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## The International Network for Bamboo and Rattan

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*Tracing the history of INBAR, an intergovernmental organization dedicated to improving the social, economic and environmental benefits of bamboo and rattan.*

On 6 November 1997, China and eight other nations - Bangladesh, Canada, Indonesia, Myanmar, Nepal, Peru, the Philippines and the United Republic of Tanzania - formally established the International Network for Bamboo and Rattan (INBAR) as an independent intergovernmental organization with a global mandate to promote the development of bamboo and rattan in ways that are beneficial to people and the environment. The organization's activities concentrate on development research with emphasis on ecological, food and livelihood security. This article traces the events leading to the formation of INBAR.

### SETTING THE STAGE

In 1979, under the auspices of the Asia Regional Office of the International Development Research Centre (IDRC) of Canada, leading rattan scientists from half a dozen countries went to Singapore to examine major research issues and make recommendations for IDRC to follow up. Almost a year later, in May 1980, IDRC held another workshop on bamboo; more than 20 forestry scientists from bamboo-growing countries assembled, once again in Singapore, to assess the research issues in the sector.

#### [The INBAR signing ceremony, 6 November 1997, Beijing, China](#)

Partly as a result of the heightened awareness of the importance of these two products, in the early 1980s IDRC started focusing its forestry programmes, at least in Asia, on social forestry with an emphasis on non-wood forest products (NWFPs). The first project of establishing a rattan information centre to collect and disseminate information on rattan was initiated in Malaysia in 1983. The project also facilitated networking among forestry scientists in the region.

In 1984 IDRC, together with the Special Programme for Developing Countries of the International Union of Forestry Research Organizations (IUFRO), organized a gathering of Asian and international forestry experts in Kandy, Sri Lanka to identify the ten most important multipurpose tree species for priority research. Bamboo and rattan, although not tree species and still considered as "minor forest products", received considerable support for inclusion in the list. Follow-up to the meeting was the responsibility of IDRC's Asia Regional Office. IDRC set up a newsletter to facilitate communication among scientists in the region and to provide a backdrop for an informal network. Within two years, the networking activities had expanded to

such an extent that IDRC had to hire a coordinator to manage the informal Bamboo and Rattan Research Network.

### Bamboo

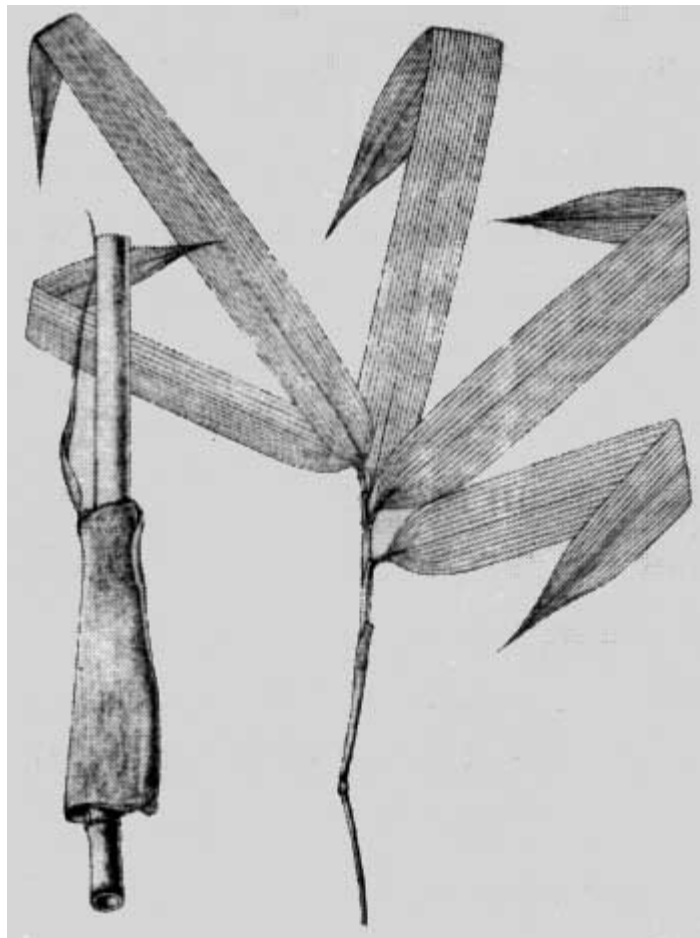
Bamboo, a tree-like woody grass with about 1 250 species in 75 genera, is thought to have made its appearance about 200 million years ago. The plant now occurs in the tropical, subtropical and temperate zones of all regions except Europe and western Asia. Recent findings have revealed that bamboo was prevalent even in Europe some 3 million years ago but vanished some time during the last ice age.

Bamboo is perhaps the fastest-growing plant on earth, gaining approximately 75 to 400 mm per day (the record of 1.2 in 24 hours belongs to *Phyllostachys edulis* in Japan). It grows three times faster than most eucalyptus species and can be bar-vested four times as often. Commercially important species usually mature in four to five years. Multiple harvests are subsequently possible every second year, for up to 120 years in some species and indefinitely in others. Bamboo is also foremost in biomass production, giving up to 40 tonnes per hectare per year in managed stands. It is estimated that about one-quarter of the biomass in tropical regions and one-fifth in subtropical regions comes from bamboo.

The bamboo culm, the most economically important part of the plant, grows to more than 40 m in some species in just three to four months. It is estimated that in 35 years a bamboo plant can produce up to 15 km of usable pole of up to 30 cm in diameter. Its lightness and high moduli of elasticity (9 000 to 10 100 N/mm<sup>2</sup>) and rupture (84 to 120 N/mm<sup>2</sup>) make bamboo an ideal material for housing in areas prone to natural calamities such as earthquakes and hurricanes. The tensile strength of bamboo is greater than that of steel.

Emerging culms (shoots) of some bamboo species are not only edible and succulent but also nutritious; a 100 g portion contains 0.5 to 0.77 g fibre, 81 to 96 mg calcium, 0.5 to 1.7 mg iron, 3.2 to 5.7 mg vitamin C, 0.07 to 0.14 mg vitamin B<sub>1</sub>, 1.3 to 2.3 g protein, 4.2 to 6.1 g carbohydrates, 42 to 59 mg phosphorus and 1.8 to 4.1 g glucose. Some species also have significant amounts of potassium and vitamin A. Bamboo shoots may contain up to 17 amino acids, including in particular saccharopine, speramic acid and glutamic acid.

Bamboo is remarkably adaptable to its surroundings. It tolerates a wide range of soils (from organically poor soils to those rich in minerals) and soil moisture conditions (from drought to flooding). This characteristic has made bamboo very useful for rehabilitating and reclaiming degraded lands.



Bamboo yields six times more cellulose than the fast-growing pine tree. It also runs an extensive subterranean system of rhizomes and roots. For example, the rhizomes of *Phyllostachys bambusoides* are reported to travel about 3.6 m per year. Some species generate a rhizome network that spans up to 1 000 m<sup>2</sup>. A bamboo plant typically binds 6 m<sup>3</sup> of soil. Bamboo's efficacy in protecting riverbanks and hill slopes against soil erosion is well documented.

The spreading foliage of bamboo helps reduce the destructive onslaught of tropical rains on topsoil. Leaf litter that can reach a thickness of about 10 cm per year also helps absorb the impact of rain on the ground and facilitate absorption and retention of moisture by the earth. In many areas bamboo populates and protects exposed areas and provides the microclimates for regeneration of tropical forests.

It is thought that about half of the world's population of more than 5 000 million shares to some extent in the trade and subsistence use of bamboo, valued at more than US\$7 000 million. The plant has more than 1 500 documented uses, ranging from fuelwood to light bulbs, medicine, poison and toys to aircraft manufacturing. Over 1 000 million people live in houses made of bamboo or with bamboo as the key structural, cladding or roofing element. China earns US\$130 million and Taiwan Province of China about US\$50 million annually from exports of edible bamboo shoots. China's annual exports of woven bamboo products are valued at US\$117 million. India uses bamboo in its incense stick industry, estimated to be worth US\$400 million. Bamboo is also an important raw material for many pulp and paper industries in China, India, Thailand and other Asian countries. Bamboo finds major uses in the rayon, handloom, fishing and sericulture industries, where it provides the basis for millions of jobs.

### **[A bamboo forest in Uganda](#)**

A second bamboo workshop was organized in Hangzhou, China in 1985 by IDRC in collaboration with the Ministry of Forestry of China, the Chinese Academy of Forestry, the Nanjing University of Forestry and IUFRO. The workshop provided a measure of what networking could achieve. The first workshop in Singapore had the participation of 22 scientists who presented 19 papers for discussion. In the second workshop, about 80 scientists from different parts of the world participated and about 50 papers were presented.

Promoting the utilization of bamboo through the development of new products was one of the objectives of IDRC's networking activities. In 1988, a bamboo mat board project was initiated at the Indian Plywood Industries Research and Training Institute (IPIRTI). In five years, the project developed an improved technology for the manufacture of bamboo mat boards and commenced the transfer of the technology to other Asian countries. IDRC organized a third workshop at Cochin, India in 1988 in collaboration with the Kerala Forest Research Institute. It was at this workshop that the topic of an international centre for bamboo research first came up. Many of the participating scientists felt that the scope and pace of bamboo research had reached a stage at which national programmes would benefit from the support, guidance and coordination that only a formal and international focal point could provide.

In 1990, the review *Research needs for bamboo and rattan to the year 2000*, jointly commissioned by several international donors - IDRC, the International Fund for Agricultural Development (IFAD), the Rockefeller Foundation, the United Kingdom's Overseas Development Administration (ODA) and the International Board for Plant Genetic Resources (IBPGR) (since 1994 the International Plant Genetic Resources Institute, IPGRI) - outlined a framework for consolidating existing research and provided a new research direction based on an in-depth needs assessment in the region. It also recommended formalization of the bamboo and rattan network as an independent, autonomous institution either within or outside the Consultative Group on International Agricultural Research (CGIAR) system. In 1991 the recommendations of the review were endorsed by a group of CGIAR donors during a meeting in The Hague, the Netherlands and by national representatives at a meeting convened in conjunction with the fourth International Bamboo Workshop at Chiang Mai, Thailand.

Subsequently, a proposal was made to IDRC for the creation of the International Network for Bamboo and Rattan as a formal research network with its own secretariat and staff. IDRC approved the proposal and agreed to provide all the necessary administrative and financial management support. It also agreed to provide the major part of the funds required to establish and operate INBAR for two years.

## **IMPLEMENTATION OF THE NETWORK**

INBAR was formed in 1993 through grants from IDRC and started operations from IDRC's South Asia Regional Office in New Delhi, India. An orientation meeting was held in New Delhi in March 1993. The participants included national programme scientists involved in bamboo and rattan research; potential donors to the programme, including IFAD, IDRC, the Canadian International Development Agency (CIDA) and FAO, through its Forestry Research Support Programme for Asia and the Pacific (FORSPA); and collaborating institutions such as IUFRO and the Natural Resources Institute (NRI), United Kingdom.

IFAD, which had co-sponsored the study that led to the formation of INBAR, stepped in as a donor in 1994 by providing grants for the Socio-Economics and Policy Programme in particular.

The new network had a mandate to address two principal issues. One was the crucial role of NWFPs, especially bamboo and rattan, in the socio-economic well-being of the predominantly rural population of developing countries. The other was the potential of bamboo and rattan for conserving tropical forests and for curtailing the rapid decline of forest genetic resources by offering alternative solutions to wood-based products.

INBAR was founded with a holistic approach to research, focusing on all parts of the bamboo and rattan sectors from production to utilization, and linking natural and physical sciences to socio-economics in order to maximize the relevance and impact of its work. In addition, INBAR actively undertook to promote the utilization of its research results through information, training

and technology transfer activities. It initiated the production of a series of technical publications, and the network's newsletter was redesigned and expanded to disseminate information on INBAR activities and to provide network members a forum for the exchange of ideas.

By 1994 INBAR was becoming a leading voice among all interested sectors, articulating development and environmental solutions using bamboo and rattan, but there were several impediments to realization of its full potential. First, its status as a time-limited project created difficulties in establishing confidence among national programme partners, which preferred longer-term and more stable relationships. Another problem was its legal status as an IDRC project, which hampered efforts to secure funds from other donor agencies. Internal and independent evaluations of INBAR suggested that greater efficiency could be achieved through an expansion of the network: geographically, by extending the network's range of activities to Africa and Latin America, and topically, by deepening and broadening the network's commitment to strategic, development-led research on bamboo and rattan.

### Rattan

Rattan, a spiny climbing or trailing palm with some 600 species, is strictly an Old World plant. Its distribution is limited to tropical and subtropical Asia, where 10 of the 13 known genera are endemic, and equatorial Africa. Indonesia, where half of the known species grow, is the world's largest producer of rattan raw materials. Cane, the stem of rattan minus the sheaths, is the most valuable part of the plant.

Rattan occurs from sea level to an altitude of 3 000 m and can grow in a wide range of soils and soil moisture conditions. Most commercially important rattans are vigorous climbers and reach harvestable age in eight to ten years.

Both fruits and shoots of rattan are edible, and the latter contain high amounts of protein, carbohydrates, vitamins and other nutrients, including eight amino acids. Rattan roots, fruits and leaves are used in folk medicine. Leaves of some species, such as *Calamus andamanicus* and *Daemonorops kurzii*, are used as roof thatch. Rattan is a lepidocaryoid or "scaly-fruited" palm, and the fruit scales of some species yield a substance called "dragon's blood" which is used to produce dyes and varnishes.

In many Asian countries rattan is second only to timber in economic importance. The global trade and subsistence value (domestic and export) of rattan and its products is estimated at US\$6 500 million. Undoubtedly, furniture is the most popular rattan product. The Philippines alone exported rattan furniture worth US\$123 million (plus wicker products worth US\$118 million) in 1994. Rattan products accounted for 89 percent of Indonesia's foreign exchange earnings of US\$238 million in 1987. In 1992, finished rattan products alone earned the country about US\$294 million. In the same year, China earned US\$869 million from exports of 27 forest products, of which US\$329 million was from rattan and bamboo products. Besides furniture, other rattan products include carpet beaters, walking sticks, umbrella handles, handles for cricket traps, animal traps, hats, ropes, cordage, birdcages, matting, baskets, panelling, hoops and ammunition boxes.



Although rattan's ecological role is much less studied than that of bamboo, it is likely that rattan species with subterranean stems, such as *Calamus minutus*, or those with widely radiating, horizontally growing roots, such as *Calamus caesium* and *Calamus manan*, could have a significant role in preventing soil displacement.

## AN INDEPENDENT INSTITUTION

The transformation of INBAR into an independent institution with a global mandate was endorsed by INBAR's Research Advisory Group in 1994 and by a subsequent Strategy Group meeting in March 1995. The latter meeting recommended the constitution of a task force to "take all necessary action to formalize the establishment of an autonomous, international, scientific, philanthropic organization to replace the existing network". The change was unanimously endorsed by a special session at the twentieth IUFRO World Congress in Tampere, Finland in August 1995. The 1995 International Bamboo Congress, held in Bali, Indonesia, also recommended the establishment of an international centre for bamboo research. The core funding agencies of INBAR -IDRC and IFAD - pledged to continue to support the network as a secretariat of IDRC pending its affirmation as an independent international organization.

The task force proposed by the Strategy Group was formed in late 1995. It recommended that INBAR continue operations as a decentralized network even after becoming an independent international organization, and that it be given a global mandate. It also recommended that IDRC continue as the executing agency during the transitional phase.

The next step was to find a permanent headquarters for INBAR. *Research needs for bamboo and rattan to the year 2000* had recommended that the selection of a location for INBAR headquarters be governed by three considerations: easy access to countries with research experience, ease of operation and absence of any vested national interests.

China offered to host the headquarters for the new international organization and the offer was discussed and accepted by the task force. China had been an important participant in network activities almost from the very beginning. One of the early bamboo projects was in China, and the country also housed the first Bamboo Information Centre. Chinese forestry scientists, particularly from the Chinese Academy of Forestry, had played a major role in the network's

exchange programmes.

Towards the end of January 1997 the State Council, China's cabinet, presided over by the prime minister, formally approved the establishment of INBAR in China. It would be the first international organization to have its headquarters in the country.

### **Fish traps made from rattan**

An Interim Advisory Board was constituted in May 1997 to oversee INBAR's transition into an independent entity. As Interim Director-General the board appointed Cherla B. Sastry, who as Senior Programme Officer in Forestry at IDRC's Asia Regional Office in Singapore had been at the helm of the network since its inception and had steered its development towards independence. The organizers soon began negotiations with the Government of China on a headquarters agreement and text for an international treaty. The Multilateral Negotiations Meeting on INBAR Agreement, which was held in June 1997 in Beijing, was attended by participants and observers from 13 countries (Canada, China, Italy, the Republic of Korea, Malaysia, Myanmar, Nepal, Pakistan, Peru, the Philippines, the United Republic of Tanzania, Thailand and Viet Nam) and representatives of INBAR, IDRC and four ministries of the Government of China. The meeting examined, modified and adopted the draft INBAR Establishment Agreement. The Board of Governors of IDRC subsequently endorsed the approved agreement.

On Thursday, 6 November 1997, the new INBAR was officially born with the signing of the INBAR Establishment Agreement by Wang Zhibao, China's Vice Minister for Forestry (who was later elected Chair of the INBAR Council), on behalf of the Government of China. Sastry was appointed the founding and first Director General. Chinese Premier Li Peng, Vice Premier and Minister for Foreign Affairs Qian Qiche and Minister for Forestry Chen Yaobang were in attendance to witness the event - ample evidence of the importance accorded to it by the Chinese Government.

Since INBAR's rebirth in 1997, Bolivia, India and Malaysia have joined, bringing the total membership to 12.

With its global mandate, INBAR has initiated actions aimed at establishing national and regional nodes. INBAR-Nepal and INBAR-Europe are already active, and efforts are under way to set up African and Latin American nodes.

INBAR dedicates considerable effort to technology transfer activities, including training, formulation of technology packages and pilot demonstrations. It has a strong focus on identifying appropriate development options and analysing the sociological and economic impacts of new policies and technologies. Strong linkages are also being built into rural development projects of IFAD, the World Bank and other agencies.

## **PROGRAMMES**

INBAR currently has seven major programmes. To achieve the objectives of each of the programmes, the network awards small grants of usually up to US\$25 000 for research and development action projects. INBAR also organizes workshops as appropriate to explore priority topics and to set the research agenda.

- The Natural Resource and Plantations Management Programme aims to improve the management of natural stocks, to encourage the cultivation of bamboo and rattan and to make their cultivation more efficient to increase the quantity and quality of these resources.
- The Utilization and Engineering Applications Programme works to upgrade

production and processing technologies, to establish standards for grading raw material, to identify new uses for bamboo and rattan and to develop new products and marketing techniques.

- The Environmental Applications Programme assesses and helps to realize the potential roles of bamboo and rattan in improving the environment.
- The Genetic Resources Conservation and Use Programme is developing methodologies for the assessment, characterization and the *ex situ* and *in situ* conservation of bamboo and rattan genetic resources, and for their sustainable use by communities.
- The Accelerating Socio-Economic Development Programme aims to provide the necessary information and analysis to guide the overall INBAR effort, identifying further research needs and development interventions to improve the income-generation potential of smallholder producer groups.
- The Information Dissemination and Technology Transfer Programme has the objective of building connections and forging innovative partnerships among stakeholders in the bamboo and rattan sectors for sustainable development. One of the major roles of INBAR is to act as a knowledge broker. To this end, the organization is developing INBARIS (INBAR Information Services) to integrate INBAR's resources and make them accessible to partners worldwide. INBARIS will include five regional information centres; comprehensive electronic and print databases and directories on bamboo and rattan species, uses, research, professionals, organizations and bibliographies; and INBAR publications, including a series of technical reports on recent research and results, working papers on new and important issues, periodicals such as the *INBAR Newsletter* and the peer-reviewed *Bamboo Journal*, and occasional reference publications and monographs.
- The Network Development Programme aims to develop and strengthen the network and its members through reinforcement of the previous network and development of new links.

## CONCLUSION

INBAR's development into an international organization represents a "first" in the development community, especially in relation to NWFPs. The mission of the new INBAR is to develop, provide and promote appropriate technologies and other bamboo and rattan solutions to benefit people and the environment. The organization aims to enhance the quality of life of poor and disadvantaged people in developing countries and to improve the state of forests and degraded environments. The focus of INBAR's operational framework is on economic self-reliance, poverty alleviation and sustainable development.

