

# **Socio-economic Issues and Constraints in the Bamboo and Rattan Sectors: INBAR's Assessment**

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**International Network for Bamboo and Rattan**

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## **PREFACE**

This document highlights the emerging issues in bamboo and rattan that have relevance to INBAR's programmatic approach to socio-economic development of rural and marginalized resource-poor communities. Using information from INBAR's 11 production-to-consumption studies from South and Southeast Asia (6 bamboo studies from China, India, Nepal and the Philippines, and 5 rattan studies from Indonesia, Laos and the Philippines), this document blends case-specific information with regional trends in bamboo and rattan cultivation, harvesting, processing and trade. The discussion is not intended to be comprehensive but illustrative of the issues that are common across the bamboo and rattan sectors in the countries studied.

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# 1 INTRODUCTION

## Bamboo and Rattan Economy

Bamboo and rattan are non-timber forest products (NTFPs) that thread together ecological, economic and social development. Certain characteristics of bamboo and rattan — ability to grow on marginal and waste lands, rapid growth, low-cost extraction, low-cost processing, multi-functionality — make them important for subsistence and income needs of rural communities, especially those with few alternative resources or employment opportunities. At the same time, bamboo and rattan are amenable to labor-intensive production systems in large-scale plantations and value-added processing.<sup>1</sup> Similarly, the direct and indirect ecological contributions of bamboo and rattan such as soil rehabilitation and biomass production, and its high value as an NTFP, underscore the “integral” nature of these plants and their wide-ranging benefits.

Worldwide, over 2.5 billion and 700 million people, respectively, trade in or use bamboo and rattan. Domestic trade and subsistence use of bamboo and rattan are estimated to be worth USD 4.5 billion and USD 2.5 billion per year, respectively. Global exports of bamboo and rattan generate another USD 2.7 billion and USD 4 billion, respectively. Additional (non-priced) socio-economic benefits attributed to these two plants include enhancement of women’s and marginalized groups’ economic position and mainstreaming of the rural poor in market economies.

The full socio-economic potential of bamboo and rattan is yet to be realized. As bamboo and rattan products enter diverse markets, the value of these resources stands to grow. Additional benefits may accrue from intervention in the sector to systematize resource use, management, marketing and processing. Furthermore, today only a small number of the approximately 1 250 species of bamboo and 600 species of rattan found worldwide are applied in domestic, commercial and ecological purposes<sup>2</sup>. If a few more species are discovered to have equal, if not greater, potential the magnitude of additional benefits would be tremendous.

Currently, the bamboo and rattan sectors are witnessing how market failures dictate an inequitable distribution of benefits to community collectors, and how policies affecting resource access, ownership, use and management constrain the benefits to users and result in over-harvesting. In several high-value industries and countries, growth in marketing and processing has been faster than the enactment and implementation of conservation and sustainable management policies. In addition, there has been insufficient

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<sup>1</sup>High-value products from these resources include paper and mat boards (primarily bamboo), and high-value furniture (primarily rattan).

<sup>2</sup>Ecological purposes refer to, among other things, bamboo’s substitutability for wood and as such, its impact in reducing the demand for wood; hence, this is bamboo’s role in enabling regeneration in natural forests and conserving biodiversity.

focus on raising incentives and popularizing technologies for intensive management. Broad-based technical training has also received inadequate attention.

## **INBAR**

The International Network of Bamboo and Rattan (INBAR) — an international, independent, not-for-profit organization — is probably the only institution taking an integrated approach to understanding the impacts of market and non-market forces on the bamboo and rattan sectors, and promoting options for using bamboo and rattan as engines for rural development.

INBAR is a network of institutions and individuals committed to development-led interdisciplinary research on bamboo and rattan. During its nascent stages, INBAR used its expertise in biodiversity conservation, production, processing and socio-economics to enhance national capacity in bamboo and rattan research and integrated development, to coordinate bamboo and rattan activities, and to facilitate information exchange between its member countries. Research activities during this period: (1) identified characteristics of bamboo and rattan that would guide their management and use; (2) tested various conservation, production and processing techniques; and (3) studied users' characteristics, markets and applications of these resources. Since its inception, the Network has enabled members to transfer technology and other inputs between countries, participate in exchange visits, and interact and share information at various conferences, meetings and workshops.

As an independent institution, INBAR is extending its network in Asia and including countries in Africa, Latin America and North America. Maintaining the emphasis on poverty alleviation and community based approaches, INBAR is focusing on the application of bamboo and rattan for ecological, food and livelihood securities. Using its action-research capacity and development capabilities, INBAR identifies, catalyses, facilitates and promotes the use of bamboo and rattan for rehabilitating marginal lands, sustainable resource use, poverty alleviation and equitable economic development. It also undertakes information dissemination, technology transfer, capacity building and development consultancy services to meet its objectives.

## **INBAR and Socio-economics**

With support from its Board and donor organizations, INBAR has prioritized activities in the socio-economic dimension of bamboo and rattan development. In this realm, it has directly and indirectly generated benefits in bamboo and rattan sectors by:

- designing and transferring low-cost efficient technologies;
- expanding applications of bamboo and rattan resources;
- creating incentives for regenerating natural stands;
- calculating profitability of alternative marketing and production systems;
- assessing users' needs for potential interventions;

- creating capacity in various institutions for conservation;
- promoting intensification of cultivation; and
- examining existing policies and recommending reforms.

An important undertaking of INBAR has been to understand the opportunities and constraints to expanding the bamboo and rattan sectors in ways that assist large segments of the rural poor who use these products. INBAR's socio-economic research takes a holistic approach in examining the technical and institutional issues found in the field. INBAR seeks to identify appropriate development interventions in bamboo and rattan through sustainable community-based changes, such as local level capacity building, value addition and formation of associations.

To date, INBAR has carried out extensive socio-economic research in several of its member countries. Two of its main products have been a series of "Database Studies" and "Production-to-Consumption System Analyses". Other work has examined secondary sector (fishing, *agarbathi*, handicraft) uses of the products and consultancies.

The database studies were undertaken in five countries (China, India, Indonesia, Nepal and the Philippines) to collate existing qualitative and quantitative socio-economic, trade and production statistics. These were small studies, intended to review the secondary literature as a basis for further work. Reviews of the data were undertaken under the recognition that bamboo and rattan data had been considered relatively unimportant by government agencies and hence subject to wide inconsistencies. Weaknesses in the data have been compounded by systematic under-reporting of production and consumption information, especially with regard to the large volume of products that are traded informally. Despite these weaknesses, these reports clearly showed the current value and potential growth of bamboo and rattan in the region.

### **Box 1**

#### **Socio-economic Issues with Bamboo and Rattan**

Some of the issues in socio-economic development through bamboo and rattan include efforts to:

- Expand application of underutilized and valuable species
- Explore advantages of alternative property right regimes
- Design and promote technologies for intensive management and processing
- Increase returns to gatherers to enable community growth
- Increase returns to small and large producers
- Improve local processing skills
- Lower risks to small-scale traders
- Expand markets for bamboo and rattan in all sectors

Production to consumption system (PCS) analyses constitute a major insight into the 'ground realities' of all participants in the bamboo and rattan sectors. The PCS involves a systems approach to analyse the stock and flow of bamboo and rattan from the harvesting of raw material through to the final product and market. Each point of product transformation or processing is examined vis-a-vis the stakeholders involved, the functions performed and the market linkages (Belcher 1995). The PCS approach enables researchers and practitioners to identify how changes (e.g. increase in production through cultivation) would affect the whole system and its parts.

Eleven PCS studies were conducted in China, India, Indonesia, Laos, Nepal and the Philippines on bamboo and/or rattan. These studies were undertaken by national program researchers to: (1) identify the constraints and opportunities for sustainable development of these resources; and (2) provide a basis for eliciting more general lessons applicable to these sectors. The studies revealed, among other issues:

- the extensive subsistence use of bamboo and rattan;
- the ecological and economic benefits from bamboo and rattan;
- the potential benefits from income generation and employment;
- the lack of adequate technology to improve production, preservation and processing;
- the need to increase resource-base through various mechanism; and
- the need for policy reforms.

Using findings from the PCS studies in South and Southeast Asia, INBAR has broadened its socio-economic approach. INBAR focuses its work through three principal areas food, ecological and livelihood securities, and socio-economics is an integral dimension of each of these areas. INBAR's interdisciplinary approach considers bamboo and rattan development through all stages — from raw material input to final output — and examines the impact of technology transfer and market expansion on rural people and communities. Overall, INBAR seeks to build connections through its members to all users of bamboo and rattan to help them realize the immense potential of these products.



## **2 BAMBOO AND RATTAN SECTORS**

In the major bamboo and rattan producing countries of South and Southeast Asia (China, India, Indonesia and the Philippines), over 2 million people formally work with bamboo and another half a million in rattan-based activities. The work is often seasonal and viewed as a source of supplementary income. Earnings from collecting these resources can be as high as 80 percent of household income, and work in factories can bring home wages equivalent to twice the minimum wages.

In most cases, rural labor (harvesting, trading and processing of bamboo and rattan) occurs in the informal sector where a minimum of investments in information and technology is evident. As a result, activities in rural areas cause direct or indirect ecological and economic costs. Perhaps with the exception of China, government initiatives in these sectors have overlooked the value of this large informal sector and provided limited training services or infrastructure to improve practices and efficiency.

By contrast, the larger players in bamboo and rattan economies capitalize on the potential of these resources, benefiting from existing policies, regulations and technical services. While smaller players (including collectors, traders and laborers) receive a fraction of possible earnings within this sector. Improving the position of small producers and collectors in bamboo and rattan sectors will require introducing improved silvicultural and resource cultivation techniques and efficiency-enhancing technology, modifying policy to recognize the needs of these participants, and facilitating their entry into new bamboo and rattan markets.

This section synthesizes findings from PCS studies to illustrate case-specific issues concerning the development of bamboo and rattan sectors in various contexts. Focus areas include the (1) resource, (2) participants, (3) constraints to sustainable resource management, (4) intensive management constraints and opportunities, (5) issues in value-added processing, (6) price formation and benefit distribution, and (7) policy impacts and implementation failures.

### **Bamboo**

Market-driven changes in the bamboo sector have encouraged communities previously not involved with the resource to enter a bamboo-based economy. Traditionally, bamboo was used for domestic purposes and supplies were extracted based on need. Now, additional applications of bamboo have propelled it into new domestic and international markets, increasing profits and income for most participants in the sector. Bamboo generates substantial export income for several countries, such as China (USD 329 million in 1992) and the Philippines (USD 241 million in 1994).

Bamboo is becoming increasingly important for several developing countries in South and Southeast Asia because of the employment it offers to otherwise marginalized groups. However, expansion of the bamboo sector has not received the support required to ensure ecological and socio-economic sustainability. Instead, the focus has been on profits and industrializing bamboo production. To generate widespread benefits, external support should foster bamboo development close to the resource base to enable growth in communities most dependent on it.

## Resource Base

Most of the 1 250 species of bamboo found worldwide offer ecological benefits such as: neutralize acidic soil; produce biomass; generate extensive rhizome networks; and bind soil. Bamboo is found in a wide variety of soils and grows intercropped with tree and agricultural crops. However, only a small fraction of these are used for commercial and/or domestic purposes. Although nearly 200 species are found in China and India, only a relative few — including *Phyllostachys heterocycla* var. *pubescens* (China), and *Dendrocalamus strictus* and *Bambusa bambos* (India) — are used to create a wide range of end-products.<sup>3</sup>

Most bamboo-processing countries are facing a shortage of raw material. The causes of this range from over-harvesting (resulting from poor and inadequate tenure policies) and conversion of bamboo-forest land to settled agriculture or shifting cultivation. Restoring productive agricultural land to bamboo production is often difficult, as is seen in Nepal, where farmers' concerns for food security are more pressing. However, if bamboo product markets can be supported, partial conversion (in some cases, back) to bamboo land may assist farmers move from subsistence agriculture and into mixed farming and the cash economy.

## Participants in the Sector

The multiple uses of bamboo integrate various socio-economic groups in the bamboo economy. The participants discussed in this section include those on the supply side of raw materials and processed products. It is important to note that in addition to benefiting the participants mentioned below, bamboo applications in traditional sericulture, fisheries and other sectors benefit large numbers of rural communities not considered in this paper.

**Bamboo collectors** are defined as those who grow bamboo on their homesteads and/or collect it from forests. Collectors, or their family members, carry out primary processing (cleaning, drying, scraping and splitting) close to collection sites.

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<sup>3</sup>Other species are mentioned in each of the PCS country studies.

Collectors often have small land-holdings that barely meet subsistence food requirements. Some collectors have traditionally collected the resource, while others have entered the trade for an additional source of income. Most collectors harvest bamboo during seasons of low agricultural activity for supplementary income.

**Traders or intermediaries** (agents) transfer products from collectors, primary processors and craft workers to larger markets or manufacturers. Traders play an important role in advancing money to collectors and craft workers on the guarantee that they would receive the material collected. The private contractor either sells directly to manufacturers with whom they have business relationship or to markets of their choice. Traders' degree of independence from manufacturers varies: some have local, regional and national market information, while others are completely dependent on their relationships with manufacturers for market facts.

**Craft workers** are usually (and increasingly) elder members of families or women. They add value by making items such as furniture, handicrafts, mats, chopsticks, skewers, wooden spoons and toothpicks. For example, members of tribal communities in India (such as *Basods* in Madhya Pradesh and *Thakurs* in Maharashtra) make bamboo crafts from their homes or in the homes of their regular clients. Craft workers are also found in urban and surrounding areas, working directly for manufacturers.

**Industrial manufacturers** transform bamboo into several utility products such as in the pulp and mat board industries. In 1993-94, the pulp-based industry of Kerala, India, consumed 169 000 tons of raw material, equalling 38% of state supply. Bamboo mat board production is also growing in scale. Many manufacturers now obtain the required raw material through long-term agreements with the government for cutting rights to a specific amount of bamboo from state lands.

## **Issues in Sustainable Resource Management**

In most countries, and especially in those where bamboo management is the domain of the state, ineffective investment and poorly enforced authority have contributed to declining bamboo stocks. For example, in Madhya Pradesh, India, the State Forest Department issues cutting permits on a 3-4 year cutting cycle, but performs only limited field verification of permit regulations. State management typically relies on natural regeneration for stock replenishment. However, since tending and supplanting with additional inputs is minimal, productivity is either stagnant or decreasing. Not surprisingly, 55% of total productive bamboo forests in Madhya Pradesh died after gregarious flowering.

## **Box 2**

### **Enhancing Tenure over Bamboo Resources through Community Forestry**

Nepal's forests have been under State ownership since 1950. The overruling of customary rights resulted in extensive degradation of forest resources. To reverse the threat on forest resources from unsustainable harvesting, Nepal implemented a Community Forestry Program (CFP) in 1988. CFP transfers use and management rights to forest user groups (FUGs). The FUGs are able to decide how to control use, access and management of their forest resources. This transfer of rights presents the necessary incentives for FUGs to invest in sustainable forest resource management. In the forest areas with bamboo forests, FUGs can profit from managing bamboo. For example, the Jhobai Kholsi Churiya User Group capitalized on the bamboo available in their 350 ha forest area. In 1994, this FUG generated NPR 14 000 from bamboo shoot extraction. The sales are expected to increase in subsequent years.

Source: Karki et al. 1998

The exception is China, which has taken major strides in creating private incentives for bamboo cultivation and wild resource management. For example, in Anji County, China, reforms providing farmers with 20-year property rights have provided the necessary incentive to maximize the potential of bamboo. There, farmers directly retain some benefits of their individual labor and have, in turn, sought to maximize profits through intensive management and long-term investments.

In the light of government policy weaknesses, illegal cutting prevails side by side with legal harvesting. Collectors with permits commonly over-harvest and disregard silvicultural regulations. In some places, such as Karjat, India, obtaining a permit is extremely bureaucratic and forest guards exacerbate associated problems by demanding additional unofficial payments (bribes). As a result, individuals prefer the risk of illegal harvesting to the struggle for obtaining legal permits.

Mechanisms to enhance tenure rights can range from long-term harvesting licenses to State-run programs, such as community forestry programs (see Box 2) in Nepal and the Philippines. These programs attempt to organize groups of people to become legally recognized stewards of nearby public land. Though these mechanisms are not new, a relatively slow pace of implementation has limited total impacts from the reforms.

A remaining issue influencing over-harvesting is a lack of grading systems and poor market information. Raw bamboo sales occur primarily in rural markets where there is limited demand-side competition or price-quality information to help differentiate supplies. Without consistent standards for bamboo, gatherers have an incentive to collect the maximum quantity. The problem is that more bamboo is

harvested than is sold, thereby reducing the growing stock unnecessarily. A low-cost, simple grading system supported by standards could generate price-quality information and reduce indiscriminate harvesting from natural stands.

## **Intensive Management Constraints**

Intensive management of bamboo or bamboo plantations is critical for increasing bamboo supply. While a few countries have successfully promoted bamboo plantations, far more struggle with providing the needed technical and financial support. In the Philippines, government, non-government and socio-civic organizations made joint promotion efforts in various provinces. The Philippine banana industry, which consumes about 13 million bamboo poles per year, started growing bamboo for their use. Plantations in Anji County, China, benefited from policy reforms and assistance, tenure incentives and financial support. Farmers also received important technical training on intensive propagation techniques that complement local conditions.

Establishing bamboo plantations requires initial capital investment, training and information. Small-scale plantations, backyard bamboo-gardens or nurseries can be established with culm cuttings or seeds in open spaces around the village, where wastewater and spillage can be used for irrigation.

### **Box 3**

#### **Are Bamboo Plantations Economically Viable?**

In the Philippines, few individuals and organizations have invested in plantations. There are several reasons for this, including the fact that under prevailing interest rates, plantations are not an attractive investment. The net present value (NPV) of a one-hectare bamboo plantation over a period of 10 years has been shown to be positive (a sensitivity analysis found NPVs of PHP 443 838 at 12%; PHP 361 172 at 18%; PHP 258 925 at 20% and PHP 187 645 at 25%). But, if the analysis is limited to realistic conditions, a bank interest rate of 25% would apply. At this rate, returns are higher from a bank deposit than an investment in bamboo plantations.

These differing conclusions can be reconciled if the intangible benefits of bamboo plantations are considered, including rehabilitation of degraded land and agriculturally non-productive areas.

Source: Rivera et al. 1995.

Poorer farmers face higher risks and uncertainties in undertaking investments, and need more information to evaluate these opportunities. Agricultural and forestry institutes commonly conduct research on clump management and harvesting techniques but results seldom reach bamboo growers and craft workers. In Madhya Pradesh, India, a lack of information sustains local farmers' fears that bamboo competes

with other crops for water, light and nutrients. Between 27-70% of the farmers who could cultivate bamboo chose to illegally harvest it from forests.

## **Issues in Value-added Processing**

Most applications of bamboo cater to the household. Primitive tools, such as machetes, are used to make useful products for construction, tool handles, fish traps, baskets, containers and various other products. Although extremely valuable to their users, these bamboo products have a short life-span and generate minimal value-addition. In Nepal, the largest consumption of bamboo is in such products and occurs in rural areas; little higher-end processing occurs there. Instead, raw material is taken to urban centers, and processed to high value-added products, like furniture and bamboo handicrafts, even though profits from these items could increase if production sites were located in rural areas where factor costs are relatively low.

Increasing the value addition of bamboo, especially close to the collection site, begins with improved technology and current product designs. Simple improvements are available to reduce the drudgery of collection and primary processing and enhance quality and consistency of finished product. However, while such techniques and technologies exist, little has been transferred to collectors and rural processors. For example, in the Philippines, neither producers/gatherers/traders nor laborers receive necessary technical assistance or technology (not even information on these) that would enable them to improve their product's quality and design.

Access to and understanding of commercial or larger markets are also important to increase bamboo product value. In Anji County, China, the government facilitated connections between bamboo processors and commercial manufacturers so that processing is based on demand. In the Philippines, by contrast, processing occurs away from the collectors, limiting market influence on collection and returns from value addition. In Karjat, India, the tribal community is isolated from large markets, and is thus unaware of how to modify their products to meet emerging needs. Manufacturers in the Philippines overcame similar constraints by forming trade associations facilitating information exchange among them.

## **Price Formation and Benefit Distribution**

The price for bamboo products depends on a number of factors including product quality, degree of value added, and competitiveness and structure of the market. Raw material quality — age, size, color, moisture content and straightness of bamboo culm — has a significant bearing on product quality. Unfortunately for producers, they have limited access to quality grade information and commonly lose revenue on their product because of this. Traders and manufacturers are better able to use market information to favorably influence their terms of trade.

Bamboo undergoes several transformations before final product stage is reached. After each point of transformation, a transfer or transaction occurs by which the

bamboo is exchanged for barter or cash. Bamboo trades in various types of markets that differ by type of buyer: end-users and traders. The market (heavily influenced by buyers) determines the price of the product and distribution of benefits. In tribal areas of India, direct sales to end-users are often conducted through informal markets where: the degree of value-addition is limited; items are made to order; quality standards are flexible; and buyer purchasing power is low. Direct sales to end-users also occurs in town markets or local fairs that attract buyers from a larger area. In these markets, prices are higher but so is supply, and there is always a risk of not selling everything. In Nepal, direct sales to traders occur in transit markets located on highways that sell raw products on particular days. At such markets, large quantities of few bamboo products are sold. Direct sales of specific quantities to traders are also arranged prior to harvesting through cash advances.

Larger national and international markets deal in higher-end products that have already passed through several transformations. These markets have strict standards and quality requirements, making them inaccessible to unorganized producers. Producers and manufacturers entering these markets have the necessary capital, information on market standard, quality products, and demand and linkages within the markets.

In Nepal, enterprising collectors and farmers who have boosted production of bamboo have not received commensurate increases in profits. Urban market prices have been steadily increasing, but the resultant profit is mostly going to the intermediaries and retailers rather than farmers. Similarly in the Philippines, manufacturers of bamboo fans receive the largest share of profits, approximately 45 times more than the gatherers who invest physical labor and collect the raw material. Each market structure and buyer-seller relationship offers different prices and profit distributions.

In several bamboo-producing countries, government has intervened to mitigate the exploitative nature of the market. Certain initiatives have been less successful than others because they recreate market monopolies, and are unsuccessful in replacing the intermediaries and providing an alternative institutional mechanism of a comprehensive and competitive nature. Monopolistic government cooperatives, like the Kerala State Bamboo Corporation (KSBC), create a new organizational form that does not offset the structural deficiencies and positive aspects of previous structures (see Box 4).

Policy reforms in China have transformed a state-organized trading monopoly into a competitive market, currently dominated by private traders. The latter have contacts ranging from local to outside trading companies and enterprises. As a result, the traders have linked bamboo plantations and the market, enabling competitive demand to drive prices and purchases.

Private traders can be flexible intermediaries. Nevertheless, the monopoly exercised by some private traders have also introduced a dimension of insecurity to

collectors, including a lack of purchases during unfavorable market conditions and a reduction in buying prices when profit margins are slim. To overcome the resultant constraints, farmers in China have formed their own trade organizations that endorse legal contracts with processing enterprises on supply and price.

## **Policy Impacts and Implementation Failures**

Several of the government initiatives and policies on management, tenure, technology transfer and market monopolies have been presented earlier. In most bamboo-producing countries, government interventions have been ad hoc and seldom responded to changes in demand and supply. Initiatives have been limited to particular aspects of a bamboo-based economy rather than coordinated sector-wide interventions.

In India, government interventions have focused on short-term needs rather than mechanisms to ensure sectoral growth. State governments have focused on input supply (independent of quality) and in certain cases created artificial demand. However, there has been limited, if any, effort to transfer technology, enhance local capacity and ensure long-term access to the raw material. For example, the KSBC emphasized resource protection and conservation, but not resource utilization and regeneration. Further, decisions regarding bamboo production are often taken without involving the bamboo-working community.

### **Box 4**

#### **When Government Mechanisms Cause Stagnation in the Sector**

The Kerala State Bamboo Corporation (KSBC) was established to replace the intermediaries, and ensure sustainable harvesting of *Ochlandra* and other bamboo species. There are three legal channels for harvesting — the KSBC sector, head-load passes and the quota allocated to private companies. The basic eligibility criterion for getting a pass from KSBC is that the cutter must have a proven extraction rate of a minimum of INR 3 000 worth of bamboo per year. But without a pass, no one can extract bamboo. This contradiction has led to the nurturing of an informal sector by KSBC itself.

There are indications that participants of the various sub-sectors of the industry have joined to promote private interests rather than wider long-term interests of the bamboo resources and workers. For instance, a tacit agreement between private traders and KSBC officials is alleged which facilitates a clandestine but systematic leakage of raw material from the product streams. Therefore, despite the official policy of promoting public or collective interests, the practice has been one of promoting selective private interests. For this reason, the industry has been showing a trend towards stagnancy over the past decade.

Source : Mathew, P.M. 1998.



It is only with an overall sectoral approach that government initiatives can enable development. Independent efforts, like technological advancement, can lead to enhanced productivity, but this does not ensure increased income and employment. Anji County, China, has shown that bamboo sector development must be the cumulative result of policy reforms that include removal of price controls and monopoly marketing, and promotion of bamboo manufacturing and trade. With bamboo trade governed by supply and demand forces, the local government has focused on developing new techniques and in development planning. The cumulative effect from these policies has increased industrial demand for raw bamboo culms and shoots by 4.5 to 30 times, respectively. In Nepal, the recent liberalization of the economy has made it easy to set up small rural enterprises. Good markets exist for most of the products, and some financial and technical assistance is available.

Government interventions, most importantly, have to be collaborations between government agencies administering bamboo enterprises. In China, the Forestry Department, Light Industry Department, Industry and Commercial Management Bureau, and Foreign Trade Committee are all associated with the bamboo sector. Each of these agencies has established its own enterprises to protect and promote sector benefits as they see fit, sometimes without considering the impact on raw material supply and final product markets.

## **Rattan**

The rattan sector cannot be discussed without first mentioning Indonesia and its dominance over world rattan trade. Indonesia has a clear advantage over other countries with its overwhelming supply of wild and cultivated rattan (80% of the world's raw material). Indonesia's public and private sectors have created strong business relationships in all PCS linkages, establishing a versatile in-country trading system that efficiently moves raw and processed materials over land and water. In addition, government policies promote the rattan sector through investment and trade enabling Indonesia to influence world rattan prices and product standards.

The importance of rattan in Indonesia and elsewhere stems from its economic and ecological benefits. While rattan contributes about USD 300 million to Indonesia's foreign exchange holdings and is an important vehicle for rural development, it also raises the value of standing forests. Rattan is the most valuable commodity among non-timber forest products (NTFPs) in the country, earning 90% of total export earnings from such products.

Although rattan-producing countries differ in trade dominance and raw material supply, they share several common issues related to sectoral development. This section discusses the status and implications of sector-wide issues based on data generated by the PCS case studies in Indonesia, Laos and the Philippines.

## **Resource Base**

Wild rattan grows in the tropical forests of South and Southeast Asia, parts of the South Pacific (such as Papua New Guinea) and West Africa. Rattan is a climber that

needs tall trees for support. Much of the world's stock of rattan grows in over 5 million hectares (ha) of forest area in Indonesia. Other Southeast Asian countries, such as the Philippines and Laos, have considerably less rattan in total but have been relatively self-sufficient considering the respective size of their rattan processing sectors.

Species differ in utilization based largely on stem (cane) diameter. Small-sized rattans — such as *Calamus caesius*, *C. trachycoleus* and *C. impar* — are used for making baskets, webbing, floor mats, etc. Large-diameter rattans — such as *Calamus manan* and *C. scipionum* — are used mostly in furniture.<sup>4</sup>

In the PCS study areas (Indonesia, Laos and the Philippines), parts of the rattan resource base is becoming scarce. Certain forest areas are more severely affected by over-harvesting than others. Some governments, like Indonesia, have no information on rattan species distribution, density or productivity to facilitate and coordinate effective resource management. Nevertheless, there are few private initiatives to cultivate rattan and increase supply.

## Participants in the Sector

The rattan sector employs men and women, young and old in various capacities. The Indonesian rattan industry officially employs over 150 000 people; in the Philippines, 6% of the population (4 million people) are involved in the rattan sector for either their livelihood or supplementary cash income. While most people involved in rattan depend on it for more than half their annual income, a small percentage makes sizable profits from rattan trade. The various participants in the sector may be categorized into five groups.

**Rattan collectors** are often small farmers or tribal people who collect rattan in labor-specialized groups: men harvest from the forest and haul it to a village or roadside, while women and children scrape, dry and sort the raw material. These families are typically hired to collect a contracted amount of raw material for a specified sum. Their annual incomes are often highly dependent on rattan work. In the Philippines, some collectors are associated as a cooperative, enabling them to more effectively bargain for higher raw material prices.

**Plantation owners/operators** include private tree plantation companies, village farmers, or individuals contracted by the government for reforestation programs (as in the case of the Philippines). This group shares a focus on bottom line profitability of rattan cultivation. Plantation owners commonly hire labor to harvest rattan and provide them the necessary tools. Farm-level cultivation of rattan is found extensively in East Kalimantan, Indonesia, but little elsewhere. Most rattan plantations are established in forest lands leased from the government.

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<sup>4</sup>Other species are mentioned in the PCS studies.

**Small-scale traders** differ by their access to the resource base (via number of cutting permits), degree of vertical integration in the PCS, and proportion of non-rattan income. Smaller, ‘town-based’ traders are more dependent on rattan trade and vulnerable to changes in demand than larger “provincial” or “city-based” traders who have sufficient capital to stock rattan and hire people to perform value-adding procedures. Regardless, few traders influence raw material demand or harvest levels. Typically, all traders have either formal or informal business relationships with rattan cutters and buyers (whether semi-processors or manufacturers). In very few cases, traders perform processing themselves. The most successful traders have storage compounds so that they can maximize their gain from price fluctuations. Profits earned by this group are generally quite small (less than 10%).

**Small firms/Semi-processors** broaden competition in the value-added sub-sector by employing men and women to perform specific ‘semi-processing’ of rattan. Most of these firms are small in scale, financially dependent on value addition to rattan, and have little control over the resource. In Indonesia, small firms are not linked to semi-processors, but are often sub-contracted by large firms; making them vulnerable to market shifts. Semi-processors often face supply constraints because of their weakness relative to large firms; even inefficient large manufacturers out-compete them. Nevertheless, some semi-processors in Indonesia reportedly make 50% profit, though the majority earns much less. Various government schemes in Indonesia have had some success in strengthening this sub-sector through training in processing.

**Medium to large manufacturing firms** are distinguished from semi-processors based on scale of production<sup>5</sup> and market connections<sup>6</sup>. With their permits and/or concessions, medium to large firms directly determine harvest levels for most, if not all, raw material in Indonesia, Laos and the Philippines. Manufacturers employ large numbers of people and increase direct and indirect benefits to the local and national economy. Manufacturers often employ brokers who distribute finished products to retailers and exporters. Larger manufacturing firms, whether producing furniture or handicrafts, dominate rattan markets in most countries through their eligibility for policy benefits and financial resources.

## **Issues in Sustainable Resource Management**

In government forests, forest departments manage rattan stocks by (1) limiting harvests to an allowable cut and (2) managing resource flows by granting or selling harvesting permission. Licensing rules vary between countries in eligibility and cost, but all attempt to limit rattan extraction. In addition, licensees and concessionaires are bound by the rules to properly harvest and replant.

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<sup>5</sup>In Indonesia, the amount of capital investments distinguishes manufacturers from semi-processors. For manufacturers, investments range from Indonesian Rp (IDR) 1 billion to over IDR 100 billion. (USD 1 = IDR 2 300).

<sup>6</sup>Manufacturers directly employ retailers/exporters or have formal trade relationships, while semi-processors are dependent on contracts from retailers/exporters and/or their informal relationship with traders.

## Box 5

### Traditional Cultivation of Rattan

In East Kalimantan, Indonesia, traditional cultivation of small-diameter rattan dates to the 19th century when shifting cultivators realized the value of growing rattan 'gardens' for the valuable floor mat trade. Today, 24 000 ha of rattan is planted in plots of up to 8 ha (about 80% of a farmer's land). Rattan clusters are harvested every 3-4 years to produce 750 to 1 300 kg/ha/y, generating over IDR 2 million in income. This crop earns over 80% of an average farmer's income.

This cultivation pattern is beginning to wane as recent economic and policy conditions have promoted land conversion to fast-growing and profitable oil palm. Policies that further depress cultivation include an export ban on floor mats and private royalties levied on rattan production. In just two years, farmers have converted about 1/8<sup>th</sup> of their rattan gardens.

To assist rattan cultivation, the government should attempt to boost productivity by adjusting its policies, and raising awareness on proper cultivation techniques, seed selection, transplanting and intensive tending. Demonstration plots should be established to transfer knowledge and institutions should increase credit access.

Source: Purnama et al. 1998.

In practice, harvesting guidelines are rarely adhered to by licensed gatherers, nor are they enforced by authorities. Gatherers, who have no tenurial rights over the resource and earn low returns from collection, receive no direct benefits from conservation. Hence, most try to maximize harvests, especially of high-value large-diameter species. And, rattan traders will take whatever they can get. Poorly implemented and enforced policies not only enable over-harvesting but also reduce the potential returns from forest products, thus creating losses in both natural and financial resources<sup>7</sup>. Since the forest department allocates inadequate funds<sup>8</sup> for restocking and enrichment planting, state ownership of rattan forests abates over-extraction of the resource but does not enhance management.

The impact of over-harvesting can be seen in all PCS study areas: in Indonesia, large-diameter rattans are becoming scarce; in Laos, the rate of exploitation from accessible areas is unsustainably high; and in the Philippines, which has recently

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<sup>7</sup>Estimated illegal harvest is 1/3rd of officially recorded harvest in Sulawesi, Indonesia, resulting in significant loss of royalty.

<sup>8</sup>Of royalties collected in Sulawesi, Indonesia, only 35% is spent on rattan management, 45% on "local development" and 20% is remitted to the Central Government.

become a rattan importer. Some positive signs of change are seen in response to this situation. For example, in the Philippines, permit-holding rattan gatherers are forming associations and more actively replanting seedlings. Also, long-term tenure control is being explored for community-based forestry management institutions. While all participants want a sustainable supply, competition over resources, weak management and steady (or rising) product sales and prices create incentives for over-harvesting in government forests.

## **Intensive Management Constraints**

Private sector cultivation of rattan, from both large — and small-scale plantations, has fallen below expectations and failed to respond to local raw material scarcities. An estimated 37 000 ha of mostly high-value rattan species are grown in Indonesia, while only a paltry 6 000 ha is found in the Philippines where scarcity is more pronounced.

Policy initiatives (incentives and regulations) to increase small-scale rattan cultivation have had limited impact as government policies and resulting economic conditions make investment in other resources more attractive. In addition to economic constraints, rattan (1) has a long maturation period (up to 15 years); (2) lacks secure tenure over resources; and (3) has difficult market conditions, which hinder small farmers and are too risky for many large farmers. Even the few traditional rattan collectors and farmers, who know the product and market, are not investing in enhanced productivity and are switching to alternative crops.

Though both large — and small-scale plantations in Indonesia are returning profits, other land uses are becoming more lucrative (see Box 5). For example, in Java, the internal rate of return (IRR) for inter-cropping pine and rattan is only 0.8% higher than mono-cropping pine<sup>9</sup>. In some cases, as with Indonesian government's export bans, policies have depressed rattan prices and made plantations uneconomical. The government also negatively influences product prices by allowing unsustainably high harvest levels through ineffective harvest permit enforcement.

More appropriate government intervention in enhancing cultivation is seen in several countries, and is in part justified by the economic benefits accrued to rural households<sup>10</sup>. In the Philippines, government investments in cultivation have been recently undertaken in 15 sites around the country. In addition, incorporation of plantations into community-based forest management schemes, with or without vertical integration in processing could be an important policy direction. Ultimate success will come from cooperation and collaboration between the government and the private sector to identify areas for rattan production and have the government make investments by planting support trees.

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<sup>9</sup>Any decrease in projected prices could easily create uneconomic conditions.

<sup>10</sup>In Indonesia, nearly 20% of income is derived from plantation work (nursery, field management, etc.) and about 70% of the beneficiaries are women.

## Issues in Value-added Processing

Rattan passes through many hands that perform one or several levels of processing before it reaches its final state. In Indonesia, over 100 000 people are employed in formal processing activities, with many more unaccounted for in the informal sector. Women form more than one quarter of the employed. Work is full-time and an average worker earns almost twice the minimum wage.

From the forest to and through semi-processors and manufacturers, rattan poles are scraped, dried, split, sized, cored and chemically treated. Typically, gatherers perform minimal tasks of scraping and drying, leaving the higher processing to skilled semi-processors or city-based traders who also maintain rattan stockyards. These initial stage processors are vital to the entire sector as they prepare the product for higher-end processing.

The different stages of processing combine various technologies and techniques to turn rattan into a useful product and raise its value. Yet, for most gatherers, time constraints, credit availability and technical assistance limit their adoption of modern/efficient technology. Small-scale processors face similar hurdles for expansion as they are typically low-capital, low-profit, home-based, use traditional techniques, and rely on the experience of older craftsmen. The PCS studies found in most cases that large manufacturers dominate this sector by utilizing more sophisticated machines and efficient processes. (See Box 6)

### Box 6

#### A Tale of Two Processing Industries

Laos presents an interesting example of an underdeveloped but growing rattan processing sector. In Laos, most processing is performed by hand, with only very rudimentary tools, and finished quality is low\*. As a result, the bulk of finished furniture is sold domestically, and only semi-finished poles are exported. In terms of rattan peel, Vietnamese machine-processed products are much cheaper and of better quality than those produced by hand in Laos. Recognizing that they are losing the major component of value-addition, some companies have started to invest in machines to improve quality and lower cost, and hire skilled managers and workers from outside the country.

By contrast, rattan processing and manufacturing in Indonesia dominates the rattan sector worldwide. Government policies, such as raw rattan export regulations, clearly favor the development of the finished products industry because of its impact on employment and foreign exchange. The sector includes a large number (5 000) of processing firms, of which about 90% are home-based. The firms are competitive but also specialized in a level of production and type of task. Large manufacturers dominate the sector, often relying on the smaller firms for specific tasks, but still controlling the lion's share of total profits.

\* Source: Vongkhamsao et al. 1995.

The underlying goal of participants in the processing sector is to produce quality products that command a high value. All participants seek this and all benefit (however marginally through market chains) from high-end product sales. To achieve greater high-value market penetration, skills and technology must be developed through training, technology transfer and demand-side market information, especially in foreign markets. Gains may also be made in stimulating demand for higher-end products from domestic customers. An increase in returns to value-addition should result in benefits to the large number of participants, directly and indirectly, in the processing sector.

## **Price Formation and Profit Distribution**

Price formation fundamentally begins with the attributes of the raw material which determine the path of trade and end-use. The most valuable rattans are the large-diameter ones (3/8 to 1-1/4 inches) which can be used to manufacture a variety of furniture items and handicrafts. Large-diameter poles sell for more than four times the price of small-diameter poles<sup>11</sup>. Small poles (under 3/8 inch) and ones of poor quality are processed differently and formed into floor mats and furniture webbing.

Other determinants of raw material costs are harvesting, transportation and processing costs. These factors relate to the infrastructure surrounding the resource. The poorest households have limited infrastructural support, and thus get the lowest net returns from their harvests because of their high transportation costs (within and to the forest).

Price is also determined by the type of transaction at different transformation points. Contracts are a common arrangement between traders/manufacturers and gatherers. Because rattan is heterogeneous, geographically dispersed, perishable and seasonal, contracts lower the transaction costs for gatherers and manufacturers. The relationship built through repeated contracts also ensures a minimum quality standard for traders/manufacturers which otherwise can be expensive to determine. The contract also proves beneficial for gatherers who have a guarantee of sale.

Profit distribution is tipped towards people such as large-scale manufacturers, who are financially independent of the rattan trade, but have control over rattan harvesting rights. In Indonesia, estimated total profit made is 5% by the gatherer, 10% by the trader, 20% by the semi-processor and 65% by the manufacturer. This profit distribution is more or less of the same magnitude in other countries.

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<sup>11</sup>The price difference is explained by the percentage value-added for handicrafts which is the highest at more than 350%, followed by floor-mats (327%) and furniture (273%).

The annual net income of rattan gatherers in Indonesia ranges from about IDR 1 million to 3 million (with the poorer villages earning the lower limit and depending the most on this income). They work more days (in the forest looking for rattan), earn less money and hence take home less profits. Across the region average net income from rattan compares favorably to farm work and road work, but for those involved in rattan, dependence is 80% or more. In the Philippines, efforts have been made to increase the returns of the gatherers through associations (see Box 7). Improvements in quality through grading and better access to markets (and market information) can add value to rural harvesting/production.

### **Box 7**

#### **Bargaining Strength through Associations**

One interesting feature of the Philippines PCS are the rattan cutters' associations. Encouraged by a government policy that allocated rattan cutting permits, gatherers' associations have been established in many places to bring a larger share of the product value to gatherers and increase incentives for sustainable harvesting. Some of these associations have taken on marketing responsibilities and perform semi-processing.

Rattan collectors' associations have both strengths and limitations. Prices they receive for raw materials can be three times what independent collectors receive. In some places, associations have managed to increase rural returns by 6% of total value but elsewhere, they have merely shifted power from traders to local individuals. However, further value capture is limited because of their comparative financial weakness and other government policies that enable large manufacturers to control resource demand.

The horizontal linkages from associations are often stronger in manufacturing and export stages of PCS. These associations provide market information services and effectively consolidate political influence, sometimes at the expense of non-association members. For example, ASMINDO (Indonesian Furniture and Handicraft Association) wields considerable influence on policies that further strengthen its members' competitiveness. They have promoted quality and volume restrictions on floor-mats, effectively influencing the industry size, demand and prices for rattan. Also, by excluding smaller firms (minimum requirement for association membership is an intake capacity of 1 000 tons/year) in ASMINDO, larger firms retain advantages over policy reforms.

Source: Pabuayon et al. 1998; Dwiprabowo et al. 1998.



Raw material traders in most countries have more bargaining power than gatherers, but are still relatively weak compared to processors. In Laos, traders depend on rattan for 20% of their income, the rest coming from other NTFPs. In part, because of their weakness in the market, traders and gatherers minimize transaction costs by forming strong business relationships<sup>12</sup>. Although, traders are able to dictate prices to gatherers who have few market outlets, they in turn become price takers in transactions with manufacturers and are left in control over a relatively small profit margin.

In all cases, medium to large manufacturers dominate the sector, especially those who have implicit or explicit control over resource flows. Manufacturers and processors earn profits in direct proportion to their level of capitalization. The smallest firms are highly vulnerable to fluctuations in rattan supplies and sub-contract orders, and few break even when prices change<sup>13</sup>. On the other hand, licensing policies in various countries have given medium- to large-scale manufacturers implicit control over rattan harvests and prices, enabling them to extract disproportionate profits from their own activities.

## **Policy Impacts and Implementation Failures**

Governments focus on rattan for several, and sometimes contradictory, reasons: to spur rural development since a high proportion of sector participants are poor; to generate employment in the labor-intensive processing sector; and to earn foreign exchange through exports. Various policies have impacted on the sector's structure and resource flow though each has embodied a particular bias, often directed against poorer participants. For example, raw material export restrictions are biased against raw material producers; harvest license fee, even if open to all bidders, is an entry barrier to most poor farmers (the fee in Indonesia is more than their average annual income)<sup>14</sup>; and, the licensing process involves long and uncertain waiting periods and bureaucratic procedures, which are detrimental to all those involved in the sector.

Clearly, government policies also benefit some rattan sector participants. Export restrictions, in particular, offers significant benefits to the large-scale manufacturing sector (See Box 8), but these benefits are not without trade-offs. As the leading producer of rattan raw material, Indonesia can exercise some control over international markets. By preventing raw material from entering the world market, they offer a two-fold

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<sup>12</sup>Like the contracts referred to earlier. Strong business relationships are also found between other members of the PCS.

<sup>13</sup>About 900 firms in Indonesia are reported to have collapsed in the last two years. Partly this could be due to unsound management because the export value of the products did increase and other firms easily took over the market share of the collapsed firms. However, it is also likely that those who failed were highly dependent on raw material sources over which they had little control.

<sup>14</sup>The fee is not stated but is believed to be as high as IDR 1.5 million. Poorer villages in Indonesia where rattan is collected earn about IDR 0.8 million per year and nearly 90% of this comes from rattan.

short-run competitive advantage to domestic rattan manufacturers. First, foreign competitors have limited access to raw materials. Second, domestic raw material prices are kept artificially low. However, these advantages are gained at the considerable opportunity cost of foregone earnings for unprocessed and semi-processed rattan that would have been earned by gatherers and semi-processors in either the domestic or international markets. Moreover, the long-term effect of reduced raw material demand could be reduced raw material domestic production as marginal producers switch to other activities. This, in turn, could create a new, lower domestic supply equilibrium. Additionally, the policy could stimulate a further shift from domestic products as foreign competitors seek alternative sources of raw materials and reduce their rattan requirements through substitution.

### **Box 8**

#### **Benefits from Export Restrictions**

Export policies have a tremendous impact on the development on value-added sector as well as the distribution of benefits from rattan trade. No better example of the impact is found than in Indonesia, where the government has imposed a series of bans, then taxes, since 1979 on raw and semi-processed materials.

These regulations have had a significant effect on rattan trading and processing. With better infrastructure, the rattan manufacturing industry in Java took off. Raw and semi-finished rattan, which in pre-ban years used to be exported directly from other islands, began to flow into Java. Prior to the ban, 87% of raw or semi-processed materials were exported, while afterwards all rattan (estimated at 125 000 tons), except about 6 000 tons of contraband, were processed domestically. In effect, the export ban was a subsidy for domestic processors as it artificially reduced demand for raw material. As a result, a diversified group of processors formed to carry out all types of tasks.

Interestingly, the ban-induced development of processing in Java has not gone unnoticed by Indonesia's other islands. Sulawesi has recently passed restrictions on the export of raw materials collected within its borders — the first inter-island trade restriction as far as rattan is concerned. Such restrictions within Indonesia may be beneficial to the raw material supplier, but may also lessen the country's manufacturing competitiveness.

Source: Dwiprabowo et al. 1998.

Government regulation has also met with significant implementation problems because of certain practical difficulties. With forest products, where production is geographically dispersed, direct enforcement is difficult, if not impossible. In addition, forest departments are understaffed and under-funded, making management difficult over a large area of forest resources. Consequently, enforcement procedures have focused on the post-harvest transportation of the raw material. In theory, monitoring rattan flows at checkpoints is practical; in practice, however, it allows substantial abuse by government officials. Police and forest checkpoint officers have the leverage to extract payments from traders seeking to reduce time and inconvenience costs associated with obtaining permits. It is also in the benefit of traders who, in the Philippines, pay 'standard operating procedures' (bribes) to increase their net returns by 15%<sup>15</sup>. Corruption of this kind is common across the region and also serves to benefit manufacturers by keeping prices low and supplies high.

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<sup>15</sup>Profits can increase by as much as 25% if documents are 'recycled.'

### 3 CONCLUSION

Bamboo and rattan are unique multipurpose resources with wide-ranging commercial, ecological and subsistence applications, and largely unexploited market potential. They offer development opportunities associated with widespread employment for marginalized communities, and provides oft-needed seasonal income. However, rapid expansion of bamboo — and rattan-based economies have often been at the expense of the resource base and equitable distribution of benefits. Often, initiatives promoting bamboo and rattan sectoral growth are oriented towards organizing raw material production, and improving the scale and quality of processing. If traditional producers or processors do not have the capital or technical capacity to participate in these activities, they are easily marginalized in the sectors.

Constraints common to both resources include decreasing supply of raw material, lack of adequate technology transfer, exploitative market structures and lack of government consideration for small-scale producers and processors. The PCS studies underscored the importance of coupling efforts to scale up bamboo and rattan production and processing with socio-economic considerations for economically and ecologically sustainable sectoral changes and equitable benefit distribution. Weaving the lessons learnt from the PCS studies into its activities, INBAR's objective is to apply these resources to achieve food, ecological and livelihood securities for rural communities in the 21st century.

Among the issues identified in the PCS is that developing long-term solutions to existing resource supply constraints will be instrumental in fuelling sustainable benefits from bamboo and rattan. Supply-related initiatives must ensure access to principal users, be financially attractive and serve multiple purposes in order to not compromise other agricultural activities. Such efforts must also recognize the long gestation periods (compared with agricultural crops), resultant opportunity costs and ecological value to determine ideal cultivation schemes.

Methods to increase resource supply are critical because they influence users' access and rights over raw material and market prices. Benefits from large-scale private bamboo plantations accrue primarily and directly to the owner, and indirectly to laborers. Supplies from large-scale plantations can periodically flood raw material markets and lower prices, if the units are not associated with a bamboo-dependent industry or buyer. In these events, small-scale producers are further marginalized. In contrast, cultivation on marginal farmland benefits a wider range of small farmers by ensuring a market for raw material buyers and further processing and sale. Cultivation of bamboo on communal land or of rattan in community-managed forests would further favor direct beneficiaries from intensive cultivation.

**Box 9**  
**Inbar in the 21<sup>st</sup> Century**

Livelihood, Ecological and Food Securities are priority concerns in INBAR's initiatives to alleviate poverty through bamboo and rattan. These three areas include:

*Livelihood Security*

- Improving subsistence uses
- Enhance sectoral uses
- Microenterprise development

*Ecological Security*

- Substitute wood products
- Promote plantations
- Conserve biodiversity

*Food Security*

- Rehabilitate degraded land
- Arrest soil erosion
- Manage watersheds

INBAR's activities to promote plantations complement local socio-economic and ecological conditions, including land size, current land uses, land quality and ownership patterns of land. INBAR encourages intensive cultivation on marginal lands belonging to small farmers or under community management. By cultivating on marginal lands, producers benefit from the plants' soil conservation properties and ability to restore wasteland, while increasing bamboo and rattan supply and reducing pressure from natural stands. Rehabilitated land is often amenable to agro-forestry practices, further enhancing benefits to farmers. Recognizing that producers seldom invest in rattan plantations, INBAR provides training and information to improve silvicultural practices in natural stands.

Associations (such as in the Philippines) have been instrumental in enhancing the position of participants in the bamboo and rattan-based economies. They have enabled participants to access market information, influence and benefit from policy changes, and increase bargaining power and profits. For bamboo and rattan associations to have widespread livelihood impacts, they should incorporate the participants who are most dependent on the resource for income. Associations that can enhance the scale and quality of activities, and formalize bamboo and rattan

collection and processing, must reinforce the viability of small-scale operations and market accessibility for marginalized groups.

By promoting microenterprise development, INBAR encourages organized use of bamboo and rattan and employment security for those working in the sector. INBAR's initiatives enhance the legal recognition of the diverse and often marginalized participants in the bamboo and rattan sector, thereby facilitating their entrance into larger markets. From earlier efforts, INBAR has shown that limiting the scale of activity to microenterprises does not inhibit the overall growth in the sector. "Social contracts" that link small processing enterprises with larger manufacturers (similar to those in the bamboo mat board industry), and associations of microenterprises have enhanced the socio-economic position of collectors and primary processors.

Wastage during harvesting and limited value-addition are a result of the technological deficiencies of small-scale collectors and processors. Currently, harvesting and collection of bamboo and rattan are done with primitive technology. Minor technological improvements and transfer of information regarding processing and timing of harvest can make significant efficiency improvements. Given the seasonality of harvesting, technology must be low-cost and serve multiple uses to be attractive for investment from collectors.

Introducing adequate technology and new techniques is one of INBAR's principal activities. New preservation techniques are introduced to increase the longevity of subsistence applications of bamboo and rattan and improve the quality of traditional bamboo and rattan products used in fisheries and sericulture. Advanced technology is promoted to improve the efficiency of bamboo and rattan production and processing. INBAR undertakes this with a view of improving the efficiency of microenterprises and promoting substitution of wood products with bamboo and rattan.

Existing market imperfections skew prices, quality standards and supply. Sustainable expansion of the bamboo and rattan sectors will require market-driven forces to enable collectors, processors, manufacturers and traders to capitalize on growing and changing market demands. To maximize returns, it is necessary to address existing weak links between production and marketing, and to diversify products. Rattan has an established commercial market for a diverse range of products, a market dominated by large-scale manufacturers. Bamboo, on the other hand, is still primarily used for subsistence purposes. Upgrading and strengthening existing markets and ensuring access for small-producers will require better connections between transformation points, with increased availability of information on market demand, quality standards and potential for new products.

INBAR's activities related to livelihood and ecological securities address market imperfections and attempt to establish transparent market linkages between producers and buyers. In order to improve subsistence and sectoral uses of bamboo and rattan, INBAR is creating a mechanism by which processors can respond to changes in local

demand and develop products that complement need. By developing microenterprises, INBAR is systematizing collection and processing, and creating an institutional structure that can receive and react to market information. Improved market linkages ensure appropriate pricing and valuation of the resource, resulting in greater interests in sustainable management of the raw material.

INBAR's activities acknowledge the importance of working with the government, either directly or indirectly. Because bamboo and rattan are primarily found in state forests, government cooperation is instrumental to facilitate sustainable management. Government collaboration is equally valued for policy reforms — in areas such as licensing, production, subsidy and tenure — that recognize the role and needs of small-scale participants in the bamboo and rattan sectors.

INBAR intends to guide worldwide expertise to focus on the issues constraining socio-economic development through the bamboo and rattan sectors. As a network, bringing together a plethora of diverse institutions and individuals, INBAR will continue to transfer information and technology and build local capacity at the grass-roots level, strengthening institutions and partnerships. Also, INBAR will bring its advanced knowledge on all aspects of bamboo and rattan to project implementation through consultancies. These development consultancies will link efforts of the network to project-specific action programs, enabling projects to apply the latest achievements of the network.

These conclusions have looked at how the general findings from the PCS studies are woven into INBAR's direction for the 21<sup>st</sup> century. It should be noted that specific approaches and activities will be country — and community-specific and depend on the degree of development of bamboo and rattan. For example, the Philippines may be more interested in strengthening associations rather than exploring trade policy reforms. In other areas, the development of markets for handicrafts is an important intervention. To this extent, the PCS studies provide more detailed information on a variety of interventions that should be considered in a variety of cases. As INBAR implements its socio-economic initiatives now and in the future, these studies and others like it provide a foundation for understanding the opportunities for effective and sustainable development of rural communities through bamboo and rattan.

## 4 REFERENCES

- Astana, S; Nasendi, B.D. 1998. Wild rattan in Sulawesi: a case study of the production-to-consumption systems. INBAR Working Paper No. 11. International Network for Bamboo and Rattan, Beijing, China. 29 pp.
- Belcher, B.M. 1995. Bamboo and rattan production-to-consumption systems: a framework for assessing development options. INBAR Working Paper No. 4. International Network for Bamboo and Rattan, New Delhi, India. 12 pp.
- Belcher, B. 1998. Bamboo and rattan sectors in Asia: an assessment of research and investment opportunities. INBAR Working Paper No. 22. International Network for Bamboo and Rattan, Beijing, China. (Under print).
- Dwiprabowo, H.; Irawanti, S.; Supriadi, R.; Nasendi, B.D. 1998. Rattan in Java, Indonesia: a case study of the production-to-consumption systems. INBAR Working Paper No. 13. International Network for Bamboo and Rattan, Beijing, China. 27 pp.
- ICFRE (Indian Council of Forestry Research and Education). 1998. Natural forest-based bamboo production-to-consumption system: a case study from Central India. INBAR Working Paper No. 20. International Network for Bamboo and Rattan, Beijing, China. 69 pp.
- Karki, M.B.; Sherchan, G.R.; Karki, J.B.S. 1998. Extensive bamboo production-to-consumption systems in Eastern Nepal: a case study. INBAR Working Paper No. 17. International Network for Bamboo and Rattan, Beijing, China. 41 pp.
- Mathew, P.M. 1998. The bamboo economy of Kerala, India: an analysis of the production-to-consumption systems. INBAR Working Paper No. 12. International Network for Bamboo and Rattan, Beijing, China. 68 pp.
- Nagi, K. 1998. The status of bamboo and bamboo craft in Karjat, India, and strategies for development. INBAR Working Paper No. 19. International Network for Bamboo and Rattan, Beijing, China. 39 pp.
- Pabuayon, I.M.; Rivera, M.N.; Espanto, L.H. 1998. The Philippine rattan sector: a case study of the production-to-consumption systems. INBAR Working Paper No. 14. International Network for Bamboo and Rattan, Beijing, China. 60 pp.
- Purnama, B.M.; Prahasto, H.; Nasendi, B.D. 1998. Rattan in East and South Kalimantan, Indonesia: a case study of the production-to-consumption systems. INBAR Working Paper No. 21. International Network for Bamboo and Rattan, Beijing, China. 24 pp.
- Srivastava, P.B.L. 1998. Management and utilization of bamboo and rattan in Papua New Guinea. INBAR Working Paper No. 18. International Network for Bamboo and Rattan, Beijing, China. 35 pp.
- Zhenh Maogong; Xie Chen; Zheng Wei; Fu Maoyi; Xie Jinzhong. 1998. Bamboo in Anji: a case study of an intensive production-to-consumption system. INBAR Working Paper No. 15. International Network for Bamboo and Rattan, Beijing, China. 47 pp.