



International Network for Bamboo and Rattan

VILLAGE BAMBOO PRESERVATION UNIT

IMPROVING BAMBOO QUALITY AND RURAL INCOMES

Source of the Technology

Forest Research Institute, Dehra Dun, India and others around the world

Expected Benefits

Income generation, rural employment

Suitable for

Village co-operatives, interested individuals

Key Words

Bamboo preservation, rural income generation, poverty alleviation

Village Bamboo Preservation Unit



Preserving bamboo extends its life and maintains its quality. Bamboo culms are natural materials and will decay with time. They are also susceptible to insect and fungal attack. This will limit the useful lives of the products they are used to produce and may reduce the quality of the raw material to the point that it is no longer useable. Almost every bamboo processing unit producing large items (e.g. furniture, fencing, housing) requires preserved bamboos and preservation is preferable if bamboos are used for scaffolding. Preserved bamboos are also preferred for smaller items such as household goods and handicrafts.

Impact on Poverty

A village bamboo preservation unit will provide income generating opportunities for local people. The preserved bamboo produced by the unit will be applicable for a wide range of uses and can be used to supply local rural bamboo processing units that can be established concurrently. The unit will promote the sustainable management of nearby bamboo stands to supply a regular quantity of bamboos for preservation.

The main development attributes of the unit are:

- Promotion of the sustainable use of wood-alternatives
- More effective use of natural bamboo resources

- Creation of employment opportunities for men and women at the preservation unit
- Increased community prosperity in rural areas
- Development of the local bamboo sector

Target Groups

There are two main target groups. The first are those who will run the unit. The unit requires only unskilled and semi-skilled labour although if pressurised facilities are installed some technical skill will be required. The work can be done by both men and women. The other main target group are those who will be involved in cultivating and harvesting the bamboo to supply the unit. Establishing the unit as a cooperative venture within the village will also benefit the community as a whole and lead to increased community prosperity and sustainability.

Key points for success

The essential requirements for a successful village bamboo preservation unit are:

- Start-up capital ranging from a few US dollars to \$5,000 depending on the type of preservation involved.
- Willingness of the village community to establish a cooperative.
- Access to a local supply of bamboo.
- Proper linkages to the users of the treated culms.

How are bamboos preserved?

There are many methods of preserving bamboos but they can be divided into two general categories; non-pressure methods and pressurised methods. Non-pressure methods allow the preservative to penetrate the bamboo at a natural rate. Soaking the bamboo in preservative and allowing the preservative to penetrate by capillary or wick action are the main non-pressure methods. Pressurised methods force the preservative into the bamboo. These methods are more rapid but require pressurised vessels and facilities that are more expensive to establish and run.

Non- pressure methods work suitable for fresh bamboo are:

- **Steeping:** Freshly cut bamboo culms are immediately placed upright in containers of concentrated solutions of water-borne preservatives. The treatment takes between 7 and 14 days, depending on the length of the culm. The quantity of solution in the container must be constantly topped-up.
- **Sap displacement:** Round, half, quarter and 1/8 split fresh bamboos are immersed vertically up to 25 cm deep in 10% aqueous solutions of water-borne wood preservatives in a small bucket. The preservative solution rises by wick action and the solution level is maintained by adding fresh quantities as required. Adequate absorption is obtained in a two metre long bamboo in just six days.
- **Diffusion process:** In the diffusion process, freshly felled bamboo culms with high moisture content (above 50%) are kept submerged in solutions of water-borne preservatives for a period sufficient to attain the required preservative loading. A diffusion period of 10 to 20 days is satisfactory in round bamboo, while split bamboo can be treated in about seven days.
- **Boucherie process:** This is a widely used process. The basal end of the freshly felled bamboo is attached to a hose-pipe fixed to a reservoir of water-borne wood preservative solution. Even one-day-old felled bamboo can be treated by just chopping off the basal 15 cm of the culm. In this process, the preservative is pushed through the bamboo by gravity from a container placed at a height.

Non pressure methods suitable for dry bamboo are:

- **Soaking:** Air-dried bamboo is submerged in the preservative solution (solvent type) for a period that depends upon the species, age, thickness and the required absorption. Penetration is predominantly by capillary action.
- **Hot and cold process:** Also known as the open tank process. Air-dried material is loaded into a tank that is fitted with steam coils or some other heating arrangement. Split bamboo requires no preparation, but holes should be drilled near the nodes of round bamboo to allow the preservative to pass into the inner surface of each internode. The tank is then filled with a hot creosote: fuel oil mixture and heating is continued to raise the temperature to about 90°C. This is maintained for a period of about 2-3 hours. The preservative is then allowed to cool, after which the oil is drained out.

Pressure treatment is best suited for qfast, large scale production of treated bamboo. Such equipment has the advantage of producing material of uniform quality with very little risk of chemical spills. They require pressure-treating equipment and a supply of electricity.

Two methods are used:

- **Full cell or Bethel process:** This process is used when maximum absorption of the preservative is desired. The bamboo is introduced into the pressure cylinder. The door is tightly closed and a vacuum is maintained for half an hour to remove as much air as possible from the cells. At the end of the vacuum period, the preservative is introduced into the cylinder. The vacuum pump is stopped and the cylinder is subjected to pressure of 3.5 to 7.0 kg/cm² for a fixed period. The preservative is then withdrawn from the cylinder. Finally a vacuum of 38 to 56 cm of mercury is applied for about 15 minutes to free the material from the dripping preservative.
- **Empty-cell processes:** These processes aim at a maximum penetration of the preservative with the minimum of net absorption. The cylinder is loaded with the material and the door is closed. It is then filled with the preservative solution and a pressure of 3.5 to 7.0 kg/cm² is applied until the required absorption is obtained. The pressure is then released. The cylinder is then drained and a final vacuum is applied to remove unabsorbed preservative

Establishing a village bamboo preservation unit

A village bamboo preservation unit can be established with two or three US dollars for a bucket, or up to US \$5000 for a pressure treatment plant. A “modified Boucherie” processing unit requires US \$500 and other non-pressure methods are much cheaper to establish.

References and further reading

Village Bamboo Preservation Unit Transfer of Technology Model via <http://www.inbar.int/totem/totemmain.asp>

Bamboo Preservation by Sap Displacement Transfer of Technology Model via <http://www.inbar.int/totem/totemmain.asp>

Bamboo Preservation Compendium. See <http://www.inbar.int/publication/pubdetail.asp?publicid=117>

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