alternatively, 37, 500 kg organic fertilizers such as farmyard manure can be used. Application in the drill is best done in combination with soil loosening in the winter months. When green manure is employed as fertilizer, it can be applied at 75 tonnes per hectare, and can also serve as a protective layer to reduce evaporative moisture loss.

Weeding is done in June or July and repeated in August or September of each year. Weed control in mature stands may be achieved in a single operation in July or August. Soil-loosening in bamboo plantations is important, as maintaining a good soil structure in the stand will help the growth of shoots and the root system, as well as improve water conservation. Soil loosening is done once or twice a year from November to February and involves surface tilling to a depth of 15 to 20 cm.

Monopodial (running, sub-tropical) bamboos

The main monopodial species used commercially in China is *Phyllostachys pubescens*, known colloquially as “Moso”. It produces the largest shoots of the monopodial species. Other species widely used in China are: *P. praecox*; *P. praecox f. pervernalis*; *P. propinqua*; *P. dulcis*; *P. irridescens*; *P. prominens*; *P. flexuosa*; and *P. bambusoides*.

Monopodial bamboos can be planted every month but planting survival rates in autumn, winter and spring are all above 90 % and the highest survival rate is in spring. Large-scale plantations are best established in winter and early spring when bamboo rhizomes and buds grow slowly.

Winter shoots are harvested in December –February, and locating them under the soil cover requires skill. Spring shoots are usually harvested in March and April. Rhizome shoots are harvested in August – September.

Sympodial (clumping, tropical) bamboos

Sympodial bamboos produce shoots from May to October with most production in July to August. Some of the best species in China are *Dendrocalamus asper*, *D. latiflorus* and *Bambusa beecheyana*. Generally, the first-emerging shoots and most of those produced in the summer are harvested, but those produced towards the end of the shooting period will be selected and retained as mother culms.

Sympodial bamboos can be planted throughout the year but the best time for planting is in the dormant season i.e. from January to March or in the rainy season in the summer. Planting in high temperatures and dry seasons requires intensive management techniques and requires more labour.

Shoots are usually harvested in June and July. Elongated shoots 1.3-1.5 m in height which are used for processing fermented dry shoots are simply cut down at ground level after removal of the soil cover. Processing of all other shoot products requires younger shoots harvested at a height of about 30 cm. The practice of harvesting involves removing soil around the shoot, cutting it off from the rhizome and finally returning soil to the harvesting hole. The basal part of the shoot can be retained intact and buds on it may develop as new shoots in the present or coming year.

Shoots produced around August and September should be retained as mother culms to maintain a reasonable culm-density in the stand. Over-harvesting will result in a decline of both quality and quantity of shoots in coming years and even cause serious degeneration of the stand. Three or four shoots well distributed within the clump are normally retained to develop per clump annually. Culms of over three years of age are harvested every winter to keep the stand at reasonable age-structure and density of culms.



Reference and further reading

Bamboo shoots plantation Transfer of Technology Model from INBAR via <http://www.inbar.int/totem/totemmain.asp>.

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