



INBAR's Agenda for the 21st Century







As we approach the 21st century, we are in urgent need as never before to solve a host of pressing environmental and development concerns. INBAR was founded on the premise that two groups of plants, bamboo and rattan, can contribute significantly to finding sustainable solutions to these problems, through comprehensive research, development and networking.

This "traveling exhibition", a published form of the INBAR exhibition which was first mounted at INBAR's launch in November 1997, tells part of the story of what bamboo and rattan can do for people and the environment. And what INBAR—with your partnership and support *will* do.

We look forward to working together in global cooperation to improve the social, economic, and environmental benefits of these two groups of plants.



Rattan

Rattan

Rattan Resources



Rattan is a thorny climbing palm

There are 600 known species of rattan

Rattan grows from sea level to 3000 m altitude

Rattan is used for a wide range of products

Some rattan species are edible

The local usage of rattan is worth US\$2.5 billion

The external trade of rattan generates US\$4 billion

700 million people worldwide use rattan



Bamboo

Bamboo

Bamboo Resources



Bamboo is a tree-like woody plant

There are 1250 known species of bamboo

Some bamboos live over a 100 years

There are over 1500 possible uses

The local usage of bamboo is worth US\$ 2.7 billion

Trade in bamboo generates US\$ 4.5 billion

2.5 billion people worldwide use bamboo

1.0 billion people live in bamboo houses





Livelihood Security

Poverty alleviation and empowerment of women and marginalized groups are central to improving the conditions of rural people.

Bamboo and rattan, with their potential economic contribution through subsistence and diverse income generating uses, can advance efforts to enhance livelihoods.

In the area of livelihood security INBAR will:

- ▲ increase benefits from subsistence applications
 - ▲ enhance other sectoral uses
- ▲ promote micro/small enterprise development
 - ▲ adding value to traditional knowledge



Ecological Security

Given the state of natural resources today, forest conservation through economically attractive means and alternative production systems is critical.

Bamboo and rattan
are multifaceted resources and can
contribute to these efforts in many ways.

INBAR will promote:

- ▲ forest conservation through wood substitution
- ▲ increasing the value of forests
- ▲ plantation improvement
- ▲ conservation of bamboo and rattan biodiversity



Food Security

Food Security

Increased human consumption, extensive deforestation, unsustainable agricultural practices and overgrazing, are threatening sustainable food production by degrading land.

Bamboo and rattan can play a central role in raising the productivity of degraded land.

INBAR, through its activities, will use bamboo and rattan for:

- ▲ rehabilitation of degraded lands
 - ▲ soil-conservation
 - ▲ watershed management



Livelihood Security

The economic
potential of
bamboo and rattan
can be key to
improved
livelihoods for many
resource
poor families.

Improving Subsistence Uses



Bamboo and rattan span a broad spectrum of subsistence uses which can be diversified, expanded and made more efficient. Improving and extending the vital role of bamboo and rattan for rural poor in several countries would enhance living standards.

Improving Subsistence Uses



■ Chinese manufacture more than 8,000 varieties of bamboo/rattan handicrafts and wares

■ In tribal communities in NE India, 25-35 percent total household income is from rattan

■ In Indonesia and the Philippines, 65-100 percent total cash income for several households is from rattan gathering

■ The Indian bamboo sector generates 432 million workdays annually

■ The small scale bamboo industries in West Java, Indonesia employ nearly 60,000 people



for much of the world, it is life

INBAR, to improve the contribution of subsistence uses to rural poor, aims to:

- ▲ identify new production and processing technologies
- ▲ improve existing applications, and marketing practices
- ▲ develop appropriate technology to improve and diversify processing and use
- ▲ enhance extension efforts
- ▲ assess the impact of government policies on the bamboo/rattan sector

Bamboo and rattan are used in several economic activities — fisheries, sericulture, etc. Improving and developing new uses of bamboo and rattan for these activities can increase efficiency, efficacy and revenue.

Sectoral Uses

Sectoral Uses



INBAR, through research and networking, aims to:

- ▲ increase and improve bamboo and rattan use in on-farm activities
- ▲ expand bamboo and rattan use in fisheries, sericulture, weaving, etc.

■ Bamboo pipes irrigate extensive areas of agricultural land in different agro-ecological settings

■ Sericulture requires loosely woven bamboo trays for silkworms to feed and build cocoons

■ Bamboo is used for various aspects of fisheries, from boat masts & nets, to fish & crab traps



*in sericulture, agriculture,
fisheries & weaving...*



Micro-Enterprises Development

The informal labor sector, largely involved in the harvesting, processing and production of bamboo and rattan, face uncertainties regarding the length of employment and amount of income. Organized use of bamboo and rattan through micro-enterprises can improve efficiency, increase revenue and provide needed employment security to large numbers of rural people.

Micro- Enterpr Developm





■ The *Agarbathi* industry in India has over 3,800 production units and generates nearly US\$400 million from domestic and export markets

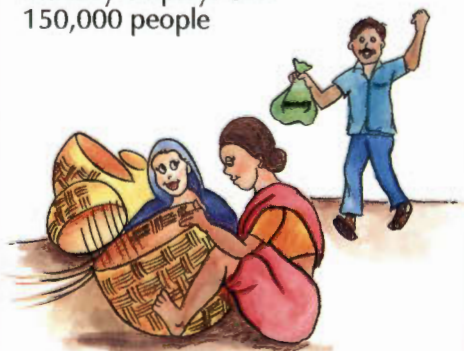
■ In 1992, China had about 30,000 bamboo and rattan enterprises providing employment to 800,000 people

■ Small townships and villages in China own more than 90 percent of bamboo and rattan enterprises

■ The Indian rattan industry accounts for 200,000 employment

■ The Philippine rattan sector employs 250,000 workers

■ The Indonesian rattan industry employs over 150,000 people



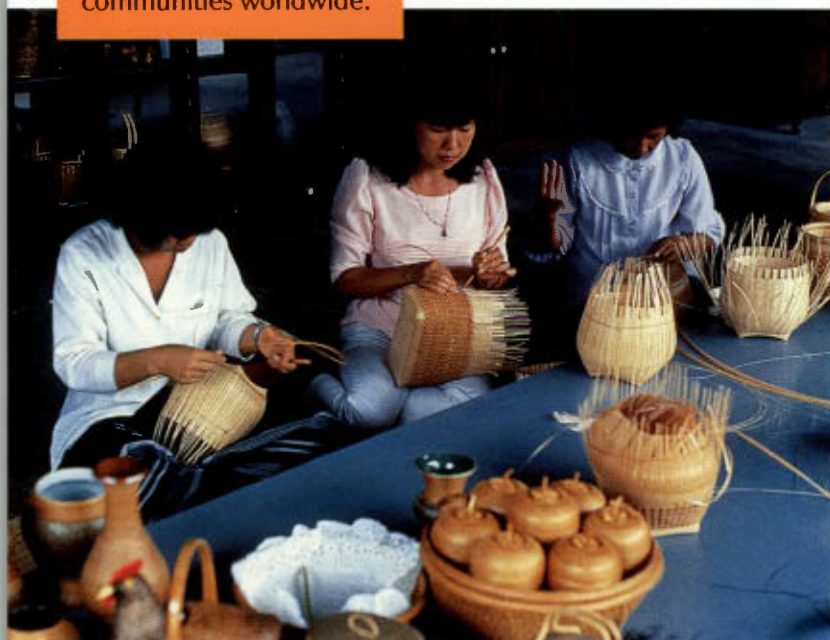
the proverbial daily bread

In an effort to promote micro-enterprises INBAR aims to:

- ▲ improve design, durability, and value-added in consumer products from micro-enterprises
- ▲ use market research to improve the returns to small scale collectors and producers

Local communities have used bamboo and rattan in ingenious ways but these traditions are threatened by lack of materials and markets. New technical inputs, savvy marketing and better resource management can revitalize these traditions into engines of social and economic growth, building sustainable futures for millions of communities worldwide.

21st Century Traditions



21st Century Traditions

■ Over 20 million people in India make a living by working with bamboo and cane

■ In the Philippines, over 300,000 people are employed by bamboo and rattan small enterprises

■ Despite better quality, bamboo products lack access to major markets in developing countries, where industrializing elites still view it as only "poor man's timber"



■ Artisans worldwide face severe difficulties in obtaining new materials



*Yesterday's wisdom
meets tomorrow's opportunities*

With a focus on holistic and sustainable local development, INBAR aims to:

- ▲ understand and record local uses of bamboo and rattan
- ▲ strengthen capacity for local resource management
- ▲ enrich local traditions with new technologies and design ideas
- ▲ promote bamboo products and artisans
- ▲ improve market access for artisans
- ▲ develop policy options for governments to support bamboo traditions



Ecological Security

Bamboo and rattan,
as substitutes for
wood products,
can mitigate the
pressures on
natural forests, and
contribute to
carbon sequestration
and conservation
of biodiversity.



There is an urgent need to reduce the growing pressure on ever-shrinking forest areas. Bamboo and rattan with their wood-like properties provide perfect substitutes for some wood products, concomitantly abating demand on forest resources.

Substituting Wood Products

■ Bamboo yields six times more cellulose than fast growing pine trees

■ The chemical composition of bamboo culms (for paper production) is:



■ Holocellulose	61-71%
■ Lignin	20-30%
■ Silica	0.5-4 %
■ Pentosans	16-21%
■ Ash	1-5%

■ Using 50,000 culms of *Phyllostachys pubescens* for bamboo based panels can save 2.33 million m³ of timber



"bamboo is far superior to our building timber" Klaus Dunkelberg comparing bamboo and spruce

INBAR aims to:

- ▲ improve processing and use of the fibre base of bamboos for products such as pulp, paper, rayon and cellulose
- ▲ produce superior bamboo-based panels and related wood substitute products and applications
- ▲ improve structural and engineering uses of bamboo and rattan
- ▲ develop grading, quality and sustainability standards

Economic value from alternative uses of natural forests has proven to be an effective way of promoting sustainable forest management. The economic value of bamboo and rattan can accordingly have a positive impact on use of natural forest stands where they are found.

Forest Forest Conservation





■ Bamboo grows three times as fast and can be harvested four times as often as eucalyptus trees

■ The bamboo shoot industry in China earned US\$ 130 million from exports

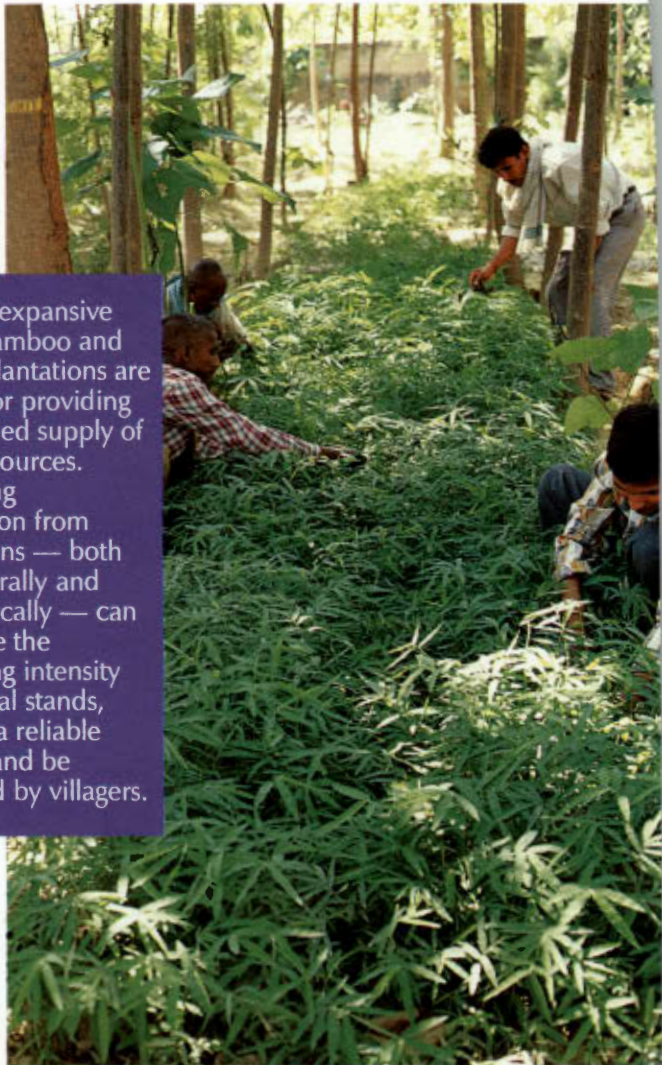
■ Bamboo and rattan mixed products earned Indonesia US\$ 1.5 billion between 1991 and 1993



adding economic value

Using bamboo and rattan, INBAR aims to:

- ▲ develop methods for enrichment planting
- ▲ ensure increased, sustainable and diversified production of these plants in different forest ecosystems
- ▲ improve/create suitable micro-environments to enhance regeneration of forests



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iven the expansive use of bamboo and rattan, plantations are critical for providing the needed supply of these resources. Improving production from plantations — both silviculturally and economically — can minimize the harvesting intensity on natural stands, provide a reliable source, and be managed by villagers.

Promoting Plantations

**Promoting
Plantations**

■ In Indonesia villagers manage rattan plantations that cover over 13,000 hectares

■ India establishes about 40,000 hectares of bamboo plantations annually

■ Unsustainable harvesting and forest clearing from other activities have dwindled rattan and bamboo resources to critical levels in several countries

■ In Thailand the unexpected gregarious flowering of *Dendrocalamus asper* caused losses worth US\$130 million and significantly affected the bamboo shoot industry



INBAR aims to:

- ▲ identify local germplasm that can increase productivity and quality
- ▲ select wild bamboo and rattan genotypes to enhance productivity and diversity of plantings
- ▲ carry out extensive silvicultural research
- ▲ identify controls against pests and diseases
- ▲ improve methods for propagation and increased agrobiodiversity



the fountainhead

Conserving Biodiversity of Bamboo and Rattan

As the potential of bamboo and rattan grows, the close connection between the multiple uses of these plants, the economic benefits they can generate, and their role in subsistence households, can threaten their extinction through overuse unless the necessary management measures are adopted.





- 140 species out of 1250 known bamboo species are used extensively
- 50 out of 600 known rattan species are used extensively
- 42 genera and 547 species of bamboo occur in the Americas representing 40 percent of the worldwide species diversity
- 25 rattan species occur naturally in Africa. Of these 4 are heavily utilized for commercial purposes
- Bamboo and rattan are often overlooked in biodiversity conservation efforts
- Some species of bamboo and rattan face the risk of over-exploitation



*depleting resources,
diminishing livelihoods*

Effective conservation should involve the users and the resource.

INBAR aims to:

- ▲ assess the genetic diversity patterns of bamboo and rattan genepools
- ▲ identify biodiversity hotspots
- ▲ integrate the two resources in national genetic resource programs
- ▲ develop community based buffer zone and forest conservation strategies which provide economic returns





**International
Network for
Bamboo
and Rattan**

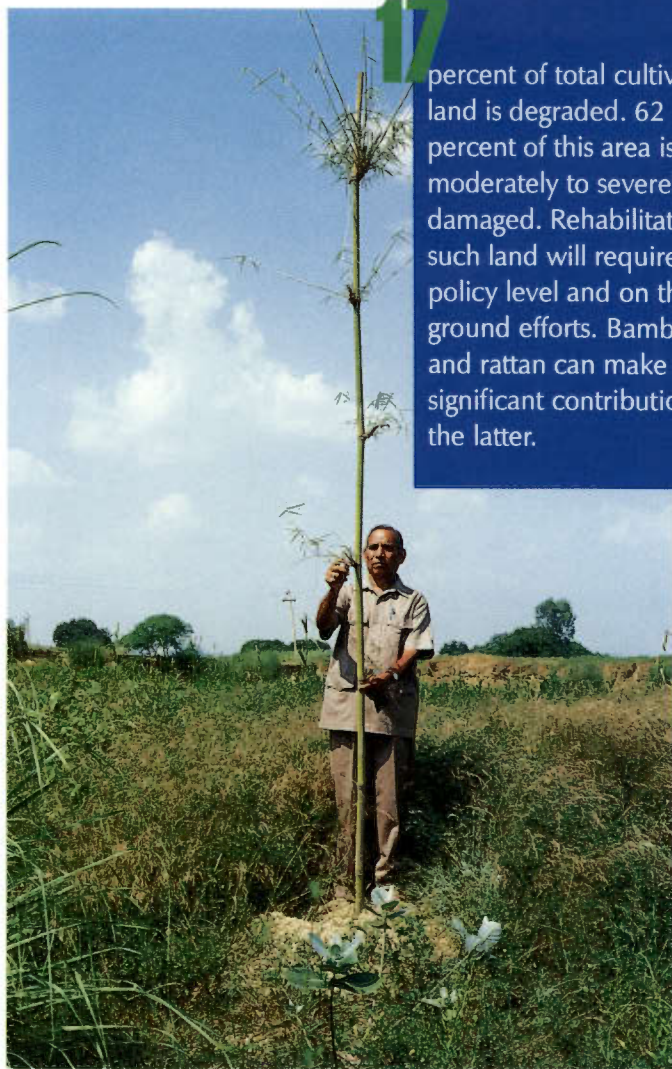


As fertile and
cultivable land
diminish
at an unprecedented
pace, bamboo and
rattan will be
instrumental in
rehabilitating
degraded land,
conserving top-soil,
and watershed
management.

Food Security

17

percent of total cultivable land is degraded. 62 percent of this area is moderately to severely damaged. Rehabilitating such land will require policy level and on the ground efforts. Bamboo and rattan can make a significant contribution to the latter.



Rehabilitating Degraded Lands

INBAR, aims to identify:

- ▲ agroforestry models for rehabilitating degraded lands
- ▲ planting materials that assist in bamboo and rattan production under various farming and agroforestry systems

■ Bamboo and rattan are suited for rehabilitation of eroded agricultural and forest lands

■ Bamboo and rattan are amenable to inter-cropping

■ Bamboo is a major agroforestry crop for most rural households in Nepal

■ Bamboo can neutralize acidic soil



revitalizing earth

Arresting Soil Erosion

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oil resources are depleted by removal of wind and water barriers to soil erosion leading to loss of top soil and depletion of soil nutrients. The impact of unsustainable agricultural practices and deforestation on soil can be mitigated by appropriately using bamboo and rattan.



Arresting Soil Erosion

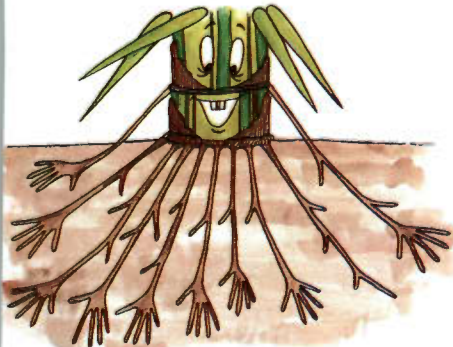
INBAR aims to develop:

- ▲ methods for protecting hill slopes, flood plains, and erosion prone areas

■ Temperate bamboo stands and leaf litter can intercept more rain than conifers and pines

■ The modulus of elasticity of bamboo culms is about $9000-10,100 \text{ N/mm}^2$, hence it does not break in strong winds

■ Bamboo and rattan have extensive systems of roots and rhizomes



stitching soils



W

atershed management plays an integral role in soil and water conservation. This is especially true in mountainous areas where water erosion is very severe and can cause irreparable damage to the fragile ecosystem, affecting the economic security of the people.

Watershed Management



■ In Dayingjiang river and Jinlongjiang river in China, bamboo succeeded in protecting river banks after planting of other trees failed to yield results

■ In Bangladesh, *Melocanna baccifera* is used to conserve the soil and water in catchment areas of denuded hills, minimizing siltation downstream and controlling flash floods in the valleys and plains

■ Puerto Rican researchers found bamboo to be one of the most effective in controlling landslides



"Nature's Band-Aid"

Considering the nexus between ecological stability and food security, INBAR aims to:

- ▲ study and promote the protection of riverbanks, dam sites, and canals using bamboo and rattan

INBAR

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INBAR is a non-profit
intergovernmental organisation which develops,
provides and promotes appropriate technologies
and other bamboo and rattan based solutions to
benefit people and environment.

A world-wide network,
it connects governmental and non-governmental
organisations and the private sector.

INBAR provides leadership,
coordination, and support for
research and development.

INBAR's R&D programs
cover natural and cultivated raw materials;
genetic resources; processing and utilization;
economic and other social aspects; and
supporting services. INBAR is dedicated to
enhancing bamboo and rattan's contribution to

livelihood security,

ecological security

and

food security.



**International Network for
Bamboo and Rattan**

HEAD OFFICE

Anyuan Building No. 10, Anhui Beili, Asian Games Village
Chaoyang District, Beijing, People's Republic of China
Tel.: 86-10-64956982 Fax: 86-10-64956983 E-mail: inbar@rif.forestry.ac.cn
Mailing Address: Branch Box 155, P.O. Box 9799, Beijing 100101
People's Republic of China

PRESENT ADDRESS

c/o IDRC, 17 Jor Bagh, New Delhi 110003, India
Tel.: 91-11-4619411 Fax: 91-11-4622707 E-mail: inbar@idrc.ca
Homepage: <http://www.idrc.org.sg/inbar>